CAR 2023

Advancing Imaging Care Through Innovation

April 27-30 avril 2023
Montréal, QC

PROGRAMME

Canadian Association of Radiologists
L'Association canadienne des radiologistes

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The Canadian Association of Radiologists Annual Scientific Meeting (ASM) provides collaborative learning opportunities to enhance radiologists' knowledge and competencies in diagnostic and therapeutic medical imaging to help deliver optimal quality healthcare for patients and the Canadian public at large.

Accreditation and Designation Statements

CAR 2023 Annual Scientific Meeting is an Accredited Group Learning Activity (Section 1) as defined by the Maintenance of Certification (MOC) Program of the Royal College of Physicians and Surgeons of Canada and approved by the Canadian Association of Radiologists. The CAR 2023 scientific program is approved for **18 credit hours**.

Participants in the **CAR Trainee Day** are eligible to claim a maximum of **5 hours** under **Section 1 (Group Learning Activity)** of the MOC Program of the Royal College. These credits are in addition to the CAR 2023 scientific program that is approved for a maximum of 18 credit hours (Section 1).

This event also features an Accredited Workshop. Participants are eligible to claim a maximum of **6 hours** (credits are automatically calculated), under **Section 3 (Simulation Based Activity)** of the MOC Program of the Royal College.

We're also featuring an Accredited Self-Assessment Program (SAP) component with a session series. Participants completing the pre and post test are eligible to claim **1 hour** (credits are calculated automatically), under **Section 3 (SAP)** of the MOC Program of the Royal College.

Participants should only claim the credits commensurate with the extent of their participation in the activity.

AMA Accreditation Statement

Through an agreement between the Royal College and the American Medical Association, physicians may convert Royal College MOC credits to AMA PRA Category 1 Credits™. Information on the process to convert Royal College MOC credits to AMA credits can be found at https://edhub.ama-assn.org/pages/applications.

UEMS-EACCME Accreditation Statement

Live educational activities recognized by the Royal College as Accredited Group Learning Activities (Section 1) are deemed by the European Union of Medical Specialists (UEMS) eligible for ECMEC.

Accredited Symposium

SURPRISE!!! Incidental Findings in Lung Cancer Screening

Join our guest speakers for this **lunch session** which brings together radiology and respirology to discuss incidental findings that can occur when screening for lung cancer. This program was co-developed with Boehringer Ingelheim and was planned to achieve scientific integrity, objectivity, and balance. This Accredited Symposium is approved for a maximum of **1 credit hour**, under Section 1 of the MOC Program of the Royal College (separate certificate).

Certificate of Attendance

Following the event, participating radiologists will be able to access and complete their certificate of attendance at car-asm.ca.

Participants can document their learning in the Royal College's MAINPORT at https://rclogin.royalcollege.ca/oamlogin/login.jsp.

LEARNING OBJECTIVES

After attending CAR 2023, participants will be able to:

1. Identify and implement practical strategies to improve patient management as part of a multidisciplinary team.
   CanMEDS roles: Collaborator, Communicator, Leader, Professional
2. Recognize, identify, and avoid common misinterpretation and blind spots in each of the following subspecialties: neuroradiology, interventional radiology, musculoskeletal, breast and chest imaging.
   CanMEDS roles: Professional, Scholar, Health Advocate
3. Discuss the differential diagnoses of common pathologies in a selection of multimodality, multidisciplinary cases.
   CanMEDS roles: Medical Expert, Scholar, Health Advocate
4. Adopt an evidence-based approach to common radiologic findings to enable the formulation of an appropriate differential diagnosis.
   CanMEDS roles: Medical Expert, Scholar
5. Discuss characteristic appearances and distinguishing imaging features in each of the following subspecialties: musculoskeletal, breast, neuroradiology, cardiothoracic, abdominal (GI/GU), and pediatric.
   CanMEDS roles: Medical Expert
6. Evaluate the use and application of advanced imaging techniques *for various clinical scenarios*
   CanMEDS roles: Medical Expert

Presentations

Unless otherwise indicated under individual sessions, each presentation is scheduled for approximately 20 minutes. A designated Q&A section has been allotted at the end of each series for speakers to answer questions from the audience. Don't be shy! Microphones will be placed throughout the room to accommodate even the quietest of speakers. Every session has been designed as an educational offering to advance practitioners' professional development and the profession.

Abstracts (Electronic Posters)

All abstract electronic posters are featured in the Whova app, in the 'Posters' section, under 'Additional Resources'. Participants are encouraged to view the electronic posters during the breaks and lunch and throughout the ASM. Reading electronic posters is a Self-learning Activity, under Section 2 of the MOC Program of the Royal College and is eligible for a maximum of **1 credit per electronic poster**.

Disclaimer

No responsibility is assumed by the CAR for any injury and/or damage to persons or property as a matter of product liability, negligence or otherwise, or from any use or operations of any methods, products, instructions, or ideas contained in materials distributed or described during presentations throughout CAR 2023. Because of rapid advances in the medical sciences, in particular independent verification of diagnoses and drug dosages should be made.

Although all advertising material available on the CAR 2023 event app is expected to conform to ethical (medical) standards, inclusion in this event does not constitute a guarantee or endorsement of the quality or value of such product or of the claims made of it by its manufacturer and representatives.

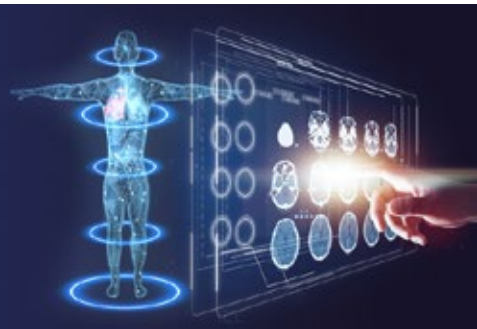
Disclosure of Conflict of Interest

The CAR has a formal policy regarding the need for authors and presenters to inform CAR attendees of any Conflict of Interest (COI). A COI includes, but is not limited to, employment, ownership of stock, membership on a standing advisory council or committee, or being on the board of directors or publicly associated with a company or its products. Other potential areas of real or perceived conflict of interest could include receiving honoraria, consulting fees, or grants.

Session Evaluations

The CAR values your feedback! By completing evaluations for the individual sessions and overall ASM, you will have a direct impact on the quality of programming and ensure the CAR will continue to meet your educational needs. Click the icon in the session details to complete the session evaluations.

Annual Scientific Meeting Standing Committees | Comités permanent du congrès annuel scientifique



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Agenda
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- Workshop | Atelier
- Wellness Breaks | Pauses santé
- CAR & CRF AGMs | Assemblées générales de la CAR et de la FRC

CAR 2023 Agenda

Thursday, April 27

Visit the Scientific and Educational Electronic Posters – Available on the ASM App

07:00-16:00	**The Essentials of Musculoskeletal Ultrasound: A Hands-On Workshop**	
Virtual Trainee Day		
10:00-10:55	**The Potential of Competence by Design in Diagnostic Radiology Post-Graduate Medical Education: How to Get the Most from the Transition to Competency-Based Medical Education** *Adelle Atkinson, Helena Bentley, Linda Probyn, Karen Vats*	
10:55-11:00	Break	
11:00-13:30	**Pearls and Pitfalls from Head to Toe** *Moderator: Lindsay Cherpak*	
11:00-11:20	The Devil is in the Details – Little Known Cardiothoracic Imaging Findings to Not Miss *Stephanie Tan*	
11:20-11:40	Head and Neck Tumour Board Cases *Talia Vertinsky*	
11:40-12:00	You Are My Density *Suki Dhillon*	
12:00-12:10	Break	
12:10-12:30	Spine Tumor *Lindsay Cherpak*	
12:30-12:50	Overnight Genitourinary Ultrasound – Tips and Trick *Sarah Barrett*	
12:50-13:10	Introduction to Breast MRI: Tips and Tricks *Michelle Zhang*	
13:10-13:30	Primary Liver Malignancies *Ciara O'Brien*	
13:30-13:45	Break	
13:45-14:40	**A Day in the Life** *Moderator: Lindsay Cherpak* *Panelists: Stephanie Kenny, Stephany Pritchett, Jenny Jessup*	
14:40-14:45	Break	
14:45-15:45	**Junior Hot Seats** *Leads: Priscila Crivellaro and Maya Grisaru-Kacen*	**Senior Hot Seats** *Lead: Shrivuthsun Srigandan*
16:15-17:15	CAR Annual General Meeting	
17:15-17:30	Break	
17:30-18:30	**Photon-Counting CT in Musculoskeletal Radiology: Opportunities and Limitations** *Jan Fritz, introduction by Tanya Chawla*	
18:30-19:30	Welcome Reception	

Friday, April 28

Visit the Scientific and Educational Electronic Posters – Available on the ASM App

07:30-08:30	Breakfast		
08:30-10:15	**An AI Fireside Chat with the Experts** *Moderator: Arun Krishnaraj*	**Multi-Disciplinary Approaches to MSK Patient Management** *Moderator: Natalia Gorelik*	**Scientific Research Project Competition Presentations** *Moderators: Amrit Bamrah, Julia Niles*
	Sheela Agarwal *Christopher Austin* *Mark Cicero* *Dan Zikovitz*	Red Flags in Musculoskeletal Tumors: When and How to Refer. The Quebec's Sarcoma Network Experience *Sophie Mottard*	*Judges:* *Daria Manos* *Jai Shankar* *Vivek Virmani*
		Limb Alignment in Patellofemoral Maltracking *Mitchell Bernstein*	
		MRI of the Hand – Case Based Review *Véronique Freire*	
		MRI of the Hip Labrum *Kawan Rakhra*	
		Case-Based MRI of the Elbow *Jan Fritz*	
		Q&A	
10:15-10:30	Break		
10:30-12:00	**Diffuse/Interstitial Lung Disease** *Moderator: Kristin Greenlaw*	**Topics in Neuroradiology** *Moderator: Lindsay Cherpak*	**Radiologist-in-Training Research Project Competition Presentations** *Moderators: Amrit Bamrah, Julia Niles*
	Progressive Fibrotic ILD: What it Means for Radiology *Cameron Hague*	Imaging Spectrum of CNS Vasculitis *Laurent Letourneau-Guillon*	*Judges:* *Silvia Chang* *Andreu Costa* *Nicolas Murray*
	Making Sense of the 2020 Hypersensitivity Guidelines – Practical Clues for the Radiologist *Micheal McInnis*	MRI Perfusion: Pearls and Pitfalls in Brain Tumor Imaging *Paula Alcaide Leon*	
	Smoking and Vaping Lung Changes: What You Need to Know *Elsie Nguyen*	CTA Head and Neck: What the Community Radiologist Needs to Know! *Yingming Amy Chen*	
	Q&A	Q&A	
12:00-13:00	Lunch and Visit the Electronic Posters		
12:00-13:00	**Accredited Symposium: SURPRISE!!! Incidental Findings in Lung Cancer Screening** *Deborah Assayag, Cameron Hague, Carmela Pepe*		

Friday, April 28 (continued)

13:00-14:30	**Lung Cancer** *Moderator: Felipe Torres*	**Topics in Emergency and Trauma Imaging** *Moderator: Adnan Sheikh*	**Value of Radiology Project Competition Presentations** *Moderators: Amrit Bamrah, Julia Niles*
	Lung Cancer Survivorship *Jana Taylor*	Acute Cholecystitis: Not Always an Easy Diagnosis *Jorge Soto*	*Judges:* *Andreu Costa* *Ramy El-Jalbout* *Charlotte Yong-Hing*
	Locally Advanced Non Small Cell Lung Cancer (NSCLC), Imaging and Management Options *Hamid Bayanati*	Inflammatory Bowel Disease: An Emergency Radiology Perspective *Prasaanthan Gopee-Ramanan*	
		Troubleshooting the Problematic Appendix *Satheesh Krishna*	
	Panel Discussion: Lung Cancer – Multi-Disciplinary Discussion on Challenging Cases *Moderator: Jana Taylor* *Participants:* *Jeremy Erasmus* *Christian Sirois* *Felipe Torres* *Linda Ofiara*	Lung Trauma: What to Look For *Robert Moreland*	
		Cervical Spine Injuries: What Not to Miss *Thomas Ong*	
		Q&A	
14:30-14:45	Break and Visit the Electronic Posters		
14:45-16:15	**Current Topics in Breast Imaging and the Importance of IV Contrast** *Moderator: Jean Seely*	**Advanced Topics in Emergency and Trauma Imaging** *Moderator: Adnan Sheikh*	**Departmental Clinical Audit Project Competition Presentations** *Moderators: Amrit Bamrah, Julia Niles*
	The Risks and Consequences of Breast Tissue Density *Paula Gordon*	Whole Body CT in Trauma *Nicolas Murray*	*Judges:* *Lindsay Cherpak* *Suki Dhillon* *Matthew McInnes*
	Fundamentals of Preoperative Breast MRI *Mary Beth Bissell*	Dual-Energy CT Evaluation: Non-traumatic Abdominal Pain *Sarah Barrett*	
	Contrast Enhanced Mammography: The BC Cancer Vancouver Experience *Charlotte Yong-Hing and Zina Kellow*	Breast Emergencies: What the Radiologist Needs to Know *Raman Verma*	
	Q&A	Cardiac Trauma *Sadia Qamar*	
		Stroke Imaging: Recent Advances *Gregory Ratcliffe*	
		Q&A	
16:15-16:30	Break		
16:30-17:15	**Imaging the Chest Post Radiation Treatment: What the Books Don't Tell You** *Jeremy Erasmus, introduction by Daria Manos*		
17:30-19:00	Vendor Cocktail		
19:00-21:00	Radiologist-in-Training Reception		

Saturday, April 29

Visit the Scientific and Educational Electronic Posters – Available on the ASM App

07:30-08:30	Breakfast		
08:30-09:15	**Pitfalls in CT Imaging of Abdomino-Pelvic Trauma** *Jorge Soto, introduction by Savvas Nicolaou*		
09:15-09:30	Break		
09:30-10:30	**Management of Incidental Findings: CAR Guidelines Update** *Moderator: Iain Kirkpatrick*	**Contrast** *Moderator: Andreu Costa*	**Invited Sessions** *Moderator: Angus Hartery*
	Pancreatic Cysts: Recommendations and Management in the 21st Century *Chris Fung*	Optimizing Dosing and Delivery of Iodinated Contrast Media for Abdominal CT *Andreu Costa*	Radiation Protection Officer: Duties and Responsibilities *David Koff*
	Incidental Intraosseous Musculoskeletal Findings on Cross Sectional Imaging *Gordon Boyd*	Contrast Associated AKI: CAR Guidelines Applied in 2023 *Blair Macdonald*	SFR Rising Star Fast and Full Free-Breathing CMR: Are We There Yet? *Benjamin Longère*
	Incidental Marrow Findings *Gina Di Primio*	Management of Allergic Reactions to IV Radiocontrast Media *Anne Ellis*	Q&A
	Q&A	Q&A	
10:30-10:45	Break		
10:45-12:15	**Abdominal Lesions and Masses** *Moderator: Silvia Chang*	**Imaging Pediatric Trauma** *Moderator: Heather Bray*	
	Retroperitoneal Masses: Narrowing the Differential Diagnosis *Silvia Chang*	Safety Practices: Pediatric CT *Nina Stein*	
	How I Do It: Classification of Solid and Cystic Liver Lesions in Non-cirrhotic Patients *An Tang*	Pediatric Cervical Spine Trauma *Makabongwe Tshuma*	
	Update on Adrenal Imaging *Jorge Abreu Gomez*	Pediatric Traumatic Brain Injury *Claudia Martinez-Rios*	
	An Imaging Approach to Splenic Lesions *Valerie Keough*		
	Q&A	Q&A	
12:15-13:15	Lunch and Visit the Electronic Posters		

Saturday, April 29 (continued)

13:15-14:45	**Hot Topics in Abdominal Imaging** *Moderator: Gavin Sugrue*	**Neonatal Ultrasound** *Moderator: Heather Bray*	**Innovation in Community Interventional Radiology: How, When and Why?** *Moderator: Jeff Jaskolka*
	ADPKD – What's New? *Satheesh Krishna*	US of the Spine in Neonates and Young Infants *Srirupa Desai*	Interventional Radiology Workforce Shortages in Small and Rural Practices: The Report of the SIR/ACR Joint Task Force *Gilles Soulez*
	CT Protocol Optimization: Bowel, Liver and Pancreas *Iain Kirkpatrick*	Neonatal Bowel Ultrasound *Samantha Gerrie*	Interventional Tips and Tricks for the Non-Interventionalist *Véronique Caty*
	Abbreviated Body MRI Protocols *Sharon Clarke*		Advanced Peripheral Arterial Intervention in the Community *Jeff Jaskolka*
	Potential Roles for Oral Contrast in Modern CT Imaging: A Summary of the Evidence *Signy Holmes*	3D Ultrasound and Artificial Intelligence in Hip Dyslpasia *Jessica Knight*	Interventional Oncology in the Community: Breast Cryoablation *Ryan Margau*
	Utility of Dual Energy CT in the Post-Operative Setting *Gavin Sugrue*		Lessons Learned Starting a Fibroid Embolization Program in the Community *Brooke Cairns*
	Q&A	Q&A	Panel Discussion
14:45-15:00	Break and Visit the Electronic Posters		
15:00-16:30	**Multidisciplinary Approaches to Abdominal Imaging (Crohn's)** *Moderator: Tanya Chawla*	**Hidden and Overlooked Cancers** *Moderator: Gavin Sugrue*	
	The Patient Perspective *Jennifer Loschiavo*	Imaging of Melanoma *Khaled Elbanna*	
	What Does a Gastroenterologist Want From a Radiologist in an IBD Report *Vivian Huang*	Imaging of Toxicities of Immunotherapy *Atul Shinagare*	
	What Does a Surgeon Need to Know? *Anthony DeBuck van Overstraeten*	Imaging in Multiple Myeloma *Muhammad Umer Nasir*	
	Cross Sectional Imaging in Crohn's Disease *Tanya Chawla*	Lymphoma for Radiologists *Maura Brown*	
	Panel Discussion	Panel Discussion	
16:30-16:45	Break		
16:45-17:30	**Treatment-Induced Neurotoxicity** *Carlos Torres, introduction by Tanya Chawla*		
17:30-18:00	CAR Awards Reception		
18:00-19:00	CAR Awards Ceremony		

Sunday, April 30

Visit the Scientific and Educational Electronic Posters – Available on the ASM App

08:00-08:30	Breakfast
08:30-09:15	**Abbreviated Breast MRI – State of the Field** *Yiming Gao (AIRP), introduction by Tanya Chawla*
09:15-09:30	Break
09:30-11:45	**Mistakes We All Make** *Moderator: Prasaanthan Gopee-Ramanan*
	Neuroimaging Misses/Misinterpretations – Case Examples and Tips *Mandeep Ghuman*
	The Many Faces of Pulmonary Adenocarcinoma *Amna Al-Arnawoot*
	Sharing Is Caring: Understanding How Peer Learning Can Move Us From Individual Mistakes to Meaningful Practice Improvement *Yoan Kagoma*
	Optimizing Safety in Interventional Radiology: How to Prevent Mistakes and Avoid Catastrophe *Patrick Kennedy*
	MSK imaging *Santhosh Reddy*
	Tomosynthesis Mistakes *Yiming Gao*
	Q&A
11:45-11:50	**Closing Remarks** *Tanya Chawla*

CAR 2023

The Essentials of Musculoskeletal Ultrasound: A Hands-on Workshop

Le Westin Montreal • April 27, 2023 • 07:00-16:00

This one-day hands-on workshop will feature didactic lectures and small group, comprehensive dedicated training focused on the most important practical aspects of musculoskeletal ultrasound (MSK US). Designed for practicing radiologists, this workshop is structured to simulate real-case reporting. Short high-impact didactic reviews will be followed by training opportunities on MSK US utilization and techniques of the upper and lower extremities.

Participants will cycle through five rotations, with two ultrasound machines in each room. With a faculty-to-participant ratio of ten participants to 2-3 faculty, participants will benefit from individualized instructor feedback, small group discussions, expert feedback, and plenty of time for hands-on practice. Each rotation will include a brief didactic lecture, scanning demonstrations followed by opportunities for participants to practice on **live models** and interact with faculty from across the country.

Workshop Learning Objectives

Following active participation in this simulation workshop, participants should be able to:

- Describe musculoskeletal anatomy and the biomechanics of musculoskeletal ultrasound
- Demonstrate comprehensive skills for performing musculoskeletal examinations
- Apply techniques to perform transducer positions to improve musculoskeletal ultrasound skills

Register at car-asm.ca

Target Audience

This workshop is designed for general radiologists, radiologists-in-training and sonographers involved in protocolling, imaging and assessment of musculoskeletal injuries.

Agenda

TIME	TOPIC
07:00-07:40	Breakfast
07:40-07:45	**Introduction** *Adnan Sheikh, MD*
07:45-08:55	**Rotation 1** Shoulder / Wrist / Ankle / Elbow / Hip
08:55-09:10	Break
09:10-10:20	**Rotation 2** Wrist / Ankle / Elbow / Hip / Shoulder
10:20-10:35	Break
10:35- 11:45	**Rotation 3** Ankle / Elbow / Hip / Shoulder / Wrist
11:45-13:15	Lunch
13:15-14:25	**Rotation 4** Elbow / Hip / Shoulder / Wrist / Ankle
14:25-14:40	Break
14:40-15:50	**Rotation 5** Hip / Shoulder / Wrist / Ankle / Elbow
15:50-16:00	**End of Day Wrap-up and Closing Remarks**

SURPRISE!!!
Incidental Findings in Lung Cancer Screening

ACCREDITED SYMPOSIUM
Friday, April 28, 2023 • 12:00 – 13:00

Cameron Hague MD, FRCPC
Cardiothoracic and Body Radiologist, St. Paul's Hospital
Program Director, Diagnostic Radiology Residency
University of British Columbia

Dr. Deborah Assayag MD,
MAS - Respirologist who specializes in ILD
Scientist, RI-MUHC, Montreal General Hospital
Translational Research in Respiratory Diseases Program
Centre for Outcomes Research and Evaluation
Assistant Professor, Department of Medicine, Faculty of Medicine and Health Sciences, McGill University
Department of Medicine, Division of Respiratory Medicine, MUHC

Dr. Carmela Pepe, MD
Assistant Professor, Oncology and Medicine
Gerald Bronfman Department of Oncology, McGill University

Session Overview

This session brings together radiology and respirology to discuss incidental findings that can occur when screening for lung cancer.

This 1-hour interactive session will review a series of cases and discuss the diagnosis, the differences and how radiology and respirology should work together to manage these patients post diagnosis. Three different specialities will provide their perspective on how they would approach these cases in the real world. The goal is to provide the participants with practical real life pearls ensuring the best outcomes for patients and access to appropriate treatment post diagnosis. The 50-minute multidisciplinary case review will be followed by a 10-minute question and answer segment with the audience.

Needs Assessment

This session was developed following a review of objective data including practice data, consultation with experts in the field, survey data detailing the perceived and unperceived needs of members as well as the experience and expertise of the scientific planning committee.

Target Audience

This session is designed for general and subspecialty radiologists as well as radiology residents and fellows whose work focuses on the imaging interpretation and reporting of lung cancer screening, involves interpreting images for the purposes of ILD diagnosis and follow-up assessment as part of their clinical practice.

Learning Objectives

By the end of this session, participants will be able to:

- Recognize the importance of the role of the radiologist in early screening and the diagnosis of lung disease
- Systematically evaluate HRCT for the identification and characterization of both lung cancer and pulmonary fibrosis, including progression
- Describe the next steps that follow a radiological diagnosis
- Consider the importance of a multidisciplinary discussion

This program was co-developed with Boehringer Ingelheim and was planned to achieve scientific integrity, objectivity and balance.

Boehringer Ingelheim

This event is an Accredited Group Learning (Section 1) as defined by the Maintenance of Certification (MOC) program of the Royal College of Physicians ad Surgeons of Canada and approved by the Canadian Association of Radiologists. Physicians may claim a maximum of 1 hour.

Presentations
Présentations

THURSDAY, APRIL 27, 2023

07:00 – 16:00

The Essentials of Musculoskeletal Ultrasound: A Hands-On Workshop

HIP – Marcos Sampaio, Jane St Germain

SHOULDER – Viviane Khoury, Etienne Cardinal

WRIST – Hema Choudur, Mercedes Zaja

ANKLE – Adnan Sheikh, Hugue Ouellette, Sandra St Cyr

ELBOW – Luck Louis, Sukhvinder Dhillon, Cyrille Naim

Participants will cycle through five rotations, with two ultrasound machines in each room. With a faculty-to participant ratio of ten participants to 2-3 faculty, participants will benefit from individualized instructor feedback, small group discussions, expert feedback, and plenty of time for hands-on practice. Each rotation will include a brief didactic lecture, scanning demonstrations followed by opportunities for participants to practice on live models and interact with faculty from across the country.

Learning Objectives

Following active participation in this simulation workshop, participants should be able to:

- Describe musculoskeletal anatomy and the biomechanics of musculoskeletal ultrasound
- Demonstrate comprehensive skills for performing musculoskeletal examinations
- Apply techniques to perform transducer positions to improve musculoskeletal ultrasound skills

THURSDAY, APRIL 27, 2023

10:00 – 10:55

Virtual Trainee Day Plenary

The Potential of Competence by Design in Diagnostic Radiology Post-Graduate Medical Education: How to Get the Most from the Transition to Competency-Based Medical Education

Helena Bentley, Linda Probyn, Karan Vats, Adelle Atkinson

In this CAR ASM 2023 Trainee Day Plenary Presentation, speakers from the Royal College of Physicians and Surgeons of Canada (RCPSC), RCPSC Diagnostic Radiology Specialty Committee, and residents from across the country describe the potential of Competence by Design in diagnostic radiology post-graduate medical education and highlight key strategies for residents to get the most from the transition to Competency-Based Medical Education.

Learning Objectives

By the end of the session, participants should be able to:

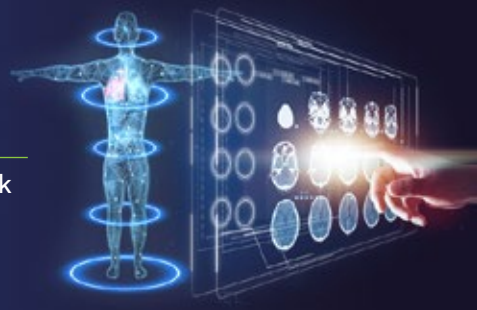
- Identify core components of Competence by Design and Competency-Based Medical Education
- Describe key benefits of the transition to Competence by Design for diagnostic radiology residents
- Apply key strategies outlined to harness the benefits of the transition to Competency-Based Medical Education
- Foster a positive culture of learning and assessment in the era of Competence by Design

THURSDAY, APRIL 27, 2023

11:00 – 13:30

Moderator: Lindsay Cherpak

Virtual Trainee Day: Pearls and Pitfalls from Head to Toe



The Devil is in the Details: Little Known Cardiothoracic Imaging Findings to Not Miss

Stephanie Tan

This review session for residents will focus on subtle cardiothoracic imaging findings that are often omitted and will demonstrate how these findings can significantly affect patient management. Each cardiothoracic pathologies presented will be reviewed while highlighting the main facts useful for practice.

Learning Objectives

By the end of the session, participants should be able to:

- Identify subtle cardiothoracic imaging findings
- Recommend proper patient management for cardiothoracic imaging findings while considering their potential clinical impact
- Optimize the reading checklist for chest radiographs and chest computed tomography

Head and Neck Tumour Board Cases

Talia Vertinsky

Illustrative cases are presented from the VGH ENT Rad/Path Tumour Board. These cases cover a range of core head and neck imaging topics.

Learning Objectives

By the end of the session, participants should be able to:

- Describe the anatomy of the pterygopalatine fossa
- Define concerning features of thyroid nodules
- Recognize the course of the recurrent laryngeal nerve

You Are My Density

Sukhvinder Dhillon

This will be a collection and review of increased density lesions seen on radiographic imaging.

Learning Objectives

By the end of the session, participants should be able to:

- Identify a range of increased density lesions seen on radiographic imaging
- Differentiate between a range of increased-density lesions seen on radiographic imaging

Spine Tumor

Lindsay Cherpak

Through a case-based approach we will discuss spine pathologies and imaging features relevant for discussion at spine tumor board conferences.

Learning Objectives
By the end of the session, participants should be able to:

- Review the normal appearance of spine bone marrow
- Recognize and describe clinically relevant features of spine tumors

Overnight Genitourinary Ultrasound – Tips and Tricks

Sarah Barrett

This presentation will review common indications to perform GU ultrasound overnight, including common errors and tips to avoid them.

Learning Objectives
By the end of the session, participants should be able to:

- Identify sonographic signs in testicular torsion and trauma
- Review errors in evaluation for possible ectopic pregnancy

Introduction to Breast MRI: Tips and Tricks

Michelle Zhang

Basic introduction to breast MRI for residents. Overview of the common indications for breast MRI, BIRADS MRI lexicon and how to use MRI as a complementary tool to other breast imaging modalities. Case review of the common pathologies seen on MRI with emphasis on pre-operative MRI and the use of MRI for breast implants.

Learning Objectives
By the end of the session, participants should be able to:

- Describe the indications and target populations for the usage of breast MRI
- Review BIRADS MRI lexicon and apply it to breast findings in daily practice
- Interpret different MRI findings, with emphasis on pre-operative MRI and breast implants

Primary Liver Malignancies

Ciara O'Brien

This session will feature a review of primary liver malignancies and their imaging features.

Learning Objectives
By the end of the session, participants should be able to:

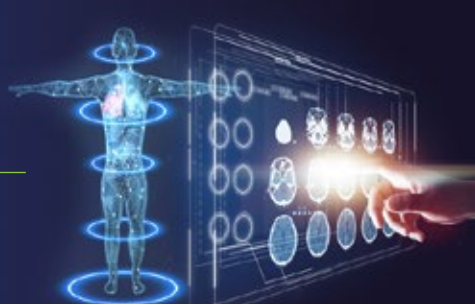
- Identify a malignant liver mass
- Review the CT and MRI features
- Compare and contrast the differing imaging appearances

THURSDAY, APRIL 27, 2023

13:45 – 14:40

Virtual Trainee Day: A Day in the Life

Moderator:
Lindsay Cherpak



Stephanie Kenny, Stephany Pritchett, Jenny Jessup

A panel discussion bringing together radiology professionals from different practice settings across Canada to share their expertise, experiences and provide insight into a career in radiology.

Learning Objectives
By the end of the session, participants should be able to:

- Describe the different experiences and career paths of Canadian radiologists
- To compare experiences working in an academic hospital, community hospital and independent clinic

THURSDAY, APRIL 27, 2023

14:45 – 15:45

Virtual Trainee Day: Junior Hot Seats

Priscila Crivellaro, Maya Grisaru-Kacen

The presentation will cover 10-15 cases of common pathologies seen in radiology, allowing junior residents (PGY 1-2-3) to describe, identify and provide a differential diagnosis of common pathologies. In addition, cases in different modalities will be brought, such as CT, US, X-ray, Mammography and Fluoroscopy. A short discussion with teaching points will be presented following each case.

Learning Objectives
By the end of the session, participants should be able to:

- Recognize and identify common pathologies in each of the following subspecialties: neuroradiology, musculoskeletal, abdominal (GI/GU), breast and chest imaging
- Discuss the differential diagnosis of common pathologies
- Discuss characteristic appearances and identify case presentations in radiology

THURSDAY, APRIL 27, 2023

14:45 PM – 15:45 PM

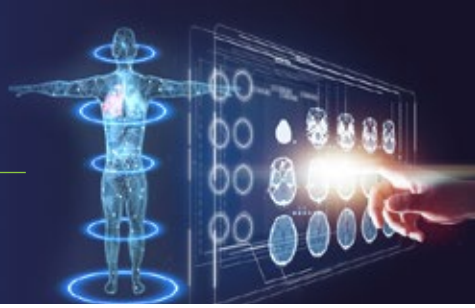
Virtual Trainee Day: Senior Hot Seats

Shrivuthsun Srigandan

The presentation will cover 10-15 cases of common pathologies seen in radiology, allowing senior residents (PGY 3-4-5) to describe, identify and provide a differential diagnosis of common pathologies. In addition, cases in different modalities will be brought, such as CT, US, X-ray, Mammography and Fluoroscopy. A short discussion with teaching points will be presented following each case.

Learning Objectives
By the end of the session, participants should be able to:

- Recognize and identify common pathologies in each of the following subspecialties: neuroradiology, musculoskeletal, abdominal (GI/GU), breast and chest imaging
- Discuss the differential diagnosis of common pathologies
- Discuss characteristic appearances and identify case presentations in radiology



Photon-Counting CT in Musculoskeletal Radiology: Opportunities and Limitations

Jan Fritz

This lecture will cover the latest research and development in photon-counting CT technology for musculoskeletal radiology, including ongoing studies and clinical trials. It will discuss the potential advantages and limitations of this technology, such as improved image quality and reduced radiation dose, as well as its potential impact on patient care. Attendees will gain insights into the current state of photon-counting CT technology and its potential applications in musculoskeletal imaging.

Learning Objectives

By the end of the session, participants should be able to:

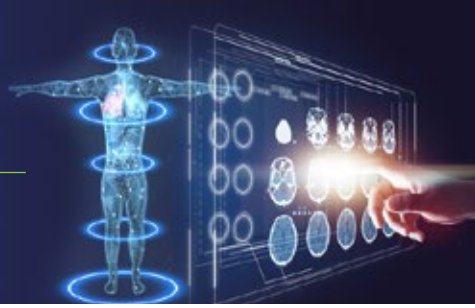
- Recognize the fundamental principles and technical aspects of photon-counting CT technology in musculoskeletal radiology, including the differences between photon-counting CT and conventional CT systems
- Evaluate the potential advantages and limitations of photon-counting CT in musculoskeletal radiology, including improved image quality, reduced radiation dose, and potential applications for bone and joint imaging
- Identify the current state of research and development in photon-counting CT technology, including ongoing studies and clinical trials, and the potential impact of this technology on musculoskeletal imaging and patient care

FRIDAY, APRIL 28, 2023

08:30 – 10:15

Moderator: Arun Krishnaraj

An AI Fireside Chat with the Experts



Sheela Agarwal, Christopher Austin, Mark Cicero, Dan Zikovitz

Is artificial intelligence (AI) an existential threat to the future of radiologists? Is AI the greatest advance in imaging since the invention of CT? Untangling truth from outrageous claims is challenging enough in our everyday lives; however, this task becomes even more difficult when grappling with the rapidly evolving intersection of AI and imaging. By bringing together experts from industry and academics, our session will demystify the "ghost in the machine" and help attendees better understand how AI could help radiologists become more productive, more patient centered, and possibly even happier.

Learning Objectives

By the end of this session, participants should be able to:

- Discuss the practical, legal, and ethical challenges that AI poses in radiology practice
- Identify strategies and opportunities for AI integration
- Debate advances in artificial intelligence and its impact on the medical imaging landscape

FRIDAY, APRIL 28, 2023

8:30 – 10:15

Moderator: Natalia Gorelik

Multi-Disciplinary Approaches to MSK Patient Management

This series of sessions includes 6 sub sessions, a Q&A section and a pre/post test, eligible for Section 3 Self-Assessment Program MOC credit. Participants must complete both the pre and post test to qualify for the additional MOC credit.

Red Flags in Musculoskeletal Tumors: When and How to Refer. Quebec's Sarcoma Network Experience

Sophie Mottard

This presentation will focus on the challenges of investigating and properly referring patients affected by a musculoskeletal tumor. Several cases will be presented to illustrate the importance of radiological guidance for general practitioners and specialists. The Prospective cohort study which led to the creation of Quebec's Sarcoma network and its investigation algorithms will be explained.

Learning Objectives

By the end of the session, participants should be able to:

- Recognize red flags which requires urgent referral to ortho-onco teams (CANOOS) while encouraging local referrals in orthopedic/plastic teams when metastatic process suspected
- Provide guidance for additional investigation to general practitioners when a musculoskeletal tumor is suspected
- Recognize the importance of decreasing delays to improve outcome and survival in sarcoma patients

Limb Alignment in Patellofemoral Maltracking

Mitchell Bernstein

Effective treatment for patellofemoral instability depends on proper clinical and radiographic diagnostic evaluations. The causes are multifactorial and complex. The presentation will elucidate some of these and implicate the radiographic evaluation in its etiology and treatment.

Learning Objectives
By the end of the session, participants should be able to:

- Describe the clinical and radiographic evaluation of axial malalignment
- Describe gait lab metrics in patients with torsional malalignment
- Consider the lack of literature support for PF dysfunction and axial malalignment

MRI of the Hand – Case Based Review

Véronique Freire

Through a variety of cases, most frequent diagnoses involving the hand will be reviewed with discussion over the differential diagnosis.

Learning Objectives
By the end of the session, participants should be able to:

- Identify the most common tumor diagnosis involving the hand/finger
- Evaluate the extent of a traumatic injury involving the hand/finger
- Apply methods to increase quality of the MRI scan involving the hand/finger

MRI of the Hip Labrum

Kawan Rakhra

Labral pathology is the most common indication for hip MRI. Understanding the anatomy of the acetabular labrum is critical for implementing effective MRI protocols. Routine MRI, as well as indirect and direct MRI arthrographic techniques can be used for the diagnosis of common labral pathologies. Morphologic and signal based strategies can be used for detecting and characterizing labral tears. Knowledge of orthopaedic surgical techniques is essential for evaluating the post-operative labrum.

Learning Objectives
By the end of the session, participants should be able to:

- Describe the anatomy and function of the hip labrum
- Implement strategies for imaging the hip labrum
- Diagnose and characterize common pathologies of the hip labrum

Case-Based MRI of the Elbow

Jan Fritz

Progressive Fibrotic ILD: What it Means for Radiology

Cameron Hague

This presentation will provide attendees with an overview of the landmark trials which help define and determine treatment for PF ILD. Current terminology and background for PF-ILD will be reviewed. How to report and define progression of ILD and how to avoid pitfalls in determination of progression of ILD will be discussed.

Learning Objectives
By the end of the session, participants should be able to:

- Describe the basis for an imaging diagnosis of PF-ILD
- Identify and avoid imaging pitfalls when determining if an ILD is indeed progressive
- Describe the significance of landmark trials for PF-ILD and how they affect diagnosis and treatment decisions

Making Sense of the 2020 Hypersensitivity Guidelines – Practical Clues for the Radiologist

Micheal McInnis

New guidelines have been implemented in clinical practice for the diagnosis of hypersensitivity pneumonitis. This presentation will review the key components of these new guidelines that are most important for the radiologist in making an accurate diagnosis.

Learning Objectives
By the end of the session, participants should be able to:

- Summarize how interstitial lung disease protocol CT for hypersensitivity pneumonitis is performed
- Describe the major categories in the ATS Clinical Practice Guideline for the diagnosis of hypersensitivity pneumonitis
- Classify interstitial lung disease using ATS Clinical Practice Guideline for the diagnosis of hypersensitivity pneumonitis

Smoking and Vaping Lung Changes: What You Need to Know

Elsie Nguyen

This presentation will highlight the imaging findings and natural history of lung injury as a response to smoking and vaping.

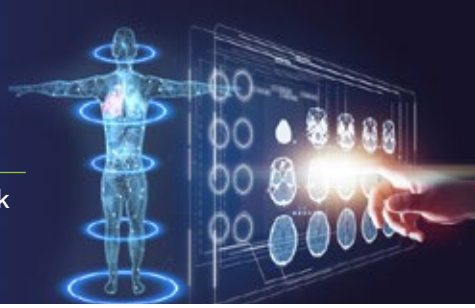
Learning Objectives
By the end of the session, participants should be able to:

- Describe the common imaging findings of lung injury as a response to smoking and vaping
- Describe the natural history of the lung parenchymal changes

10:30 – 12:00

Moderator: Lindsay Cherpak

Topics in Neuroradiology



Imaging Spectrum of CNS Vasculitis

Laurent Letourneau-Guillon

This presentation will focus on imaging presentation and differential diagnosis of CNS vasculitis.

Learning Objectives

By the end of the session, participants should be able to:

- Review the pathophysiology and clinical presentations of CNS vasculitis
- Review the imaging modalities and radiological presentations of CNS vasculitis
- Highlight important differential considerations when evaluating potential CNS vasculitis cases

MRI Perfusion: Pearls and Pitfalls in Brain Tumor Imaging

Paula Alcaide Leon

In this presentation I will discuss the advantages and disadvantages of the different types of MR perfusion. I will describe the basic physics of the most commonly used MR perfusion technique (DSC-MR) as well as common pitfalls in MR perfusion interpretation. I will review the different indications of MR perfusion in the context of patients with brain masses and show multiple cases where perfusion was critical for diagnosis and management.

Learning Objectives

By the end of the session, participants should be able to:

- Describe the basic physics of MR perfusion and apply this knowledge to recognize technical errors and avoid pitfalls in the interpretation
- Select the most adequate MR perfusion technique for each clinical scenario
- Interpret MR perfusion accurately in the context of patients with brain masses

CTA Head and Neck: What the Community Radiologist Needs to Know!

Yingming Amy Chen

Case-based review of do-not-miss pathologies in the interpretation of CTA head and neck in a general community practice.

Learning Objectives

By the end of the session, participants should be able to:

- Identify common pitfalls in the interpretation of CTA head and neck
- Identify appropriate indications for CTA use in the acute setting
- Identify do-not-miss pathologies on CTA head and neck

Lung Cancer Survivorship

Jana Taylor

With the advent of widespread screening for lung cancer and improved treatment options, the number of lung cancer survivors in the population is steadily increasing. This population remains at risk of developing local recurrence and second primary lung cancers. This presentation will review the risks faced by this patient population and the current guidelines on best practices for follow up as well as knowledge gaps that need to be addressed.

Learning Objectives
By the end of the session, participants should be able to:

- Define lung cancer survivorship and how this population will potentially be impacted by lung cancer screening
- Recognize the timing and incidence of local recurrence and second primary malignancies in this population
- Assess the current follow up recommendations for lung cancer survivors and the existing knowledge gaps for this population

Locally Advanced Non-Small Cell Lung Cancer (NSCLC), Imaging and Management Options

Hamid Bayanati

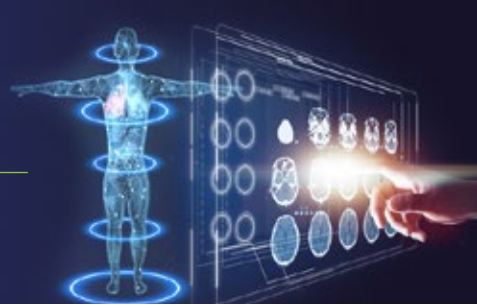
Approximately 30% of the patients with NSCLC have locally advanced NSCLC. Progress has been made and with newer targeted treatment and immunotherapy, in addition to conventional chemoradiation more options are now available to manage these patients. Join me on this talk for a brief review of imaging findings and multidisciplinary management of these patients.

Learning Objectives
By the end of the session, participants should be able to:

- Define locally advanced NSCLC based on TNM staging
- Report relevant findings that Thoracic surgeon needs to know
- Assess the rule and importance of multidisciplinary discussion in management of patients with advanced NSCLC

Panel Discussion: Lung Cancer – Multi-Disciplinary Discussion on Challenging Cases

Jeremy Erasmus, Linda Ofiara, Christian Sirois, Felipe Torres



Acute Cholecystitis: Not Always an Easy Diagnosis

Jorge Soto

Inflammatory Bowel Disease: An Emergency Radiology Perspective

Prasaanthan Gopee-Ramanan

This talk will review the role of modality-specific protocols in patients with suspected or known IBD in the emergency setting. We will highlight pearls and pitfalls in most common IBD complications in the emergency setting. Finally, we will review the role of the radiologist in providing management guidance for IBD patients in the emergent setting.

Learning Objectives
By the end of the session, participants should be able to:

- Use the correct modality and protocol exams for emergent IBD patients
- Identify highlights of the SAR lexicon for CT and MRI diagnosis and descriptions for IBD findings and major complications
- Recognize the importance of reporting and the key management impact radiologists have in assisting emergency physicians and specialists in further managing the patient following imaging

Troubleshooting the Problematic Appendix

Satheesh Krishna

Suspected appendicitis is the most common cause of ED presentations for acute abdomen. However, often, the diagnosis is not straightforward and atypical or equivocal cases result in management dilemma. The lecture provides an approach to management and avoiding these pitfalls.

Learning Objectives
By the end of the session, participants should be able to:

- Appraise evidence on ideal imaging modality for appendicitis
- Identify atypical presentations of appendicitis and mimickers of appendicitis
- Formulate an approach to equivocal appendicitis on CT

Lung Trauma: What to Look For

Robert Moreland

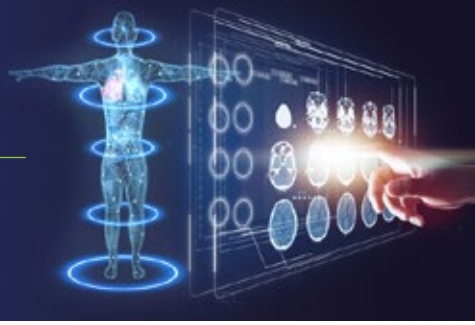
Cervical Spine Injuries: What Not to Miss

Thomas Ong

Cervical spine injuries are a common presentation at the Emergency Department. This presentation provides a review of the anatomy of the cervical spine and discusses various osseous and ligamentous injuries encountered in the context of trauma, as well as pertinent imaging findings to be reported by the radiologist interpreting cross sectional imaging.

Learning Objectives
By the end of the session, participants should be able to:

- Identify the major ligaments providing stability in the cervical spine which can be injured in the context of trauma and which can be seen on CT scan and MRI
- Recognize the various types of cervical spine fractures and describe pertinent imaging findings
- Recognize and describe subtle pertinent secondary imaging findings encountered on cross sectional imaging



FRIDAY, APRIL 28, 2023

14:45 – 16:15 Moderator: Jean Seely

Current Topics in Breast Imaging and the Importance of IV Contrast

The Risks and Consequences of Breast Tissue Density

Paula Gordon

A woman's breast density is an important piece of health information and should be shared directly with her, as well as her physician/primary care provider in every mammogram report. There are two significant risks of having dense breasts: 1) Cancer may be masked in normal dense tissue on a mammogram. This leads to an increased risk of an interval cancer.2) Women with dense breasts are at increased risk of developing breast cancer.

Learning Objectives
By the end of the session, participants should be able to:

- Consider the importance of and risks associated with dense breasts
- Recognize how breast density is determined, and its frequency
- Identify strategies to reduce the risk of an interval in women with dense breasts

Fundamentals of Preoperative Breast MRI

Mary Beth Bissell

This talk will review the current literature supporting the use of preoperative breast MRI and cover basic principles of performing and interpreting these examinations. Cases will be used to highlight key principles in staging including focality and extent of disease, contralateral findings, and axillary lymph node assessment.

Learning Objectives
By the end of the session, participants should be able to:

- Describe the current recommendations regarding the use of preoperative breast MRI
- Identify the anatomy relevant to assessing extent of disease and axillary lymph node stations
- Described the key findings in staging breast MRI and understand their relevance to surgical management

Contrast Enhanced Mammography: The BC Cancer Vancouver Experience

Zina Kellow, Charlotte Yong-Hing

Using case examples, this session will provide an overview of the Contrast Enhanced Mammography at BC Cancer Vancouver, with a focus on the rationale, the initial steps, the barriers as well as its success.

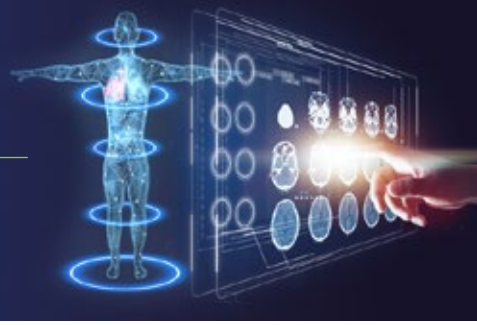
Learning Objectives
By the end of the session, participants should be able to:

- Describe the basics of contrast enhanced mammography (CEM)
- Identify the possible barriers to implementation of CEM
- Recognize the utility of CEM by way of illustrative diagnostic workups

14:45 – 16:15

Moderator: Adnan Sheikh

Advanced Topics in Emergency and Trauma Imaging



Whole Body CT in Trauma

Nicolas Murray

The purpose is to provide an update on the use of whole-body CT in trauma, from indications to acquisitions, supported by the current literature.

Learning Objectives
By the end of the session, participants should be able to:

- Review the indications of whole-body CT in trauma
- Review the various acquisition protocols, highlighting their strengths and weaknesses

Dual-Energy CT Evaluation: Non-traumatic Abdominal Pain

Sarah Barrett

This presentation will review the practical use of dual-energy CT to evaluate abdominal pain in the emergency setting.

Learning Objectives
By the end of the session, participants should be able to:

- Identify advantages of DECT over conventional single energy CT
- Discuss the implementation of DECT protocols in the ER setting

Breast Emergencies: What the Radiologist Needs to Know

Raman Verma

Using a multi-modality, case-based and algorithmic approach, this session will highlight key acute presentations related to breast imaging and touch on imaging pearls and pitfalls in order to allow the radiologist to effectively manage the presenting complaints.

Learning Objectives
By the end of the session, participants should be able to:

- Recognize the imaging features of common breast emergencies
- Describe the management of the acutely ill patient presenting with a breast abnormality
- Identify management strategies to distinguish acutely presenting breast emergencies from underlying malignancy

Cardiac Trauma

Sadia Qamar

Cardiac trauma is second most important cause of fatal traumatic injuries. Non-specific signs and symptoms in blunt cardiac trauma warrants high index of clinical suspicion in an appropriate traumatic context. Penetrating cardiac injuries though clinically obvious tend to deteriorate drastically and can present with delayed complications. Motion free images are crucial for accurate diagnosis of cardiac traumatic injuries.

Learning Objectives
By the end of the session, participants should be able to:

- Develop an imaging approach for identifying blunt and penetrating cardiac traumatic injuries
- Describe the spectrum of imaging findings in blunt and penetrating cardiac traumatic injuries

Stroke Imaging: Recent Advances

Gregory Ratcliffe

Stroke is a common disease with significant contribution to morbidity worldwide. Imaging plays an important and increasing role in the work up of stroke and in patient selection for therapeutic intervention, which is crucial for decreasing morbidity. This presentation will describe the imaging approach to stroke depending on the time of patient presentation from symptom onset as well as the pertinent findings which will influence treatment in each category.

Learning Objectives
By the end of the session, participants should be able to:

- Describe the imaging approach to stroke with patient symptom onset within 6 hours
- Recognize the imaging approach to stroke with patient symptom onset between 6 and 24 hours including the use of CT perfusion
- Differentiate the imaging approach to stroke with patient symptom onset greater than 24 hours

FRIDAY, APRIL 28, 2023

16:30 – 17:15
Plenary Lecture

Imaging the Chest Post Radiation Treatment: What the Books Don't Tell You

Jeremy Erasmus

Radiation therapy using conventional fractionated external-beam or high-precision dose techniques is important in the treatment of lung cancer. Knowledge of the radiation technique used, radiation treatment plan, expected temporal evolution of radiation-induced lung injury (RILI) and patient-specific parameters (concurrent chemoradiotherapy, immunotherapy etc.), is important in imaging interpretation. This talk discusses factors affecting the development and severity of RILI and its radiologic manifestations with emphasis on the differences between conventional radiation and high-precision dose radiotherapy techniques.

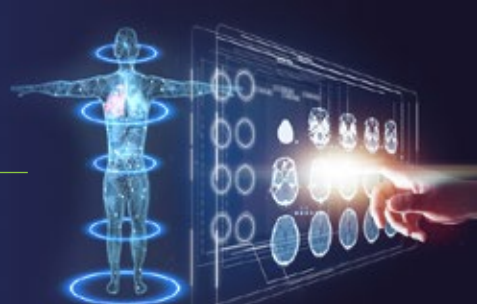
Learning Objectives
By the end of the session, participants should be able to:

- Identify imaging manifestations and temporal evolution of lung injury when conventional external beam radiation as well as newer radiation techniques such as SBRT and IMRT are used to treat thoracic malignancies and access resources to assist in filling in areas where a gap in knowledge or skill has been identified
- Diagnose manifestations of tumor recurrence in the radiated lung and identify the gap between current and desired skill/competency

SATURDAY, APRIL 29, 2023

8:30 – 9:15

Plenary Lecture



Pitfalls in CT Imaging of Abdomino-Pelvic Trauma

Jorge Soto

SATURDAY, APRIL 29, 2023

9:30 – 10:30

Management of Incidental Findings: CAR Guidelines Update

Moderator: Iain Kirkpatrick

Pancreatic Cysts: Recommendations and Management in the 21st Century

Christopher Fung

A review and comparison of pancreatic cyst management recommendations. Key imaging features, evidence behind recommendations, and cases will be covered.

Learning Objectives

By the end of the session, participants should be able to:

- Differentiate when, and when not, to work up incidental pancreatic cysts
- Integrate imaging findings into a holistic patient care pathway

Incidental Intraosseous Musculoskeletal Findings on Cross Sectional Imaging

Gordon Boyd

This presentation will cover incidentally-discovered osseous lesions on MR and CT, are a common diagnostic dilemma, with a frequency of up to 10%. The objective is to accurately categorize lesions into those that can be ignored, versus those that require further work up.

Learning Objectives

By the end of the session, participants should be able to:

- Differentiate between innocuous intraosseous lesions and those that require follow up
- Identify intraosseous lesions that have a pathognomonic imaging appearance

Incidental Marrow Findings

Gina Di Primio

The CAR Incidental Findings Working Group initiated a paper on MSK findings in 2021. This presentation, based on the recommendations from that paper, will focus on the Incidental MSK findings found on MRI and how to characterize, manage or dismiss incidental findings.

Learning Objectives

By the end of the session, participants should be able to:

- Identify findings that will allow differentiation of a clearly benign and dismissible lesion in bone on MRI
- Apply methods or techniques on a finding seen in body MRI that will allow further characterization of a clearly benign or dismissible lesion and those that require further assessment
- Access resources that can be used to help characterize incidental findings on MRI

9:30 – 10:30
Contrast

Moderator: Andreu Costa

Optimizing Dosing and Delivery of Iodinated Contrast Media for Abdominal CT

Andreu Costa

This image-rich presentation will focus on important considerations with respect to dosing and deliver of iodinated contrast for abdominal CT protocols. Optimal timing and a weight-based dosing scheme for multiphasic HPB CT protocols will be emphasized. Diagnostic pitfalls relating to suboptimal dosing will be presented.

Learning Objectives
By the end of the session, participants should be able to:

- Discuss adequate iodinated contrast media dosing and phase timing for abdominal CT protocols
- Avoid pitfalls relating to interpreting abdominal CTs with suboptimal contrast media dosing or phase timing

Contrast Associated AKI: CAR Guidelines Applied in 2023

Blair Macdonald

The risks of clinically significant kidney injury following intravenous administration of modern (LOSM) iodinated contrast media have been significantly overstated. This is due to conflation of Contrast Associated-Acute Kidney Injury (CA-AKI) and Contrast Induced-Acute Kidney Injury (CI-AKI). The result is that patients with reduced kidney function may be deprived of important enhanced CT exams resulting in delayed diagnosis or misdiagnosis (suboptimal staging, treatment planning). Radiology and nephrology literature is evolving about the true risk of low osmolar iodinated contrast media (ICM). Inconsistent or confusing recommendations by radiologists and nephrologists in clinical practice leads to delays and reduced patient and provider satisfaction from system friction. The goal is to standardize the care of patients with kidney disease who have indications for enhanced CT scans.

Learning Objectives
By the end of the session, participants should be able to:

- Recognize that CT contrast (ICM) by IV route has a very low risk of inducing kidney injury when eGFR greater than 30l
- Describe the goals of the simplified (CAR 2022) screening tool
- Compare the benefits of contrast and increased access to optimal tests, to the risks of AKI
- Recognize that eGFR Screening for emergent conditions (stroke, PE, sepsis, free air) may be inappropriate

Management of Allergic Reactions to IV Radiocontrast Media

Anne Ellis

This session will bring the audience up to date with respect to the best new evidence for the management of patients who have experienced allergic reactions to radiocontrast media in the past. Specifically we will address the role (or lack of!) for corticosteroids and other pre-treatment prophylactic procedures.

Learning Objectives
By the end of the session, participants should be able to:

- Describe optimal strategies for the management of a patient with a previous reaction to radiocontrast media
- Discuss how pretreatment regimens have evolved and are in fact now actually optional

Radiation Protection Officer: Duties and Responsibilities

David Koff

Congratulations, you have been appointed Radiation Protection Officer for the Department of Medical Imaging! But, what does it mean, what is your role and responsibilities? This lecture will help you to identify the task you are going into and what knowledge and expertise you need to fulfill the job.

Learning Objectives
By the end of the session, participants should be able to:

- Identify the duties and responsibilities of the Radiation Protection Officer
- Identify the gaps between current and desired knowledge as it relates to radiation protection
- Access resources to fill the gap in knowledge

SFR Rising Star

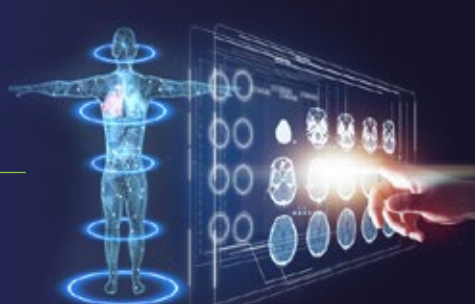
Fast Full Free-Breathing CMR: Are We There Yet?

Benjamin Longère

Cardiovascular magnetic resonance (CMR) is the gold standard for myocardial assessment, but it can be time-consuming and difficult to perform, especially in cases of shortness of breath or arrhythmia, which are common in patients with heart disease. Newer real-time acquisition techniques can facilitate acquisition by avoiding breath-holding.

Learning Objectives
By the end of the session, participants should be able to:

- Describe the potential of using compressed sensing cine as an acquisition technique for the reliable assessment of ventricular functional parameters
- Discuss how compressed sensing cine prototype improves image quality without compromising circumferential strain assessment



Retroperitoneal Masses: Narrowing the Differential Diagnosis

Silvia Chang

Primary retroperitoneal masses are masses within the retroperitoneum that do not arise from a retroperitoneal organ. They represent a varied group of neoplastic and non-neoplastic entities. Retroperitoneal masses can be solid or cystic. Although they are uncommon masses, the majority of them are malignant. Their overlapping imaging appearances can cause a diagnostic challenge. Familiarity with imaging features along with relevant clinical information can help narrow the differential diagnosis.

Learning Objectives

By the end of the session, participants should be able to:

- Describe the anatomy of the retroperitoneum including the compartments and structures within them
- Use imaging signs to determine whether a mass is in the retroperitoneum or not and distinguish if it is arising from a retroperitoneal organ or not (primary retroperitoneal mass)
- Use imaging features to narrow the differential diagnosis of primary retroperitoneal masses

How I Do It: Classification of Solid and Cystic Liver Lesions in Non-cirrhotic Patients

An Tang

Ultrasound (US), contrast-enhanced computed tomography (CT) and magnetic resonance imaging (MRI) are frequently used for the non-invasive diagnosis of cystic and solid liver lesions. This case-based presentation will provide an approach to classification of: 1) simple cystic lesions, 2) complex cystic lesions, 3) solid benign lesions, and 4) solid malignant lesions that occur in non-fibrotic or non-cirrhotic livers. We will review the demographics, key imaging and enhancement features that help classify these lesions US, CT, and MRI. We will then present a selection of representative cases to illustrate a diagnostic approach.

Learning Objectives

By the end of the session, participants should be able to:

- Describe demographics, imaging, and enhancement features of cystic and solid liver lesions
- Explain the approach to classification of cystic and solid liver lesions
- Recognize key differences between differential diagnoses

Update on Adrenal Imaging

Jorge Abreu Gomez

This presentation describes the current status of imaging in the diagnosis of adrenal conditions including CT and MRI. The utility of imaging as a problem solving tool and the value of radiologists in the adrenal multidisciplinary approach.

Learning Objectives

By the end of the session, participants should be able to:

- Review the imaging workup of the most common adrenal conditions as well as incidental findings
- Highlight the value of imaging as a problem-solving tool in the assessment of adrenal disorders
- Recognize the value of the radiologist in the multidisciplinary assessment of the patient with adrenal disease

An Imaging Approach to Splenic Lesions

Valerie Keough

The detection of benign and malignant splenic lesions has grown due to increasing imaging utilization. Establishing the diagnosis can be challenging due to lack of accompanying clinical and laboratory data, rarity of some pathologies and overlapping imaging features. This presentation provides a multimodality imaging approach to splenic lesions, with pathologic and clinical correlation, to help aid in the formulation of a clinically relevant differential diagnosis.

Learning Objectives
By the end of the session, participants should be able to:

- Outline the pathology of splenic lesions and how this determines the imaging features
- Formulate a relevant differential diagnosis of splenic lesions, based on their composition, number and clinical presentation

SATURDAY, APRIL 29, 2023

10:45 – 12:15 Moderator: Heather Bray

Imaging Pediatric Trauma

Safety Practices: Pediatric CT

Nina Stein

Review of basic concepts of radiation and risks associated with medical radiation exposure and tools to build safe CT pediatric protocols

Learning Objectives
By the end of the session, participants should be able to:

- Review of basic concepts in radiation safety and medical exposure
- Review of CT parameters needed to adjust pediatric imaging acquisition protocols and doses

Pediatric Cervical Spine Trauma

Makabongwe Tshuma

A brief overview of pediatric cervical spine trauma through clinical case examples. Exploring challenges faced in younger patients and how to best image the pediatric cervical spine.

Learning Objectives
By the end of the session, participants should be able to:

- Recognize the common patterns of pediatric c-spine traumatic injury
- Identify best contextual imaging approach for the pediatric c-spine

Pediatric Traumatic Brain Injury

Claudia Martinez-Rios

Traumatic brain injury is a significant cause of morbi-mortality in children. Children have age-dependent characteristics of the developing brain that makes them more susceptible to trauma, resulting in a wide range of specific imaging patterns. Awareness of the main pediatric brain injuries from accidental and non-accidental injury will allow an improved diagnosis and guide appropriate prompt management.

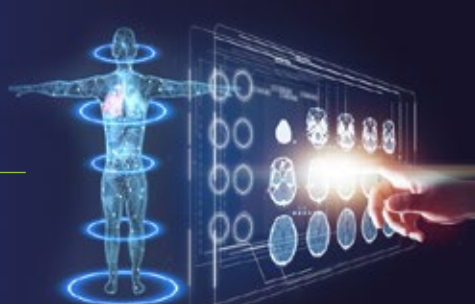
Learning Objectives
By the end of the session, participants should be able to:

- Describe the particularities in the pediatric head that predisposes to traumatic brain injury
- Discuss the mechanisms of injury of head trauma including accidental and non-accidental trauma
- Explain the use of CT and MRI in traumatic brain injury and imaging findings of frequent primary and secondary brain injuries

13:15 – 14:45

Moderator: Gavin Sugrue

Hot Topics in Abdominal Imaging



ADPKD – What's New?

Satheesh Krishna

Autosomal dominant polycystic kidney disease (ADPKD) is a spectrum of disease severity based on genetic and morphologic features, and radiologists play an important role in establishing the diagnosis by using US criteria, predicting future renal function decline, and identifying complications of ADPKD.

Learning Objectives
By the end of the session, participants should be able to:

- Identify the role of the radiologists in predicting renal function decline in patients with ADPKD
- Apply the correct diagnostic criteria in at-risk individuals for early detection of ADPKD

CT Protocol Optimization: Bowel, Liver and Pancreas

Iain Kirkpatrick

This session will cover ways in which radiologists can improve image quality and diagnostic yield by optimizing their scan protocols for examinations of the bowel, liver and pancreas. Protocols which will be covered include CT for mesenteric ischemia and Crohn's disease, GI bleed CT, and multiphasic hepatic and pancreatic CT. The use of dual energy and low kV scanning will be discussed and ideal contrast injection protocols will be reviewed.

Learning Objectives
By the end of the session, participants should be able to:

- Explain basic principles of iodinated contrast enhancement and how to adjust contrast volumes and flow rates to improve image quality
- Describe the potential advantages and disadvantages of low kV scanning and dual-energy CT acquisition
- Select scan timing that is optimized for imaging the bowel, pancreas and liver

Abbreviated Body MRI Protocols

Sharon Clarke

Abbreviated MR protocols for prostate cancer detection, pancreatic cystic lesion follow up and hepatocellular carcinoma surveillance will be presented and discussed.

Learning Objectives
By the end of the session, participants should be able to:

- Describe the rationale for abbreviated body MRI protocols
- Describe the advantages and disadvantages of the abbreviated protocols compared to standard protocols

Potential Roles for Oral Contrast in Modern CT Imaging: A Summary of the Evidence

Signy Holmes

Positive oral contrast played a key role in delineation of bowel before the advent of volumetric imaging, but its role in modern imaging is less clear, with wide variation in current practice. In this evidence-based review the current roles of neutral and positive oral contrast will be summarized.

Learning Objectives
By the end of the session, participants should be able to:

- Review advantages and limitations to positive and neutral oral contrast and their potential formulations
- Summarize the evidence for and against oral contrast in a range of clinical scenarios

Utility of Dual Energy CT in the Post-Operative Setting

Gavin Sugrue

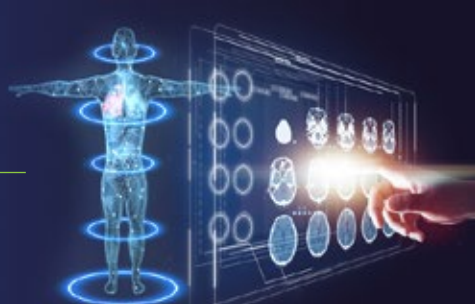
This session will provide a practical case-based overview of the added value DECT provides in the post-operative setting, with a focus on the anatomical leaks, fistula assessment, visceral perforation, vascular injury and recurrent disease.

Learning Objectives
By the end of the session, participants should be able to:

- Review basic principles of DECT
- Summarize commonly encountered post-operative findings that DECT adds value.
- Pearls and pitfall with interpretation of DECT

13:15 – 14:45 Moderator: Heather Bray

Neonatal Ultrasound



US of the Spine in Neonates and Young Infants

Srirupa Desai

This presentation covers common Indications for performing an US spine, technique, the normal US spine exam, normal variants frequently overcalled as abnormal, and examples of abnormal examinations.

Learning Objectives
By the end of the session, participants should be able to:

- Call a normal US spine exam normal, including describing commonly seen normal variants
- Suggest appropriate referral and/or follow up in abnormal US spine exams

Neonatal Bowel Ultrasound

Samantha Gerrie

Neonatal bowel ultrasound with a focus on necrotizing enterocolitis and malrotation with midgut volvulus.

Learning Objectives
By the end of the session, participants should be able to:

- Discuss the sonographic features of necrotizing enterocolitis
- Recognize how ultrasound can be useful in the assessment and management of necrotizing enterocolitis
- Discuss the sonographic features of malrotation with midgut volvulus

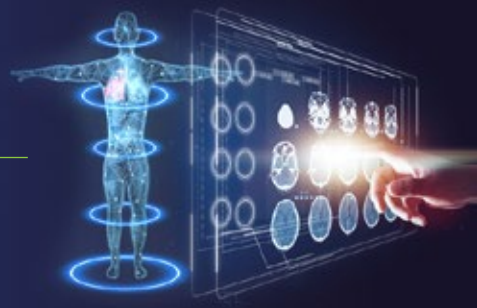
3D Ultrasound and Artificial Intelligence in Hip Dysplasia

Jessica Knight

If developmental dysplasia of the hip (DDH) is not diagnosed and treated early in infancy, it can lead to serious complications later in life. Ultrasound is an excellent test for DHH, but due to a lack of skilled readers it cannot be used for population level screening. Artificial intelligence has made it possible to automate hip ultrasound image interpretation, which could make population screening possible in the future.

Learning Objectives
By the end of the session, participants should be able to:

- Recognize the limitations of conventional 2D hip ultrasound for dysplasia
- Identify advances in image acquisition and analysis that have potential to improve hip dysplasia ultrasound screening



SATURDAY, APRIL 29, 2023

13:15 – 14:45

Moderator: Jeff Jaskolka

Innovation in Community Interventional Radiology: How, When and Why?

Interventional Radiology Workforce Shortages in Small and Rural Practices: The Report of the SIR/ACR Joint Task Force

Gilles Soulez

Radiology practices characterized as small and rural are challenged to recruit and retain interventional radiologists. Lack of access to interventional radiologic services results in a failure to meet the needs of patients, hospitals, and other community stakeholders. Acknowledging this challenge, the ACR's Commission on General, Small, Emergency and/or Rural Practice and Commission on Interventional and Cardiovascular Imaging and the Society of Interventional Radiology partnered to establish a joint task force to study this issue and identify strategies the ACR and the Society of Interventional Radiology should take to improve small and rural practice recruitment and retention of interventional radiologists.

Learning Objectives

By the end of the session, participants should be able to:

- Recognize the challenge of providing access to interventional radiology procedures in small and medium size hospitals and potential impact on the continuum of care
- Identify the different level of procedure complexity and how diagnostic and interventional radiologists can collaborate to cover these procedures
- Discuss different business models to increase the coverage of interventional radiology in small and medium practices

Interventional Tips and Tricks for the Non-Interventionalist

Véronique Caty

Advanced Peripheral Arterial Intervention in the Community

Jeff Jaskolka

A short presentation on some of the amazing peripheral vascular interventions performed at our community hospital along with how and why we made it happen.

Learning Objectives

By the end of the session, participants should be able to:

- Describe several techniques for advanced peripheral vascular intervention and when to use them
- Explain the value to a community of providing complex interventions outside an academic centre
- Identify strategies for using a collaborative multidisciplinary approach to program building

Interventional Oncology in the Community: Breast Cryoablation

Ryan Margau

This presentation will focus on cryotherapy for breast cancer, outlining how the procedure works and how the ablation is accomplished. The indications and contraindications for breast cryoablation will be discussed, focussing on the importance of the multidisciplinary nature of breast cancer care, and the importance of interdisciplinary collaboration and tumor board review.

Learning Objectives
By the end of the session, participants should be able to:

- Describe when breast cryoablation may be indicated
- Describe why a successful breast cryotherapy program requires interdisciplinary collaboration and tumor board review

Lessons Learned Starting a Fibroid Embolization Program in the Community

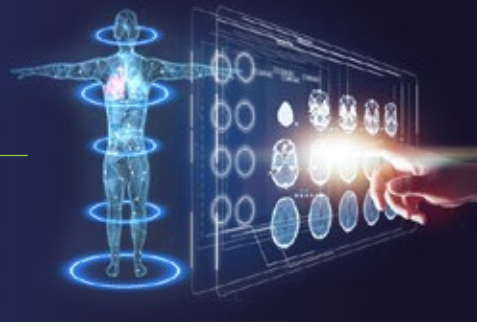
Brooke Cairns

This session will review some of the challenges, setbacks, hurdles, and ultimately successes in building our uterine fibroid embolization program in Kelowna “from scratch”.

Learning Objectives
By the end of the session, participants should be able to:

- Consider some of the barriers one might face in beginning to offer a new procedure in a community setting
- Identify some strategies that might be helpful in successfully expanding your practice

Panel Discussion



SATURDAY, APRIL 29, 2023

15:00 – 16:30

Moderator: Tanya Chawla

Multidisciplinary Approaches to Abdominal Imaging (Crohn's)

The Patient Perspective

Jennifer Loschiavo

What Does a Gastroenterologist Want from a Radiologist in an IBD Report?

Vivian Huang

Crohn's disease is a chronic inflammatory disease of the intestines that can affect any part of the digestive tract, and that can present in many phenotypes from inflammatory, fibrostenotic, and penetrating or fistulizing disease. Our aim in management of Crohn's is make the diagnosis early in the disease course, start treatment early in order to prevent or delay progression of disease that may lead to structural damage such as strictures, fistulas, or perforation. Patients may or may not have symptoms depending on their disease phenotype and behavior, and their disease may be out of reach of standard endoscopic procedures. Gastroenterologists rely tremendously on imaging to help make the diagnosis and appreciate the phenotype. We rely on the radiologist's assessment and comparison over time to help us determine response to therapy. In multidisciplinary care, we rely on the radiologist's assessment to help us gauge when to continue the medical approach and when to refer for a surgical opinion.

Learning Objectives

By the end of the session, participants should be able to:

- Identify the key components of an IBD imaging report that will help the ordering gastroenterologist make the diagnosis of IBD and phenotype of IBD
- Identify the key components of an IBD imaging report that gastroenterologists look for regarding response to therapy

What Does a Surgeon Need to Know?

Anthony DeBuck van Overstraeten

Learning Objectives

By the end of the session, participants should be able to:

- Discuss the findings that a surgeon needs to know from a radiology report in patients with Inflammatory Bowel Disease
- Discuss the surgical treatments available for the treatment of Inflammatory Bowel disease
- Discuss important radiological findings concerning postoperative complications

Cross Sectional Imaging in Crohn's Disease

Tanya Chawla

Cross-sectional imaging (specifically CTE and MRE) are integral to the diagnosis, monitoring and management of patients with Crohn's and drive much of the decision-making and triage (to medical or surgical management). Given that endoscopy is limited to the assessment of the mucosa and that much of the small bowel is beyond reach, imaging provides a global overview of both transmural disease and extra enteric manifestations. Providing a meaningful report is therefore essential irrespective of the modality employed.

Learning Objectives

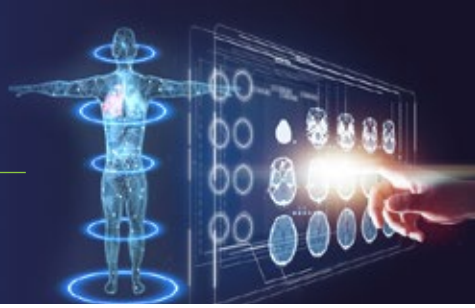
By the end of the session, participants should be able to:

- Discuss standard nomenclature when reporting CT and MR enterography
- Discuss the utility of scoring systems to evaluate disease activity and assess response to treatment in patients with Crohn's
- Discuss the role of imaging in the ongoing monitoring of patients with Crohn's as part of a multi -disciplinary approach to management

Panel Discussion

15:00 – 16:30 Moderator: Gavin Sugrue

Hidden and Overlooked Cancers



Imaging of Melanoma

Khaled Elbanna

This presentation will review and discuss the imaging modalities and radiologic manifestations of melanoma.

Learning Objectives
By the end of the session, participants should be able to:

- Discuss the different imaging modalities used in the diagnosis and staging of melanoma
- Recognize the radiologic manifestations of primary and metastatic melanoma

Imaging of Toxicities of Immunotherapy

Atul Shinagare

The presentation will review the principles of immune checkpoint blockade and its relevance in immune-related adverse events (irAEs). We will review the common irAEs seen on imaging, and understand their frequency, imaging features and clinical relevance. We will also review how some of the toxicities serve as biomarkers of response.

Learning Objectives
By the end of the session, participants should be able to:

- Describe the principles of immune checkpoint blockade
- Identify common toxicities of immune checkpoint inhibitors seen on imaging and recognize their frequency and clinical relevance

Imaging in Multiple Myeloma

Muhammad Umer Nasir

Learning Objectives
By the end of the session, participants should be able to:

- Describe the role of imaging in multiple myeloma
- Identify the use of various imaging modalities
- Assist oncologists in managing multiple myeloma

Lymphoma for Radiologists

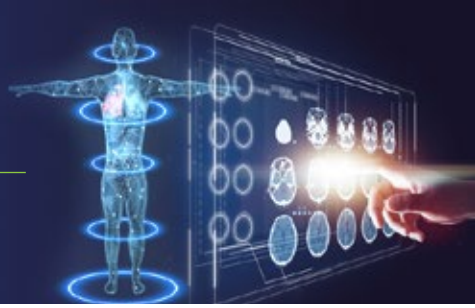
Maura Brown

Review the role of diagnostic imaging through the lymphoma patient "journey" including diagnosis/staging, mid-treatment response assessment, end of treatment response assessment and follow-up.

Learning Objectives
By the end of the session, participants should be able to:

- Review the basics of lymphoma staging and follow up
- Review the role of imaging at diagnosis, mid-treatment, end of treatment and follow up

Panel Discussion



Treatment-Induced Neurotoxicity

Carlos Torres

Treatment-induced CNS toxicity is a major cause of morbidity in cancer patients which can limit the course and type of treatment. Even though the CNS is relatively resistant to the toxic effects of cancer treatment by virtue of the blood-brain barrier, CSF and low proliferative rate of neurons, neurotoxicity is the second most common dose-limiting factor after myelosuppression. Neurotoxicity depends on a variety of factors that include: dose delivered, route of administration, interactions with other agents, and individual patient vulnerability. Neurotoxicity is a diagnosis of exclusion; imaging results in early recognition of adverse effects which may lead to dose adjustment or treatment discontinuation to prevent further injury. In this presentation, we will review the common and rare imaging CNS abnormalities that could be seen during or after treatment with chemotherapy, immunotherapy and radiotherapy.

Learning Objectives

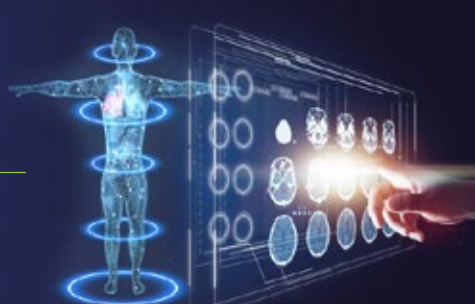
By the end of the session, participants should be able to:

- Discuss common and rare causes of treatment related neurotoxicity using a case-based approach
- Review CNS imaging abnormalities found during & after treatment with chemotherapy, immunotherapy and radiotherapy

SUNDAY, APRIL 30, 2023

08:30 – 9:15

Plenary Lecture



Abbreviated Breast MRI: State of the Field

Yiming Gao

Future directions in breast MRI aim not only to improve accuracy of breast cancer detection, but also to reduce barriers for wider adoption. Abbreviated breast MRI is an emerging technique rapidly gaining acceptance as a supplemental screening tool. In this session, we will review data on current ABMR adoption, application, and outcomes, consider challenges in clinical implementation and auditing, and share clinical experience in using ultrafast imaging in a hybrid abbreviated protocol.

Learning Objectives

By the end of the session, participants should be able to:

- Describe the clinical role of abbreviated breast MRI (ABMR)
- Explore the potential utility of ultrafast imaging in an ABMR protocol
- Discuss basic terminology and implications of early wash-in kinetics

SUNDAY, APRIL 30, 2023

09:30 – 11:45

Moderator: Prasaanthan Gopee-Ramanan

Mistakes We All Make

Neuroimaging Misses/Misinterpretations – Case Examples and Tips

Mandeep Ghuman

This session will review 5-6 case examples of actual missed or misinterpreted neuroimaging abnormalities, discuss the potential reasons behind the overlooks, and identify useful tips to minimize the errors.

Learning Objectives

By the end of the session, participants should be able to:

- Recognize the potential sites and associated pathologies where a potential abnormality can be overlooked or misinterpreted, particularly in early stage
- Develop an approach to minimize the errors
- Formulate an approach to incorporate anatomic location, clinical context, and previous imaging etc. for appropriate interpretation

The Many Faces of Pulmonary Adenocarcinoma

Amna Al-Arnawoot

A rapid review of commonly missed presentations of pulmonary adenocarcinoma.

Learning Objectives

By the end of the session, participants should be able to:

- Describe the spectrum of findings in pulmonary adenocarcinoma
- Identify an approach to execute next step in management

Sharing Is Caring: Understanding How Peer Learning Can Move Us from Individual Mistakes to Meaningful Practice Improvement

Yoan Kagoma

This presentation focuses on applying the new paradigm of peer learning to selected abdominal imaging cases. Peer learning is a collaborative approach to improvement that focuses on non-punitive error reporting. It seeks to improve diagnostic accuracy and patient care by determining root-causes for errors, sharing these findings, and developing systems-based solutions.

Learning Objectives
By the end of the session, participants should be able to:

- Describe the scope and the potential impacts of errors in abdominal imaging
- Review selected abdominal imaging cases that highlight the need for a blame-free culture of error reporting and sharing
- Explain how a peer learning program can result in opportunities for personal and practice-wide improvement and learning

Optimizing Safety in Interventional Radiology: How to Prevent Mistakes and Avoid Catastrophe

Patrick Kennedy

This session will review key measures for ensuring patient safety in the interventional radiology suite. The importance of proper infrastructure, equipment, and training for complex interventional procedures will be discussed. Case examples will be used to identify common procedural errors and discuss approaches for optimizing procedure outcomes.

Learning Objectives
By the end of the session, participants should be able to:

- Identify important measures for ensuring patient safety when performing image-guided procedures
- Apply leadership and professional skills in challenging clinical scenarios to optimize outcomes in the procedure room

MSK Imaging

Santhosh Reddy

Presentation will include case-based examples of some of the misses, misinterpretations, pitfalls in MSK imaging. Case examples to include mix of different modalities of imaging – radiographs, CT, MRI and ultrasound covering varied musculoskeletal pathologies. Discussion on some of the factors contributing to these errors and any strategies to minimize these errors in practice.

Learning Objectives
By the end of the session, participants should be able to:

- Recognize some common mistakes and pitfalls in MSK imaging across different imaging modalities
- Consider some of the factors contributing to these errors
- Apply this knowledge and strategies to minimize the incidence of such errors

Tomosynthesis Mistakes

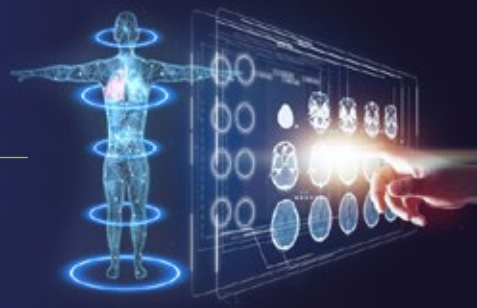
Yiming Gao

Digital Breast Tomosynthesis (DBT) is becoming the standard of care in mammography. We will discuss pearls and pitfalls in DBT interpretation through a case-based review.

Learning Objectives
By the end of the session, participants should be able to:

- Recognize strengths and limitations of DBT
- Describe appropriate management of DBT findings
- Discuss pearls and pitfalls in clinical practice using DBT

Oral Presentations and Posters
Présentations orales et résumés



FRIDAY APRIL 28, 2023

08:30 – 10:15

Scientific Research Project Competition Presentations

Moderators: Amrit Bamrah, Julia Niles

Judges: Daria Manos, Jai Shankar, Vivek Virmani

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Investigating the feasibility of using A.I. for population-level mammography image quality improvement initiatives at Leeds Teaching Hospitals NHS Trust

Nisha Sharma[1], Rosie Heathcote-Watson[1], Anne Nielsen Moody[1], Maggie Fletcher[1], Nicole Collier[2], Mohamed Abdolell[3]

[1]Leeds Teaching Hospital NHS Trust, [2]Densitas Inc., [3]Dalhousie University

PRESENTER'S LEVEL OF TRAINING: Other medical professional

OBJECTIVE: Poor image quality (IQ) lowers accuracy of mammography, increasing missed cancer rates and delaying diagnosis. Performing comprehensive positioning assessments during standard 8-minute exams is impractical and can increase patient anxiety and add a burden to the healthcare system. Further, with increasing workloads and understaffing challenges, BSP radiographers only self-review 40 self-selected exams monthly. Prior audits revealed ~50% of mammograms do not meet standards; ~80% of poor-quality images are due to positioning, and error rates range from less than 1% to nearly 40%. This study investigates the state of mammography IQ at Leeds Teaching Hospitals NHS Trust.

METHODS: A.I. (densitas®intelliMammo™) was used to assess positioning errors on mammograms acquired from December 2021 to March 2022. Error rates were assessed using means and time plots. Agreement between radiographers and A.I. was assessed using the Kappa statistic (100 CC and 100 MLO images).

RESULTS / DISCUSSION: There were 59264 studies processed during the study. Population-based error rates were relatively stable over the period assessed, ranging from 11% to 51%. The error rates aligned with clinical expectations and the published literature. Agreement between radiographers and A.I. ranged from Kappa=0.70 (95%CI: 0.502, 0.898) to 0.95 (95%CI: 0.756, 1.00).

CONCLUSION: A.I. provides reliable and reproducible IQ assessments, providing the opportunity to implement pragmatic population-wide continuous IQ improvement processes.

70

Magnetic resonance imaging characteristics of T2 hyperintense lesions of the breast and their association with malignancy: a retrospective cohort analysis

Mary Beth Bissell[1], Vivianne Freitas[2]

[1]University of Ottawa, Faculty of Medicine, Department of Radiology, Radiation Oncology and Medical Physics, [2]University of Toronto, Faculty of Medicine, Department of Medical Imaging

PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE: To determine the malignancy rate of T2 hyperintense lesions of the breast sampled under magnetic resonance imaging (MRI) guidance and to assess what additional clinical and MRI characteristics can be used to predict benign and malignant outcomes.

METHODS: We conducted a retrospective analysis of all MRI-guided breast biopsies at our institution over a two-year period (January 1, 2014-December 31, 2015), identifying all biopsies of T2 hyperintense lesions. Patient and lesion imaging characteristics were assessed for each biopsy and univariate and multivariate modelling was used to determine which factors predicted malignant outcomes.

RESULTS / DISCUSSION: 369 breast biopsies were reviewed (314 patients as 55 were dual site biopsies). Of these, 100 biopsies (27%) were performed for T2 hyperintense lesions. Final pathology results were benign for 80 (80%) of these lesions while 18 (18%) were malignant with 2 patients lost to follow-up. Using multivariate logistic modelling, patient age >50 (OR 5.99 (1.49,24.08 95%CI), $p<0.05$) and lesion size >3cm (OR 5.54 (1.54-18.7), $p<0.01$) were found to be important predictors of malignant outcomes in MRI biopsies performed for T2 hyperintense lesions.

CONCLUSION: T2 intensity is an MRI characteristic often thought to infer benignity in breast imaging, however almost twenty percent of biopsies performed for these lesions in our study yielded a malignant diagnosis. We therefore conclude that T2 intensity should not preclude tissue sampling; the decision to pursue tissue diagnosis should be made based on additional imaging and clinical factors of which the most important appear to be older age and greater lesion size.

80

The effectiveness of an optimized ultrasound protocol to confirm central venous catheter placement in the preterm infant

Reem Amer[1], Katya Rozovsky[2], Yasser Elsayed[3], Martin Bunge[2], Chiu Aaron[3]

[1]Department of Pediatrics, McMaster University, Hamilton, ON, Canada, [2]Department of Radiology, Children's Hospital of Winnipeg, University of Manitoba, [3]Department of Pediatrics and Child Health, Children's Hospital of Winnipeg, University of Manitoba

PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE: To validate the accuracy of optimized ultrasound (US) protocol in locating the central catheter position in preterm neonates.

METHODS: Premature babies less than or equal to 30 weeks gestation who had peripheral central lines or surgical lines inserted in 2 tertiary NICUs were eligible for enrollment. Confirmation of line position by chest radiograph were compared to images obtained through a specific US protocol technique for the upper limbs (UL) and lower limbs (LL). The operator of US exam was blinded to the radiographic findings. All images were reviewed by 2 radiologists who were blinded to the chest radiographs findings.

RESULTS / DISCUSSION: 35 central line placements were assessed in 33 premature infants. 22 lines were inserted in the UL, and 13 were inserted in the LL with a total of 91 ultrasound scans and chest radiographs. The position of the line was interpreted as normal in 79 scans (86.8%) and abnormal in 12 scans (13.2%) with interpreter reliability of =0.778 ($p<0.001$), sensitivity of 0.83 (95% CI: 0.52, 0.98) and specificity 0.96 (95% CI: 0.89, 0.99), positive predictive value of 0.77 (95% CI: 0.46, 0.95) and negative predictive value of 0.97 (95% CI: 0.91, 1.00). There was no significant difference between the ultrasound interpretation and the x-ray interpretation. The time required for US was 4.07 seconds shorter than time required for radiographs ($p<0.001$; 95% CI: 3.53, 4.61).

CONCLUSION: The optimized ultrasound protocol is a reliable tool for assessing the central line position in preterm neonates, and could potentially replace radiographs in NICU.

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Endovascular treatment of Pelvic Congestion Syndrome PSC in 267 women, long-term results, and analysis of prognostic factors

Ahmed Bentridi[4], Saskia Hazout[1], Farouk Tradi[2], Amina Hadjadji[1], Eric Therasse[3], Patrick Gilbert[3], Marie France Giroux[3], Gilles Soulez[3]

[1]UDEM, [2]Hôpital La TIMONE Marseille, [3]CHUM, [4]Hôpital Sacré Coeur

PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: To evaluate the long term efficacity and satisfactory of patients who have undergone endovascular treatment for PSC using sequential approach with sclerotherapy and mechanical occlusion

METHODS: Monocentric retrospective study including 246 patients embolized for SCP between 2003 and 2021 coupled with cross-sectional data collection.

All adult females who have undergone procedures exclusively in our center are included in the retrospective study, the patients with arteriovenous malformation and postphlebitic syndrome were excluded. Demographic data, the embolization details and follow-up results are extracted from medical file, the evaluation of clinical outcomes is based on the doctor's assessment. For cross-sectional data collection, patients consenting to participate in the study are requested to complete a questionnaire submitted to them based on Brief Pain Inventory and SF 12.

The primary efficacy outcome is the Overall perception of treatment efficacy

RESULTS / DISCUSSION: From 246 women, 192 are retrospectively analyzed (54 lost at follow-up), average age is 42 years, with average of 2,09 pregnancy, 20% of patients had previous treatment for legs varices, the main clinical complain is pelvic pain in 79%, lower limb pain 55%, post-coital dyspareunia 49%.

A total of 505 procedure was performed with average number of 2,09 procedures per patient. Usually, the ovarian veins are embolized in first session 88% , the branches of internal iliac vein in second session 73%, using foam of Sodium Tetradecyl Sulfate (STS) 94%, coils 66% and plugs 53% with technical success of 96%. Recanalization of ovarian veins occurred in 5%. Less than 3% of mild complication reported.

For the primary efficacy outcome, the average improvement using values from the last clinical follow-up visits is 69% (significant improvement >50%), 80% of patients get significant improvement. The average improvement is 65% after the first embolization and 71% from the second one.

Regarding the prospective evaluation 37 patients has completed the questionary since March 2022, 82% of patients are satisfied after single embolization and 85% with multiples sessions

CONCLUSION: The endovascular treatment of PSC is effective and safe with more than 80% of long-term improvement. Best results are reported in sequential treatment with more than one session of embolization, the preliminary results of ongoing prospective evaluation are consistent with.

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3D CT Quantification of Visceral Adipose Tissue in Crohn's Disease: An Imaging Biomarker for Structuring Disease?

Alwyn le Roux[1], Edwin Cheng[1], Ryan Rosentreter[2], Hua Shen[3], Deepak Bhayana[1], Alexandra Medellin[1], Cathy Lu[2]

[1]Division of Diagnostic Imaging, Department of Radiology, University of Calgary, [2]Division of Gastroenterology and Hepatology, Department of Medicine, University of Calgary, [3]Department of Mathematics and Statistics, University of Calgary

PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE: To evaluate the feasibility of 3D CT quantification and assess the relationship of 3D VAT index with disease phenotype in Crohn's Disease (CD), stricture vs inflammatory.

METHODS: 56 patients with CD and stricture segments defined by CONSTRICT criteria were retrospectively identified from a database and chart review. 3D visceral adipose tissue (VAT):Subcutaneous adipose tissue (SAT) ratios were calculated on CT enterography using a commercially available semi-automated post-processing software.

RESULTS / DISCUSSION: 28 patients have fibro-stenotic structuring while 28 inflammatory CD behaviour. In all patients, 3D VAT:SAT ratio was successfully calculated using an automated or semi-automated method.

The fibrostenotic group had significantly greater mean VAT:SAT volume ratio of 41.47 vs 34.47 for the inflammatory group ($p=0.03821$). Median bowel wall thickening (BWT) for the structuring group was significantly higher (7.0 mm) that those with inflammatory behaviour (2.0 mm, $p<0.0001$).

CONCLUSION: VAT or "Creeping fat" in CD, causes a proinflammatory effect and contributes to the severity of fibrosis and stricture formation. VAT index, the ratio between VAT and SAT, as calculated from a CT, may be a valuable objective measurement of creeping fat. This study confirms that Fibrostenotic CD patients have increased VAT:SAT ratios in comparison to those with only inflammatory behaviour, suggesting that VAT:SAT ratios could be a potential biomarker in the prediction of CD disease severity and outcome. 3D quantification of VAT:SAT allows for complete quatification of visceral fat that may be used to assess response to medical therapy or to predict outcomes in those with CD.

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Quantitative vs Qualitative Muscle MRI: Imaging Biomarker in Patients with Oculopharyngeal Muscular Dystrophy (OPMD)

Gerd Melkus[1], Marcos L. Sampaio[1], Shaoni Chakraborty[2], Ian C. Smith[2], Kawan S. Rakhra[1], Pierre R. Bourque[3], Ari Breiner[3], Jocelyn Zwicker[3], Hanns Lochmüller[3], Bernard Brais[4], Jodi Warman-Chardon[3]

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PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE: Oculopharyngeal Muscular Dystrophy (OPMD) is a genetic muscle disease causing eyelid ptosis, severe swallowing difficulties and progressive limb weakness, however atypical presentations may be difficult to diagnose. There is currently an intensive search for biomarkers of disease progression in OPMD to carry out more effective clinical trials. This study was designed to test the feasibility of using MRI to confirm an OPMD diagnosis and monitor OPMD progression.

METHODS: REB approval with informed consent for all patients were obtained. Twenty-five subjects with Dixon whole body muscle MRI were enrolled: 10 patients with genetically confirmed OPMD, 10 patients with non-OPMD muscular dystrophies and 5 controls. Using the MRI Dixon technique, muscle fat replacement was evaluated in the tongue, serratus anterior, lumbar paraspinal, adductor magnus, and soleus muscles using quantitative and semi-quantitative rating methods (2 independent readers). Changes were compared with muscle strength testing, severity of dysphagia, use of gait aids, and presence of dysarthria.

RESULTS / DISCUSSION: Muscle fat replacement in the tongue in quantitative MRI scores could differentiate OPMD from other muscular dystrophies and from controls. Moreover, fat fraction in the tongue correlated with clinical severity of dysphagia.

CONCLUSION: This retrospective study provides preliminary support for the use of Dixon-based quantitative MRI as an outcome measure for monitoring disease progression in clinical trials and provides rationale for future prospective studies aimed at methodological refinement and identification of covariates. MRI may be a feasible and relatively inexpensive biomarker for diagnosis, assessment of prognosis and follow-up of neuromuscular disorders.

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Retrospectively evaluating the utility of dynamic contrast enhancement (DCE) imaging sequences to further categorize lesions within the PI-RADS v2.1 reporting scheme

Mitchell Wagner[1], Karim Samji[1]

[1]University of Alberta Department of Radiology and Diagnostic Imaging

PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: Characterize the proportion of peripheral zone lesions "upgraded" within the PI-RADS v2.1 protocol using DCE imaging sequences in a large patient population undergoing multiparametric prostate MRI.

METHODS: Following ethical approval, a retrospective review of radiologist reports for 2742 prostate MRI exams at two large Alberta teaching hospitals between January 2017 to January 2022 was conducted. Prostate specific antigen, prostate volume, sequence specific and overall PI-RADS scores, and lesion positivity for DCE were collected if present in the accompanying radiology report. Cases without overall PI-RADS scores were excluded from the study.

RESULTS / DISCUSSION: The median age was 63, with a median PSA and PSA density of 7.5 ng/mL and 0.13 ng/mL2 respectively. A total of 1809 lesions were reported, with 69.4% of all lesions being DCE positive. Of lesions within the peripheral zone, 548 were overall PI-RADS 4. A total of 75 (13.6%) peripheral zone lesions were upgraded to a PI-RADS 4 by DCE imaging.

CONCLUSION: A relatively small proportion of PI-RADS 4 lesions in our cohort were the result of DCE imaging upgrades. This suggests that contrast enhancement is only beneficial for a small portion of patients undergoing prostate MRI. Given the invasive nature of contrast enhanced studies, potential contrast induced side effects, and added imaging time, routine use of contrast for prostate MRI is questioned. Further studies are necessary to quantify the benefit of DCE imaging to the detection of prostate cancer, and determine if it should be part of routine prostate MRI imaging protocols.

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The 'FLAIR Motor' sign: FLAIR signal abnormality in precentral cortex is useful to diagnose adult global hypoxic-ischemic brain injury following cardiac arrest

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[1]Department of Radiology, Dalhousie University, QEII Health Science Centre, Halifax Infirmary Hospital, Halifax, Canada, [2]Department of Medical Imaging, St. Michael's Hospital, University of Toronto, [3]Salford Royal NHS Foundation Trust (UK), [4]Department of Radiology, University of Calgary

PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE: On 2D-FLAIR images, the precentral cortex in normal adult MRI studies has a lower signal compared to the remainder of the cortex. The objective of this study was to investigate the loss of the normal FLAIR relative hypointensity of the pre-central cortex as a sign of global hypoxic-ischemic brain injury (HIBI).

METHODS: In this retrospective study, consecutive adult patients who underwent MRI after cardiac arrest with clinical evidence of HIBI formed the case group (n=50). Consecutive patients who had brain MRIs for other indications and had final reports of normal studies formed the control group (n=50). Age and gender matching was performed. The signal in the precentral cortex on 2D-FLAIR images was recorded in random order by two independent blinded radiologists. Observations with ambiguity and discrepancy about the signal abnormality were used as false readings for analysis.

RESULTS / DISCUSSION: Average time from cardiac arrest to MRI was 7 days (range: 1 day – 25 days). No significant age and gender differences were found between the cases (mean age 55yrs, age range: 19yrs-95yrs, 22% females) and controls (mean age 56yrs, age range: 20yrs-89yrs, 22% females). Using FLAIR signal abnormality in the precentral cortex, both sensitivity and specificity for the diagnosis of hypoxic brain injury was 94%. There were three ambiguous/discrepant observations in both groups (cases and controls). There was excellent inter-reader agreement (kappa>0.8).

CONCLUSION: On 2D-FLAIR images, the loss of normal signal in the precentral cortex is an accurate and reliable sign of global hypoxic-ischemic brain injury.

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Deep Learning Segmentation Model for Automated Detection and Quantification of Evolving Patterns of Pneumonia on CT

Sabeena Jalal[1], Amit Katyan1, Marco Law[1], Savvas Nicolaou[1,2], Brian Lee[2], William Parker[1,2]

[1]VGH, [2]Sapien ML

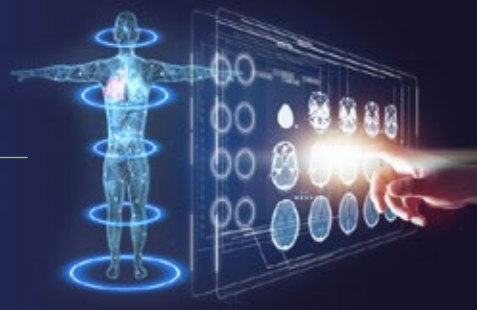
PRESENTER'S LEVEL OF TRAINING: Other medical professional

OBJECTIVE: To demonstrate an accurate method the illustrates the abnormal parenchymal tissue while accounting for normal pulmonary anatomy.

METHODS: 784 CT scans were categorized into 6 specific patterns and further divided into test (128), training set (524) and validation set (132). We had also used heuristic models such as HU thresholding and vessel segmentation thresholding, in addition to the AI model so that we obtain an improved accuracy

RESULTS / DISCUSSION: Model B showed the best diagnostic performance with 99.29% accuracy and background sensitivity of 99.88% in comparison to ground truth. Model C showed a higher sensitivity (46.06%) and lower PPV (66.63%) than Model B (Sn 42.50%, PPV 68.09%). Deep learning (DL) based automated detection of lung infection using CT images holds great potential in augmenting healthcare strategies in the management of COVID 19 infection. This model also provided percentage estimation of well-aerated lungs, a critical parameter in determining treatment strategies, conventionally limited to only qualitative assessment by human radiologists.

CONCLUSION: This deep learning segmentation model has significant clinical value in quantifying pulmonary disease, which is difficult to quantify by a human, when considering the effect of temporality and progression of the illness.



FRIDAY APRIL 28, 2023

10:30 – 12:00

Radiologist-in-Training Research Project Competition Presentations

Moderators: Amrit Bamrah, Julia Niles

Judges: Silvia Chang, Andreu Costa, Nicolas Murray

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A Lateral Point of View on Bone Mineral Densitometry: A Single Center Retrospective Analysis

Kaitlin Zaki-Metias[1], Christopher Zarour[1], Mehrvaan Kaur[1], Jeffrey MacLean[1], Malika Ganguli[2], Eda Olson[2], Bruce Henderson[3], Khurram Rashid[1]

[1]Trinity Health Oakland Hospital/Wayne State University School of Medicine, [2]Ross University School of Medicine, [3]Trinity Health Oakland Hospital

PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: Osteoporosis is significantly underdiagnosed and undertreated. This may be because traditional frontal lumbar spine protocol for dual-energy x-ray absorptiometry (DEXA) bone density evaluation potentially overestimates bone density due to the presence of superimposed osseous structures and sclerotic degenerative changes. The purpose of this study is to determine if the lateral lumbar spine DEXA is more sensitive than the traditional frontal view in diagnosing osteoporosis.

METHODS: A retrospective analysis of DEXA scans completed between January 2020 and December 2021 at a single institution was performed. All patients who met the criteria for osteoporosis screening were included. The bone mineral density (BMD) and T-scores were compared between the frontal and lateral lumbar spine, as well as the lateral lumbar spine and femoral neck. Statistical analysis was performed using SPSS statistics software version 25.0.

RESULTS / DISCUSSION: A total of 2733 patients (mean age, 67.3 years ± 9.2; 2654 (97.1%) female) were included. The T-scores obtained from BMD measurements of the lateral lumbar spine (mean, -1.5 ± 1.7) were significantly lower (paired t-test, $p<0.0005$) than that of frontal views (mean, -0.4 ± 1.7). This resulted in more frequent diagnosis of osteoporosis, with 30.7% (838/2733) of patients being diagnosed with osteoporosis based on lateral view, compared to 7.4% (202/2733) on frontal view.

CONCLUSION: Lateral lumbar spine bone mineral densitometry resulted in significantly lower BMD measurements compared to frontal lumbar spine views, leading to more frequent diagnoses of osteoporosis and osteopenia.

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Screening with Breast Cancer Mammography: Re-evaluation of Current Evidence

Jean-Paul Salameh[1], Mohammed Kashif[2], Matthew DF McInnes[3], Jean M. Seely[3]

[1]Faculty of Health Sciences, Queen's University, [2]School of Epidemiology and Public Health, University of Ottawa, [3]Department of Radiology, University of Ottawa.

PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: The Canadian Task Force on Preventive Health Care's 2018 guideline for breast cancer screening does not recommend routine screening for women in the 40–49-year-old age group. The evidence for this recommendation is largely based on a sensitivity analysis in a Cochrane Review comprised of low risk of bias randomized controlled trials with 'adequate randomization'. Recent research uncovered methodological flaws in the Canadian National Breast Screening Study (CNBSS) that were not evident at the time of the Cochrane review. As such, the CNBSS are not "low risk of bias" studies and should not have been retained in the Cochrane review sensitivity analysis.

Objective: To re-evaluate the strength of the evidence of the Cochrane review by reanalyzing its results considering that the CNBSS are at high risk of bias.

METHODS: Data from the Cochrane Review was re-analyzed based on new evidence indicating that the CNBSS is at high risk of bias. Data synthesis and analysis were modelled after the original review. Data were pooled using a fixed-effect model with the Mantel-Haenszel method.

RESULTS / DISCUSSION: Of the eight included trials, two were included in the sensitivity analysis of "low risk of bias" studies. The risk ratio (RR) of breast cancer mortality at 7-years follow-up was 0.88(0.72–1.090), P=0.25. The RR of breast cancer mortality at 13-years follow-up was 0.80(0.65–1.00), P=0.05.

CONCLUSION: Our analysis demonstrates that exclusion of the CNBSS trials from the sensitivity analysis does not impact the findings; there remains a lack of significant mortality benefit for the evaluated endpoints.

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Determinants of Failure of Visceral Artery Catheterization with the Cobra Catheter

Lojan Sivakumaran[1], Richard Liu[2], Sahir Bhatnagar[2], Louis-Martin Boucher[2]

[1]University of Montreal, [2]McGill University

PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE: To identify factors associated with failed catheterization of the celiac axis and superior mesenteric artery (SMA) with the Cobra (C2) catheter.

METHODS: Angiogram reports from a tertiary centre were searched retrospectively for the words "celiac" or "SMA". For each vessel, two groups were created: those including "Cobra" and another catheter (failed catherization group) and those including "Cobra" alone (success group). Demographic and procedural details were recorded. Vessel characteristics were extracted from periprocedural CTs. Exploratory analysis was performed with chi-square and Mann-Whitney U tests. Means (M) and standard errors (SE) are presented.

RESULTS / DISCUSSION: There were 196 (81.7%) successful and 44 (18.3%) failed Cobra catheterizations of the celiac axis and 121 (91.7%) successful and 11 (8.3%) failed Cobra catheterizations of the SMA (p=.009). For the celiac axis, in the failure group compared to the success group, there was greater vessel stenosis (M=29.88%, SE=2.26 versus M=13.03%, SE=1.73; p<.001); the takeoff was more acute (M=35.74°, SE=2.68 versus M=52.70°, SE=1.33; p<.001); and there was greater iliac tortuosity (X2=6.5, p=.010). For the SMA, in the failure group compared to the success group, there was greater vessel stenosis (M=21.21%, SE=10.85 versus M=7.55%, SE=1.62; though not significantly p=.167) and the takeoff was also more acute (M=40.07°, SE=4.30 versus M=55.75°, SE=1.80; p=.008). All other parameters were not significantly different between groups.

CONCLUSION: Failed Cobra catheterization was associated with attempted celiac catheterization, increased vessel stenosis, acute vessel takeoff, and iliac tortuosity (celiac axis only). Appropriate catheter selection based on periprocedural CTs may decrease procedure time and reduce waste.

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Assessment of Hepatic Steatosis on B-Mode Ultrasound by Radiologists and Deep Learning

Pamela Boustros[1], Pedro Vianna[2], Sara-Ivana Calce[2], Emre Aslan[1], John Marinos[1], Talal Alamri[1], Cassandra Larocque-Rigney[1], Laurent Patry-Beaudoin[1], Yi Hui Luo[1], Kim-Nhien Vu[1], Jessica Murphy-Lavallée[1], Jean-Sébastien Billiard[1], Emmanuel Montagnon[2], Michaël Chassé[2], Bich Nguyen[3], Eugene Belilovsky[4], Irina Rish[4], Guy Wolf[1], Guy Cloutier[2], An Tang[2]

[1]Département de radiologie, radio-oncologie et médecine nucléaire, Université de Montréal, Montréal, Qc, Canada, [2]Centre de recherche de l'Université de Montréal (CRCHUM), Montréal, Qc, Canada, [3]Department of Pathology, Centre hospitalier de l'Université de Montréal, Montréal, Qc, Canada, [4]Mila – Quebec AI institute, Montréal, Qc, Canada

PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: To evaluate the classification agreement and diagnostic performance of radiologists and deep learning applied to B-mode US images for grading hepatic steatosis in NAFLD, using biopsy as the reference standard.

METHODS: Institutional review board approved retrospective study conducted with 57 patients without risk factors and 142 patients with NAFLD who underwent abdominal US and contemporaneous liver biopsy. Six blinded readers visually graded steatosis on US images twice two weeks apart. Intra- and interreader agreement was assessed with κ statistics. Deep learning on B-mode US images was also used to assess grade of steatosis. Classification performance of human radiologists and deep learning for dichotomized steatosis grades was assessed by area under the receiver operating characteristic curve (AUC) on a separate test set.

RESULTS / DISCUSSION: Overall intrareader and interreader agreements were moderate (0.45 [range: 0.29, 0.66]) and fair (0.37 [range: 0.08, 0.79]) for distinguishing S0 vs ≥S1; moderate (0.56 [range: 0.41, 0.76]) and fair (0.28 (range: -0.01, 0.54) for distinguishing ≤S1 vs ≥S2; and moderate (0.44 [range: 0.24, 0.79]) and fair (0.36 [range: -0.01, 0.70]) for distinguishing ≤S2 vs S3. Readers and deep learning AUC on a test set were 0.57 and 0.85 for distinguishing S0 (n = 12) vs ≥S1 (n = 40); 0.66 and 0.73 for distinguishing ≤S1 (n = 29) vs ≥S2 (n = 23); and 0.66 and 0.67 for distinguishing ≤S2 (n = 40) vs S3 (n = 12).

CONCLUSION: Deep learning on B-mode US images shows promise for detecting hepatic steatosis in a screening setting.

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The pulmonary lesion with microlobulations on CT: a potential indicator of granulomatous disease?

Taehoo Kim[1], Eric Zhang[1], Anderson Kuo[2], Mohamed Abu Nada[1], Andre Lametti[1], Pierre-Olivier Fiset[1], Gianni Giancaspro[1], Sarah Chibane[1], Geneviève Belley[1]

[1]McGill University Health Centre, [2]Midland Memorial Hospital

PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: To define the novel term 'microlobulation', which is used to describe margins of a given pulmonary lesion identified on CT and to assess: 1) whether the presence of microlobulations in pulmonary lesions are histopathologically associated with benignity and to assess 2) whether the microlobulations are specifically associated with granulomatous disease.

METHODS: In this single-centre retrospective review, a total of 426 consecutive lung lesions underwent CT-guided percutaneous biopsies between July 2018 and August 2021. Only those that have available pre-biopsy CT and conclusive pathology results were included in the study. A senior chest radiologist identified presence or absence of microlobulations in each biopsied lung lesion, blinded to pathology results. Sensitivity, specificity, and confidence intervals were calculated. Association was tested by Fisher's exact test.

RESULTS / DISCUSSION: 30 lesions were identified as microlobulated upon review of CT. Of the lesions that were found to be benign (96 total), 17% demonstrated microlobulations (sensitivity for benignity 17%), whereas only 4% of the non-benign lesions (330 total) demonstrated this finding (specificity 96%, 95%CI: 93-97%). The association was found to be significant, $p = 0.0001$. Of the lesions that were found to be granulomas (34 total), 32% demonstrated microlobulations (sensitivity for granulomatous disease 32%), whereas only 5% of the non-granulomatous lesions (392 total) demonstrated this finding (specificity 95%, 95%CI: 92-97%). The association was found to be significant, $p < 0.0001$.

CONCLUSION: This study suggests that microlobulation is not a sensitive sign for benign or granulomatous disease, however non-benign lesions are unlikely to have microlobulated borders.

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Screening detection rate of breast cancer in post mastectomy patients treated with autologous reconstruction: a tertiary care study

Marissa Absi[1], Amit Katyan[2], Raman Verma[1], Jean Seely[1]

[1]University of Ottawa, Department of Radiology, [2]University of British Columbia, Department of Radiology

PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: To determine the cancer detection rate of non-palpable breast cancers using screening mammography in the autologous reconstructed breast post mastectomy.

METHODS: Between January 1, 2012 – 2020, we retrospectively identified 536 patients with a prior history of breast cancer treated with mastectomy and autologous reconstruction who had underwent screening mammography of the ipsilateral breast and a minimum 1 year of clinical and imaging follow-up. Clinical information, imaging, pathologic/immunohistochemical findings, location of ipsilateral malignancy, and the interval between mastectomy and loco-regional recurrence (LRR) were extracted for analysis. The cancer detection rate (CDR) of screening mammography, number of interval cancers and recall rate were determined.

RESULTS / DISCUSSION: All 536 patients underwent bilateral screening mammography for a mean of 8 years (range between 5-20 years). The total recall rate was 7.8% (42/536): 20 patients were recalled for an abnormality on the ipsilateral/autologous breast and 22 patients were recalled for an abnormality in the contralateral breast. All 3 cancers detected on the ipsilateral/autologous breast were interval cancers that were clinically palpable. No cancers were detected using screening mammography in the ipsilateral breast treated with autologous reconstruction. Nine women were found with screen-detected contralateral breast cancers (CDR 16.8/1000).

CONCLUSION: No significant association was found between screening mammography and detection rate of non-palpable cancers in the breast previously treated with autologous reconstruction. Our findings suggest that there is little additional benefit in screening the ipsilateral breast. However, continued imaging surveillance of the contralateral breast for these patients is strongly recommended, in keeping with previous evidence.

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Disparities in Radiologist's Pay by Gender in Canada

Hayley McKee[1], Cynthia Walsh[2], Mana Modares[1], Wan Wan Yap[3], Natalia Gorelik[4], Maura Brown[3], Charlotte J Yong-Hing[3], Kate Hanneman[5]

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: To examine gender-based differences in pay among radiologists in Canada and evaluate potential contributors.

METHODS: Publicly available fee-for-service (FFS) radiology billing data was analyzed from British Columbia (BC), Ontario (ON), Prince-Edward Island (PEI) and Nova Scotia (NS) between 2017-2021. Data was analyzed by gender on a per-province and national level. Variables evaluated included year, province, procedure billings, and days worked (BC and ON only). The gender pay gap was expressed as the difference in mean payments between men and women divided by mean payments to men.

RESULTS / DISCUSSION: Data points from 8,478 radiologist-years were included in the analysis (2,474 [29%] women and 6,004 [71%] men). The unadjusted difference in annual pay between men and women was $126,657 (95%CI $123,437-129,877) with a 19% gender pay gap overall. The gender pay gap did not change significantly between 2017-2021 (range, 17-21%) but did vary by province (highest gap NS). Compared to men, women worked fewer days per year (weighted mean 218±29 vs 236±25 days/year, $p<0.001$, 8% difference) and had lower procedure-based volumes and billings (460±242vs 613±198 procedures/radiologist/year, $p<0.001$, 25% difference and $19,974±5,273vs $32,255±5,496 billings/radiologist/year, $p<0.001$, 38% difference). However, procedure billings accounted for only 5% of annual radiologist billings overall, and these differences do not fully account for the disparity in pay by gender in Canada.

CONCLUSION: In an analysis of FFS billing data from 2017-2021 for Canadian radiologists, there is a 19% pay gap between men and women which is not fully accounted for by time spent working or procedure volumes.

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Is the Excretory Phase Necessary to Identify Upper Tract Uroepithelial Neoplasms at CT Urography? A 10-Year Population-Based Study

Warda Limaye, Andrew Fenwick, Ross Mason, Andreu Costa

Dalhousie University

PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: To assess the proportion of upper tract uroepithelial carcinomas (UTUC) that are evident without the excretory phase of CT urography (CTU), based on secondary imaging findings.

METHODS: Patients with history of UTUC between January 2008-December 2017 were retrospectively identified from a population-based cancer registry. For each patient, US, non-CTU CT, and MRI exams were reviewed, assessing for a primary abnormality (mass) and secondary findings: hydronephrosis; urinary tract thickening; focal luminal distention; fat stranding; lymphadenopathy; and metastasis. For patients who underwent CTU, the excretory phase was reviewed to assess if the tumour was evident as a filling defect (primary abnormality); non-excretory phases were assessed for secondary findings that would enable a diagnosis of UTUC.

RESULTS / DISCUSSION: 312 patients (mean age 73±11 years, 176 males, 136 females) who underwent 585 imaging examinations were included. 209/312 (67.0%) patients underwent non-CTU imaging with the primary mass evident in 142/209 (67.9%) patients, secondary findings evident in 176/209 (84.2%) patients, and primary or secondary findings evident in 184/209 (88.0%) patients. Of 181/312 (58.0%) patients that underwent CTU, the UTUC was evident as a filling defect in 133/181 (73.5%) CTUs. The mass was evident on non-excretory phases in 149/181 (82.3%) CTUs, and secondary findings in 172/181 (95.0%) CTUs.

CONCLUSION: The vast majority of UTUCs are evident on imaging examinations as either a primary mass or via secondary findings, without requiring an excretory phase. This finding should be considered when updating clinical practice guidelines and imaging pathways.

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Utility, Outcomes and Complications of Porto-systemic Shunts in Liver Disease Management: A Tertiary Center Review

Shamir Malik[1], Arash Jaberi[2], Sebastian Mafeld[2], Gideon Hirschfield[3]

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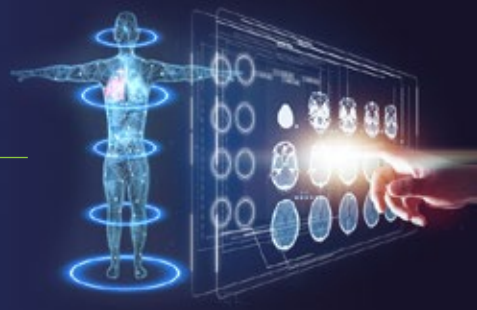
PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: To review and assess the management of portal hypertension by TIPSS (transjugular intrahepatic portosystemic shunt) and DIPS (direct intrahepatic portocaval shunt) at a tertiary care center over three decades.

METHODS: A total of 238 patients who had received a porto-systemic shunt insertion between January 1, 1990 to September 14, 2021 at University Health Network (UHN) were included in this retrospective electronic chart review. Data pertaining to clinical outcomes of portal hypertension was recorded at baseline, 1 month, 3 months and 6 months post-shunt insertion. HVPG was recorded pre-shunt and post-shunt insertion. Transplant-free survival and post-operative complications was also assessed. Patients were followed until death or liver transplant.

RESULTS / DISCUSSION: Indications for shunt placement and etiology of disease shown in Table 1. Relevant events post procedure included hepatic encephalopathy (HE, n=34), hydrothorax (n=17), vascular (including stent) thrombosis (n=17) and renal failure (n=4). 12 months post-shunt insertion 2.5% (n=6) of patients had died or received liver transplant; of these 4 were transplanted. HPVG fell consistently: 15.6 ± 1.5mmHg pre-shunt to 5.9 ± 1.2mmHg post-shunt. There was no observable increase in MELD-Na score or creatinine in the first month post-shunt. Temporal trends showed that more patients aged 50 to 69 are now receiving shunt insertion than at the initiation of the chart review but are at increased risk of HE post-shunt (OR: 4.40 [1.75-11.07]).

CONCLUSION: Portosystemic shunt placement in the form of TIPSS or DIPS insertion is a common and effective treatment for portal hypertension without significant impact to liver disease progression.



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An Analysis of the Quality and Readability of Canadian Breast Imaging and Cancer Screening Programs

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: Low health literacy continues to be a barrier in accessing effective care. The American Medical Association (AMA) and National Institutes of Health (NIH) recommend that health information and patient materials be written at the sixth and eighth grade reading level, respectively. The objective of this study was to evaluate the readability, quality and accuracy of available online health information for breast imaging and breast cancer screening programs in Canada.

METHODS: Breast imaging in hospitals and cancer screening websites of the programs of each province and territory were searched. Content on each website was analyzed for readability using three readability formulas: Flesch-Kincaid Reading Ease Index, Flesch-Kincaid Grade Level and Gunning-Fog Score. A validated tool, the DISCERN instrument, was used to measure the quality and accuracy of the online health information.

RESULTS / DISCUSSIONS: A total of 30 search engine results were analyzed for readability, quality, and accuracy. The mean readability scores across all websites were 40.5 (Flesch-Kincaid Reading Ease Index),12.1 (Flesch-Kincaid Grade Level), and 18.08 (Gunning-Fog Score) which correspond to a 12th-grade reading level. The websites were considered of average quality with a score of 43.5 (DISCERN).

CONCLUSION: This study demonstrates that online health information regarding breast imaging and breast cancer screening programs is written at a level far greater than the reading level of most adults. Websites were written at an average quality. Decreasing website reading level and increasing website quality may lead to improved breast screening attendance.

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Portable Brain MRI in a Remote Northern Canadian Setting – The Preliminary Experience of Moose Factory Implementation

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: To describe, in a step-by-step format, the process, challenges and opportunity of portable MRI implementation in a remote Canadian setting where access to MRI is otherwise unavailable.

METHODS: In this retrospective analysis, a portable MRI (ultra-low field, 0.064T) scanner was installed in Weeneebayko General Hospital, Moose Factory, Ontario. All patients 18 years of age or older with any indication for neuroimaging were eligible for study inclusion. Images were sent via secure network to Kingston Health Sciences Centre for Neuroradiologist interpretation. Scanning period was from November 14, 2021 to September 6, 2022. Prerequisite implementation steps, challenges, and solutions were defined. Clinical indications, image quality, image findings and report turnaround time were recorded.

RESULTS / DISCUSSIONS: Portable MRI was successfully implemented in a remote northern Canadian setting. During the study period, 25 patients received a portable MRI scan. 14 patients (56%) were deemed to not require transfer to a centre with fixed MRI. Within a process that followed OCAP (The First Nations principles of ownership, control, access, and possession) principles, implementation required collaboration with the host institution, local community support, approvals, and identification of human and other resource challenges with appropriate mitigation strategies.

CONCLUSION: Successful portable MRI implementation requires strong collaboration with the host facility, local community education and support, and attention to the resource challenges that are commonly found in remote communities. This project can serve as a model to democratize access to MRI and offer timely care in remote areas worldwide, where access to conventional MRI is currently unavailable.

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Evaluation of an Opportunistic Screen for Low Bone Density From Conventional X-Ray in Publicly Available Datasets

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PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE: Osteoporosis is under-screened and underdiagnosed. Osteoporosis is diagnosed using dual energy x-ray absorptiometry (DXA). Software that analyzes conventional single-energy radiographs acquired for any clinical indication at time of acquisition could alert a radiologist if the individual has a high likelihood of low bone mineral density (BMD). Inclusion of these results in the radiologist's report could trigger a timelier clinical fracture risk assessment by the referring physician. We studied the performance of a machine learning model that screens x-rays and outputs a score from 1-10 (patients with higher scores are more likely to have low BMD) in publicly available datasets to establish its generalizability.

METHODS: We identified publicly available datasets that had digital x-rays and a DXA acquired within one year of the x-ray. These included: (i) lumbar x-rays from the Canadian Multicentre Osteoporosis Study (CaMos; n=357 community-based participants, 69% female, 50-112 years); and (ii) pelvis, knee and hand x-rays from the Osteoarthritis Initiative (OAI; n=591 patients with symptomatic tibiofemoral knee osteoarthritis, 50% female, 50-83 years). We assessed the performance of a machine learning algorithm at identifying individuals with low BMD (DXA T-Score of L1-4 or FN <-1) using receiver-operating characteristic (ROC) analyses.

RESULTS / DISCUSSIONS: The area under the ROC curve was 0.87 (0.84–0.90) in CaMos and 0.82 (0.79–0.85) in OAI. Similar performance was observed in sex-stratified analyses, and for OAI, in knee, hip, and hand subgroups.

CONCLUSION: These results support the generalizability of the algorithm to opportunistically screen individuals at risk of low BMD from standard radiographs of various body parts.

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Immunotherapy Use and Change in Management in Patients With Metastatic Cancer Assessed Through RECIST v1.1 Versus iRECIST

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: We compared the utility of immune RECIST (iRECIST) criteria to RECIST v1.1 in the assessment of treatment response to immunotherapy in solid tumours.

METHODS: 16 consecutive patients with lung cancer, renal cell carcinoma or melanoma who initiated immunotherapy from 2016-2017 at a regional cancer centre were identified. Two staff radiologists retrospectively reviewed their CT images from baseline pre-immunotherapy to completion or discontinuation of immunotherapy. Tumour response criteria were applied to target and nontarget lesions. Clinical data were collected from electronic medical records until January 28, 2022.

RESULTS / DISCUSSIONS: Four subjects were initially evaluated by both radiologists to establish the intraclass correlation coefficient of 0.55. Each staff radiologist reviewed an additional 6 subjects individually. Patients were on immunotherapy for a median of 171(57-1921) days. For target lesions, the total number of progressive disease (PD) was 24 for RECIST v1.1 and 21 for iRECIST. The median number of PD in target lesions required to change systemic therapy was 1(0-2) for RECIST v1.1 and 0(0-2) for iRECIST ($p>0.05$). The median number of PD required for surgical intervention or radiotherapy was 0(0-1) for RECIST v1.1 and 0(0-0.5) for iRECIST ($p>0.05$). For nontarget lesions, the total number or PD was 21 for both RECIST v1.1 and iRECIST. The median number of PD in non-target lesions until change in systemic therapy was 0, and until surgical intervention or radiotherapy was 0, using either criterion.

CONCLUSION: Our preliminary data suggests no significant difference in management between the application of RECIST v1.1 or iRECIST in monitoring the efficacy of immunotherapy.

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Progressive Steps Towards a Standardized MRI Protocol for People with Multiple Sclerosis in British Columbia

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PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE: To assess the MS MRI protocols used in British Columbia (BC) before and after adoption of a provincial standardized protocol.

METHODS: In 2019, BC MRI centers were surveyed regarding their MS protocols. In 2020, the BC Medical Imaging Advisory Committee (MIAC) of the BC Ministry of Health recommended adoption of a provincial BC standardized MS MRI protocol (Figure 1) based on the 2016 Consortium of MS Centers (CMSC) recommendations. A follow-up survey was performed in 2022.

RESULTS / DISCUSSIONS: On the 2019 survey, 2 of 15 MRI centers (13.3%) satisfied the 2016 CMSC recommendations. 10/15 Fluid Attenuated Inversion Recovery (FLAIR) and 12/14 T2 scans used thicker slices with slice gaps. 3D T1 scans were routinely obtained in only 4/15 centres. 3 of 9 centres used the recommended subcallosal plane for axial slice prescription. In 2022, 14 of 26 centers (53.8%) were fully compliant.

CONCLUSION: Formal adoption of a provincial standardized MS MRI protocol improved compliance from 13.3% to 53.8%. Improving care for MS patients will require continued efforts to individually contact and assist non-compliant centers to adopt the standardized protocol so that it becomes standard practice in BC.

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A Provincially Adopted Standardized Operating Protocol (SOP) for Screening of Cerebral Vascular Malformations (CVMs) in Patients with HHT in Alberta

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PRESENTER'S LEVEL OF TRAINING: Resident

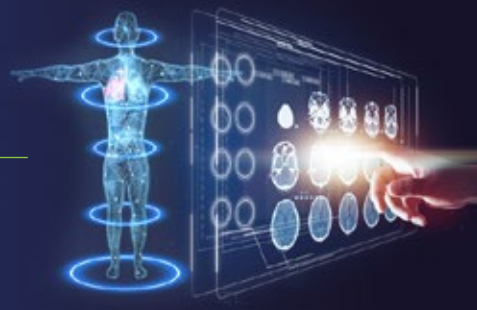
OBJECTIVE: Hereditary hemorrhagic telangiectasia (HHT) is an autosomal dominant disease involving vascular malformations within organ systems. Approximately 10% of patients with HHT have cerebral vascular malformations (CVMs). Three subtypes of CVMs exist including brain arteriovenous fistula, nidus-type AVM, and capillary vascular malformation. Due to the negative health consequences related to CVMs, screening with MRI is recommended. There is no current standardization for screening. The objective of this project is to adopt a provincial SOP to improve diagnostic accuracy, reduce inappropriate imaging, and improve the cost-effectiveness of CVM screening in patients with and without HHT in Alberta.

METHODS: Multiple forums were held amongst the five Alberta Health Services Zones with stakeholders from within urban and rural radiology groups, neurology, pulmonology, and hematology. The consensus process took five years to complete between 2015 and 2020. The content of the forums was compiled for approval by all participants.

RESULTS / DISCUSSIONS: The SOP was implemented in February 2020 and defines that screening for CVMs must include standard unenhanced MRI brain (sagittal T1, axial FLAIR and axial T2) with SWI, a 3T or 1.5T magnet strength, and minimum imaging standards to include 3mm contiguous slice thickness.

The provincial SOP process incorporated rural and remote radiologists from all 5 health regions (figure 1). Incorporation of SWI sequence to identify smaller peripheral CVMs; Elimination of MR contrast improved access to local performance of studies, facilitating virtual care.

CONCLUSION: A provincial SOP for CVM screening for HHT was successfully implemented in Alberta.



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The FIND Program: Improving Follow-up of Incidental Imaging Findings

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PRESENTER'S LEVEL OF TRAINING: Resident

PRINCIPAL LOCATION OF AUDIT: Community Based Hospital(s)

BACKGROUND AND AIM: Incidental findings (IFs) are unrelated to the original reason for examination but require follow-up. The aim is to determine the incidence of reporting follow-up recommendations and adherence to recommended follow-up of IFs at our institution.

STANDARD: Recommended follow-up of IFs varies by finding; recommendations are well-documented in American College of Radiology and Canadian Association of Radiologists white papers. Pennsylvania's Act 112 requires diagnostic imaging departments to notify patients with actionable findings directly, in addition to sending the report to the referring physician.

TARGET: Follow-up recommendations in 95% of cases. Adherence to follow-up recommendations in at least 50% of cases.

METHODS: A retrospective analysis of 1000 patients (with chest and abdominopelvic CT imaging (1,349 examinations) was performed (1/2019-1/2020). Data collected included the frequency of IFs, inclusion of follow-up recommendations in the radiology report, and adherence to recommended follow-up.

AUDIT TEAM: Radiology residents, staff radiologist/department chair

RESULTS: There were 69 IFs identified (5.1%) Follow-up recommendations were reported in 52/69 cases (75.4%), with adherence to recommendations in 34/67 (50.7%) of cases.

INTERVENTIONS / ACTION PLAN: The Radiology Finding Incidental Disease (FIND) Program was designed to track and improve follow-up of incidental imaging findings. Re-audit from 9/2020 to 9/2021 of 1000 patients (1267 examinations). 70 IFs were identified, with follow-up recommendations for 67/70 (95.7%) and adherence to recommendations in 34/67 (50.7%) of cases. Improved incidence of reporting recommendations (p=0.001) and adherence to follow-up (p=0.03).

DISCUSSION / CONCLUSION: Implementation of the FIND Program resulted in improved follow-up of IFs. This has the potential to reduce the burden of clinically significant incidental findings possibly resulting in later presentation of advanced disease.

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Use of Vacuum-Assisted Stereotactic Breast Biopsies to Decrease Post-Surgical Pathology Upgrade Rates Compared to Conventional Spring-Loaded Core Needle Stereotactic Biopsies

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PRESENTER'S LEVEL OF TRAINING: Resident

PRINCIPAL LOCATION OF AUDIT: Audit Academic Based Hospital(s)

BACKGROUND AND AIM: Patients with mammographic abnormalities may undergo stereotactic breast biopsies (SBB) for histopathologic diagnosis. Spring-loaded core needle biopsies can lead to under-sampling, limiting diagnostic accuracy. We aim to assess the value of vacuum-assisted SBB to reduce the upgrade rate after surgical excision.

STANDARD: Vacuum-assisted SBB provide optimal diagnostic performance for mammographic abnormalities.

TARGET: Post-surgical upgrade to ADH, DCIS and/or IDC of 7.7% or less (based on vacuum-assisted SBB published rates).

METHODS: 95 spring-loaded core needle SBB were previously reviewed between January 2015-August 2017. Post-biopsy and surgical pathology results were compared to calculate the rate of upstage in pathology. Results were used to implement departmental use of vacuum-assisted SBB. Pathology upstage rate using this new technique was assessed from March 2021-March 2022 to compare with the previous spring-loaded technique.

AUDIT TEAM: Radiology Residents, Breast Staff Radiologist

RESULTS: 97 biopsies reviewed; 28 patients had subsequent surgery. Total post-operative upgrades in 5/28 cases (17.9%). All 5 were DCIS upgraded to DCIS and IDC. No benign biopsies or ADH cases were upgraded. 18 cases (64.3%) had no change in diagnosis and 5 cases were downgraded.

INTERVENTIONS / ACTION PLAN: Spring-loaded SBB technique had a pathology upstage rate of 27.4%. After implementation of vacuum assisted SBB, the overall upstage rate decreased to 17.9%.

First cycle results were used to promote a vacuum-assisted SBB technique to the management team. The goal was to decrease under-sampling and post-surgical upstage for malignant and high-risk breast pathologies.

DISCUSSION / CONCLUSION: This audit supports the implementation of vacuum-assisted SBB to decrease the post-surgical pathology upstage rate compared with the use of a spring-loaded core needle.

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Improving the Quality and Consistency of Incidental Pulmonary Nodule Reporting: A Departmental Clinical Audit Project

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PRESENTER'S LEVEL OF TRAINING: Resident

PRINCIPAL LOCATION OF AUDIT: Audit Academic Based Hospital(s)

BACKGROUND AND AIM: Incidental pulmonary nodules (IPNs) are lung nodules detected on thoracic CTs done for unrelated reasons. Appropriate follow up of IPNs is important to maximise the benefits of early lung cancer detection and reduce the harm of unnecessary diagnostic tests. Approximately 60% of patients with IPNs have inappropriate follow-up recommendations (Schmid-Bindert et al.). This audit intends to assess and improve adherence to guidelines for appropriate follow-up recommendations for IPNs in our department.

STANDARD: Fleishner criteria of 2017 (MacMahon et al.)

TARGET: 95% adherence

METHODS: Two parts retrospective study. First part included adult patients with thoracic CTs (January,April and July 2021). Patients with history of cancer excluded. Imaging was reviewed by two radiology residents. Second audit will be performed after intervention during the months of February, March and April 2022 with the same inclusion/exclusion criteria.

AUDIT TEAM: Radiology Residents and Thoracic Radiologist.

RESULTS: 1278 patients screened; 91 included. Scans excluded for absence of IPNs or prior history of cancer. adherence to Fleishner criteria: 38%.

INTERVENTIONS / ACTION PLAN: We will create a local 3-step IPN management action plan. First, a review educational video presentation on Fleishner criteria will be shared with thoracic radiologists and trainees. Second, an IPN reporting template will be created and shared within the department. Finally, a paper version of the Fleishner criteria will be displayed in all concerned reading rooms.

DISCUSSION / CONCLUSION: Adherence to Fleishner Criteria is lower than the general standard. Adoption of a local 3-step IPN management action plan may improve adherence.

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An Audit on Radiology Resident Competency in Managing Acute Contrast Reaction

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PRESENTER'S LEVEL OF TRAINING: Resident

PRINCIPAL LOCATION OF AUDIT: Audit Academic Based Hospital(s)

BACKGROUND AND AIM: Adverse reactions to contrast media can range from mild to severe. To ensure optimal patient care, radiology residents need to be adequately trained to recognize and manage these adverse reactions. Reactions to iodinated contrast medium occur in 0.2-0.6% of cases, with severe acute reactions occurring in 0.04% of cases. Currently, residents learn to deal with adverse reactions through a brief didactic lecture.

STANDARD: Appropriate knowledge and high level of comfort in the management of contrast reactions.

TARGET: >90% correct response to knowledge-based questions. Likert score >4 for comfort.

METHODS: Residents received a standard 20-minute didactic lecture covering general information on contrast reactions. A knowledge quiz comprising of 20 multiple-choice questions was utilized to assess core competencies. On a 5-point Likert-type scale, participants' comfort level in managing contrast reactions were assessed.

AUDIT TEAM: Radiology Resident, Radiologist, Technologist

RESULTS: A total of 15 radiology residents participated. The average knowledge test score is 16.6/20 (83%). Only 6 were able to correctly answer >90% of questions. The comfort score average 3.5 for managing contrast reaction, 4.1 for differentiating contrast reactions, and 4.3 for differentiating severity of contrast reactions. 100% of residents would like to see an alternative method of learning about contrast allergy reactions.

INTERVENTIONS / ACTION PLAN: A simulation-based course to include various emergency scenarios including urticaria, bronchospasm, laryngeal edema, hypotension with tachycardia/ bradycardia. The knowledge test will then be distributed to participants following the simulation.

DISCUSSION / CONCLUSION: Second cycle will be completed prior to presentation. Resident's knowledge and comfort level with recognizing and managing contrast reaction emergencies can be improved with simulation-based course.

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Correlation Between Breast Arterial Calcifications and Higher Cardiovascular Risk: Awareness and Attitudes Amongst Canadian Radiologists Who Report Mammography

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: Breast arterial calcifications (BAC) on mammography correlate with increased cardiovascular risk. Reporting BAC is not standard practice. Our study evaluates the awareness of Canadian radiologists who report mammography of the clinical significance of BAC and their attitudes towards reporting BAC compared to their European and American counterparts.

METHODS: Following local institutional ethics approval, a 25 question survey (SurveyMonkey) was disseminated to Canadian radiologists via provincial and national society email lists. Responses were collected over 5 weeks (April-June 2022).

RESULTS / DISCUSSION: 186 complete responses were collected. 60% (112/186) were aware of the association between BAC and cardiovascular risk and 16% (29/186) document its presence in mammogram reports. 35% (65/186) occasionally document BAC if severe or in a young patient. 4% (7/186) had local departmental guidelines on BAC reporting and 82% (153/186) agreed there is a need for national BAC reporting guidelines. Fewer Canadian radiologists were aware of the association between BAC and cardiovascular risk compared to European radiologists (60% versus 81%), reported the presence of BAC compared to both European (15% versus 62%) and American (15% versus 35%) radiologists, informed the patient of the presence of BAC compared to European radiologists (1% versus 46%).

CONCLUSION: Canadian radiologists who report mammography are less aware of the association between BAC and cardiovascular risk than their European and American counterparts and are less likely to document the presence of BAC. Given the correlation of BAC with increased cardiovascular event risk, there is increased need for awareness as well as national BAC reporting guidelines.

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Bringing Radiology Education to a New Reality: Using Virtual Reality as a Remote Educational Tool During the COVID-19 Pandemic

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: We investigated Virtual Reality (VR) during a two-week, undergraduate, radiology elective to determine if it improved learning outcomes and user satisfaction.

METHODS: 18 students enrolled between August 2021-February 2022. Each student had a collaborative Zoom teaching session with a preceptor using a PACS-like viewing system (ODIN), followed by a teaching session using a virtual DICOM viewer (SieVRt). After each teaching session, the students independently reviewed eight imaging cases and completed case related questions. The students completed a survey, rating their subjective experiences using ODIN and SieVRt.

RESULTS / DISCUSSION: There was no difference in total test scores between the two learning strategies, however, students did perform statistically better on two of five questions designed to test the detection/measurement capabilities of SieVRt versus ODIN. Students stated that they preferred using SieVRt over ODIN and agreed that they were able to view subtle imaging findings and abnormalities better using SieVRt. However, students found that some of the functions of SieVRt (measuring angles/lengths, and multitasking) were difficult. There were technical challenges with VR and minor undesirable physical effects (dizziness, nausea, etc.).

CONCLUSION: Virtual reality has the potential to enhance radiology education by providing an immersive and engaging experience. Objectively, students were able to perform two tasks better with SieVRt. Subjectively, the VR platform received favorable reviews from students for a variety of features. There were reported technical and physical challenges related to using VR. Future developments in virtual reality systems should focus on improving the user experience.

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Meningioma Grading via Diagnostic Imaging – A Systematic Review and Meta-Analysis

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: Meningioma grading is essential in determining disease course for patients; with high grade (HG) having a worse prognosis. Current World Health Organization (WHO) grading depends on histopathological analysis of tumour. Radiology based grading can overcome the surgical risk of sampling and can expedite treatment planning to improve outcomes. Therefore, our study aims to systematically review reports on diagnostic imaging used to differentiate HG from LG meningioma.

METHODS: Three databases were searched for primary research that reported either magnetic resonance imaging (MRI) or computed tomography (CT) use in grading pathologically WHO graded meningiomas. Two investigators independently screened and extracted data from included studies with conflicts resolved via consensus.

RESULTS / DISCUSSION: 24 studies met our inclusion criteria. We identified 13 significant ($p<0.05$) CT and MRI features for differentiating HG from LG meningioma. Mass effect had the highest sensitivity (80.95%) and negative predictive value (90.7%) of all imaging features. Cystic change had the highest specificity (93.44%) and irregular tumour-brain interface had the highest positive predictive value (65.00%). The heterogeneity of tumour was most accurate at identifying HG meningioma (80.58%). Irregular tumour-brain interface and heterogeneity of tumour had the highest AUC values of 0.788 and 0.766, respectively.

CONCLUSION: Our study identified numerous significant CT and MRI features that can differentiate HG from LG meningioma. Although multivariable analysis was not performed, some features individually showed high measures of diagnostic accuracy. Thus, highlighting the potential of diagnostic imaging in prompt the grading of meningioma and prevent any delay in treatment planning for HG meningioma.

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Utility of postprandial duplex ultrasound in the evaluation of chronic mesenteric ischemia: experience at a community hospital

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: Chronic mesenteric ischemia (CMI) is characterized by intestinal hypoperfusion secondary to narrowing of the celiac or mesenteric arteries. Duplex sonography is a non-invasive method of screening for CMI, although the utility of measuring postprandial PSV for CMI screening has not been well-established. We aim to assess the outcomes of inclusion of postprandial duplex sonography in our institution's mesenteric artery evaluation protocol.

METHODS: Mesenteric artery duplex sonographic examinations completed from 1/2015 to 12/2021 were analyzed in retrospect. Sonography reports were reviewed for a diagnosis of CMI and whether the diagnosis was rendered based on preprandial PSV, postprandial PSV, or a combination. These results were compared to results of available CT or catheter angiography. Re-audit was completed for studies performed from 3/2022 to 12/2022 after removal of postprandial imaging from the institutional sonography protocol.

RESULTS / DISCUSSION: 67/97 (69.1%) of patients were diagnosed with CMI, with 21/67 (31.3%) of diagnoses based on postprandial PSV alone. Patients diagnosed with CMI via postprandial PSV had a higher incidence of negative CTA (14/15, 93.3%) ($p=0.047$). After removal of postprandial imaging from the protocol, 39/48 patients who underwent mesenteric artery ultrasound met inclusion criteria, 13 of which were positive for CMI. Six of these patients underwent further evaluation with CTA, with a concordance rate of 50% (3/6).

CONCLUSION: The use of utilization postprandial imaging resulted in overdiagnosis of CMI and a 93.3% discordance rate with CT angiography. Removal of postprandial imaging from the protocol revealed improved concordance with gold-standard imaging.

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Authorship gender among articles about artificial intelligence in breast imaging

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: Both artificial intelligence (AI) and radiology are known to be heavily male-dominated fields. A study has previously examined the authorship representation in peer-reviewed AI radiology articles. We aimed to examine a female-driven subgroup of that population and describe the current status and trends of authors publishing AI related breast imaging articles.

METHODS: Articles intersecting breast imaging and AI were identified and screened by 2 independent reviewers. Articles were excluded if it did not include original research (e.g., response letter). The following was collected for each article: year of publication, journal, journal impact factor, and first and last authors' names.

Authors' genders were tentatively determined using a validated name-based algorithm. For gender-neutral and foreign-language names, manual online searches of institutional databases, preferred pronouns in biographies, etc. were conducted. Lastly, email surveys were distributed for authors to declare self-identified genders.

RESULTS / DISCUSSION: After removing duplicates, 507 articles were screened and 115 included. Female-identifying authors represented 35.7% and 37.4% of first and senior authors respectively. Logistic regression modelling showed a significant increase in female senior authors over time but no changes in female first authors. Female mentorship is crucial in cultivating interests of female medical trainees and we hypothesize that the increase in female senior authorship within this field may be a leading indicator of future changes.

CONCLUSION: Female authors are underrepresented in AI breast imaging literature. A temporal increase in female senior authors may be encouraging for more female voices in future AI breast imaging research.

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Optimizing Stroke Imaging NB (OSI-NB)

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: The primary objective was to determine if the source of stroke can be identified by augmented CTA below the aortic arch (i.e. augmented scan including left atrium vs standard scan through aortic arch and circle of Willis). The secondary objective was to assess the inter-rater reliability of the presence of critical findings.

METHODS: REB approval was obtained from Horizon Health. Eligible patients were those who obtained an augmented CTA scan from September 2019 to April 2022, with a final diagnosis of stroke, and who underwent endovascular therapy at the Saint John Regional Hospital. Data including patient identifiers and critical findings from the augmented scan were collected from IMPAX. All cases were blindly re-interpreted by a second radiologist. Descriptive statistics were used to describe the study population and presence of critical findings on the augmented scan. The kappa statistic was used to measure the agreement between the original interpretation and the blind reviewer.

RESULTS / DISCUSSION: Of the 102 eligible patients, the mean age was 72 (95% CI 70.0, 73.9) and 63 patients were female (61.7%). The data showed that using augmented CTA scans enabled radiologists to identify potential sources of stroke in 29.4% (95% CI 21.0%, 39.4%) of the patients (Table 1). The inter-rater reliability between radiologists was moderate (kappa=0.49, $p<0.05$) which is consistent with literature. By identifying the source of stroke with the original CTA scan, subsequent scans can be avoided.

CONCLUSION: Using augmented CTA scans can elucidate the cause of proximal embolic stroke reducing the need for additional investigation in 29.4% of patients.

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Automated Classification of Interstitial Lung Disease on High-Resolution Chest CT

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: The aim was to develop an automated model to detect and classify cases of Interstitial Lung Disease (ILD) such as Usual Interstitial Pneumonia (UIP) and Non-Specific Interstitial Pneumonia (NSIP) on High-Resolution Chest CT (HRCT).

METHODS: 183 HRCT images of 7 types of ILD were used along with a set of 43 normal images. Three representative, lung window, axial images from each scan were used including the upper, mid, and basilar lungs. The images were split into training and validation data sets (ratio of 80:20). A pre-trained EfficientNetV2S convolutional neural network model based on weights obtained for ImageNet, was loaded from the TensorFlow environment, and trained using sparse categorical cross entropy as the loss function. Results were compared to the validation data set on standard machine learning metrics including accuracy. An initial call-back was utilized with a patience of 1 epoch and a minimum delta in accuracy of 0.001. The final layers of the pre-trained model were then unlocked, and additional fine tuning was performed with a learning rate of 0.0001 and a patience of 3 epochs.

RESULTS / DISCUSSION: After 9 epochs, the validation accuracy on the full data set was 84% for the detection and classification of ILD on HRCT into one of seven categories. When the data was restricted to UIP, NSIP, other, and normal, the validation accuracy increased to 96%.

CONCLUSION: A convolutional neural network using transfer learning can achieve high accuracy in detecting and classifying LD on HRCT with higher accuracy when restricted to categories with larger number of cases.

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An evaluation of Competency-Based Medical Education Curriculum for Canadian Diagnostic Radiology Residency (Queen's Fundamental Innovations in Residency Education) – Transition to Practice Stage

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: In 2017, the Queen's University Diagnostic Radiology Program underwent an accelerated path to implementing CBME as part of a university-wide initiative. This afforded us the unique opportunity to utilize the finalized national Royal College entrustable professional activities (EPAs) for Transition to Practice which will give early firsthand feedback on this set of EPAs. This study analyzes results from the final stage of CBME (Transition to Practice) and provides a narrative review on firsthand challenges encountered and lessons learned.

METHODS: Ethics approval was provided by the affiliated hospital REB. All relevant electronic assessments were collated, de-identified, analyzed, and presented in tabulated format. Evaluation of each EPA per resident explored: 1) sufficient volume, 2) case mix and, 3) other contextual variables as per the assessment plan developed by the Royal College.

RESULTS / DISCUSSION: As of 2022, one cohort of trainees (n=3) has completed the Transition to Practice stage of the CBME curriculum. A total of 39 evaluations were obtained, of which 44% (17/39) pertained to the first EPA. Eighty-eight precent (22/25) of evaluations were moderate in complexity and eight percent (2/25) were considered highly complex. None were completed on cases performed after-hours. All residents (3/3) were promoted to the next stage of training.

CONCLUSION: The transition to CBME highlighted various benefits over the traditional model, including affording great flexibility in meeting the resident's unique learning goals and encouraging management of uncertainty in diagnostic imaging. Challenges included increased administrative burden on faculty members, delays in completing evaluations, and subjectivity in interpreting rating scores.

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External rotation of the shoulder for MRI assessment of the long head biceps tendon

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: To investigate whether external rotation of the shoulder improves the accuracy of MRI visualization of the intraarticular and extraarticular long head biceps tendon (LBT).

METHODS: A retrospective PACS review was performed of outpatients referred to the radiology department at the Hamilton General Hospital for MR arthrogram or standard MR imaging of the shoulder, to identify any patients who received an additional coronal and/or sagittal sequence with their shoulder in external rotation. Two MSK radiologists blinded to the procedure then independently evaluated and reported scores from 1 to 10 on the diagnostic quality and pathology of the LBT for both the standard sequences and with the additional external rotation sequence. These scores were also summed for each patient. The scores with and without external rotation were then compared using a non-parametric Mann-Whitney U test.

RESULTS / DISCUSSION: A total of 31 patients were included. The additional MR sequence in external rotation significantly increased the level of confidence in visualization of the intra-articular LBT ($p=0.02$), visualization of pathology ($p=0.04$), and total score ($p=0.03$). There was no significant difference in visualization of the extra-articular LBT ($p=0.54$).

CONCLUSION: This retrospective review demonstrates a significant improvement in the level of confidence of both visualization of the intra-articular LBT, and visualization of pathology of the LBT with a supplementary sequence in external rotation of the shoulder. This highlights the value added by this additional sequence, and the need for a prospective study to further evaluate this relationship on a larger scale.

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Radiologists' ability to identify noise and image quality in pediatric phantoms at one institution

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: Pediatric patients exposed to radiation due to diagnostic imaging have increased risk of developing future malignancies. We conducted a single-institution study investigating radiologists' ability to detect changes in imaging noise and diagnostic quality at different radiation doses in pediatric phantom scans.

METHODS: One pediatric 'phantom' patient of a simulated head, chest/abdomen/pelvis, and abdomen/pelvis was scanned using computed tomography at four different noise index levels (Table 1). Radiologists at our institution were surveyed for determining relative noise, identifying scans closest to the current standard of practice, and determining scans of diagnostic quality.

RESULTS / DISCUSSION: Ten radiologists were surveyed. Overall, the included participants were able to correctly rank 104/160 series when asked to order the series from least noise to moist noise. 33/40 responses stated that more than one series were of equal noise, which was not true in any of the phantom scans. 11/40 responses stated that the series with the most noise was of diagnostic quality. 9/40 of responses correctly identified the series most similar to their current standard of practice. There was some variability in classification accuracy for relative noise between the abdomen/pelvis, chest/abdomen/pelvis, and head scans.

CONCLUSION: This quality improvement study found that there was considerable variability in radiologists' ability to accurately determine relative noise, diagnostic quality, and the current standard of practice. Further investigation is warranted with regards to reducing radiation doses without sacrificing diagnostic quality. Furthermore, we highlight the importance of conducting institution-specific dose reduction studies.

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Reporting of Participant Demographics in Articles Published in General Radiology Journals from 2013 to 2021

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: The reporting of research participants' demographics provides insight into study generalizability. Our study aims to determine how frequently participant age, sex/gender, race/ethnicity, and socio-economic status (SES) are reported and analyzed in radiology journals and evaluate associations between demographics reporting and study characteristics.

METHODS: Articles presenting randomized controlled trials (RCT) and secondary analyses of RCTs published in eight leading general radiology journals between 2013 and 2021 were included. The senior author continent, publication year, study type (RCT/secondary analysis), design (prospective/retrospective), funding status, subspecialty, topic, as well as demographics reporting and analysis were extracted. Associations between the reporting of demographics and study characteristics were analyzed using the chi-squared and Mann-Whitney U test for categorical and continuous variables, respectively.

RESULTS / DISCUSSION: Amongst 432 included articles, 89.4% (386) reported age, 90.3% (390) sex/gender, 5.6% (23) race/ethnicity, and 3.0% (13) SES. In articles that reported these demographics and were not specific to a subgroup, results were analyzed by age in 14% (55/386), sex/gender in 19% (66/340), race/ethnicity in 14% (3/22), and SES in 46% (6/13). Age and sex/gender reporting was associated with last author continent, journal, impact factor, study type, design, subspecialty, and topic. Race/ethnicity and SES reporting was associated with last author continent, journal, and impact factor. Race/ethnicity reporting was associated with funding, while SES reporting was associated with subspecialty.

CONCLUSION: Participant age and sex/gender are frequently reported whereas race/ethnicity and SES are rarely documented in radiology research. A consensus amongst our research community on when and how to report these demographics is needed.

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Stress Relief with the Implementation of a National "Mock Interview Series" for Radiology Residency Applicants

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: According to literature, medical students feel the Canadian Resident Matching Service (CaRMS) interview process is stressful. Our primary research objective was to determine if simulated interviews reduce anxiety and increase feelings of preparedness for CaRMS radiology applicants. The secondary objective was to evaluate whether the Canadian Association of Radiologist's Medical Student Network (CAR MSN) Mock Interview series was beneficial to interview preparation.

METHODS: Radiology Interest Group representatives and the CAR invited Canadian medical students (via email and social media) to participate in a 30-minute zoom mock interview conducted by radiology residents. Pre- and post-interview surveys (google forms) consisting of 15 questions were created by a committee of medical students and residents and were emailed to student participants. The surveys included both Likert-scaled and open-ended assessments of confidence, contributors to anxiety, planned interview preparation, and feedback on the sessions. Research Ethics Board approval was not considered necessary.

RESULTS / DISCUSSION: 47 students participated in the mock interviews. 44/47 (93.6%) and 17/47 (36.2%) of student participants completed the pre-interview and post-interview surveys respectively. Students were 4.2 (95% CI 0.8, 42) times more likely to feel confident post-interview. 40 medical student interviewees participated in CaRMS 2022; 22 matched to radiology, 13 did not, and 5 participants CaRMS results are unknown.

CONCLUSION: The CAR MSN Mock Interview Series supported medical students applying to radiology residency. Practice interview sessions were reported to be beneficial for students preparing for CaRMS radiology interviews.

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Automatic Detection of C-Spine Fractures on CT

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: To train a convolutional neural network to detect cervical spine fractures on CT, for use in the emergency setting.

METHODS: CT C-Spine scans and reports from 100 patients scanned in the Vancouver General Hospital Emergency Department were collected. The dataset included both stable and unstable cervical spine fractures. Each scan was labelled with vertebral fracture level. A convolutional neural network (CNN) was created with pre-trained weights from a publicly available CNN. The dataset was split into training, validation, and test sets with a 5-fold cross-validation used to create the training and validation sets. Fracture prediction was performed on a level-by-level basis, from which a percentage of fracture at any level was calculated. Sensitivity, specificity, and accuracy were then calculated on the overall fracture prediction. The published report was used as gold-standard, with the findings confirmed by an independent

RESULTS / DISCUSSION: Accuracy of 0.86, sensitivity of 0.85, and specificity of 0.87 was achieved. Of the false negative cases, none were unstable fractures. Accuracy of individual vertebral level fracture detection was 0.82.

CONCLUSION: A CT C-Spine algorithm was trained to detect fractures with acceptable detection accuracy and sensitivity. These results suggest our model may be used in clinical practise to help with c-spine clearing.

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Retrospective Analysis of Emergency Pelvic Ultrasounds for Suspected Ovarian Torsion: An Analysis of Clinical Outcomes

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: To identify the frequency of underlying diagnoses in the emergency room, among adult women who have undergone a pelvic ultrasound for clinical suspicion of ovarian torsion, and to explore changes in diagnostic probability across lifespan.

METHODS: Following ethics approval, a retrospective chart review was conducted for all female adult patients who presented to a Hamilton Health Sciences Emergency Room between 2014 and 2019, who underwent Doppler ultrasound to rule out ovarian torsion. Final diagnosis was determined through a review of clinical notes in the EMR with a minimum of 2 years follow-up.

RESULTS / DISCUSSION: 1640 pelvic ultrasounds met inclusion criteria. For all age categories, abdominal pain not yet determined (NYD) was the most frequent diagnosis (n=794) across all age groups. For participants aged 18-30 and 31-50, ovarian cysts (18-30: [n = 127, 14.0%], 31-50: [n = 79, 11.9%]), and appendicitis (18-30: [n = 58, 6.4%], 31-50: [n = 46, 7.0%]) were the second and third most frequent diagnoses. For patients aged ≥51, diverticulitis (n = 6, 8.7%) was the second most frequent diagnosis. There were 26 patients diagnosed with ovarian torsion (18-30: [n = 10, 1.1%], 31-50: [n = 16, 1.8%]), with no cases in patients ≥51.

CONCLUSION: For patients between ages of 18-50 who present with symptoms suspicious for ovarian torsion, the three most frequent diagnoses were abdominal pain NYD, ovarian cysts, and appendicitis, respectively. Patients aged ≥51 were more likely to be diagnosed with gastrointestinal or renal pathologies. In total 1.6% of all patients were diagnosed with ovarian torsion.

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Tunneled Dialysis Catheter Insertion Infection Risk Without Antibiotic Prophylaxis: A Retrospective Cohort Study

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: To determine the rate of infection associated with tunneled dialysis catheter (TDC) insertion and replacement without antibiotic prophylaxis, associated risk factors, and compare the infection rate to existing literature.

METHODS: This retrospective cohort study analyzed all patients that had a TDC insertion or replacement from January to December 2018 in Eastern Health, Newfoundland. Patients were followed for a one-year period to determine if they had a TDC infection causing TDC loss, bacteremia requiring hospitalization, or death.

RESULTS / DISCUSSION: Overall there were 226 catheters after inclusion criteria. There were 165 patients, 97 (59%) were male, with a median age of 64 (IQR 18). At the end of the study 30 patients had resolved AKI, and 29 died from causes other than infection. Most catheters were exchanged due to poor functioning. There was a 1.3% (3/226) infection rate per catheter and 1.8% (3/165) per patient at the 30-day follow up period, and a 4.4% (10/226) per catheter and 4.8% (8/165) infection rate per patient at 1-year follow up. There were no statistically significant differences for infection rates among first placement and replacement catheters, 3.6% and 4.9% respectively. There were no statistically significant differences for immunosuppressed, diabetic patients, or patients on antibiotics, however the results may be clinically significant.

CONCLUSION: These results suggest that antibiotic prophylaxis before the placement of tunneled dialysis catheters may have insignificant benefit in preventing infection. Rates were not significantly different between categorical variables, and infection rates were lower than previously documented rates referenced in the guidelines.

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Validation of a fully automated software for segmentation of abdominal aortic aneurysms

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: To compare the performance of an artificial intelligence (AI) based fully automatic software for segmenting abdominal aortic aneurysms (AAAs) on contrast enhanced (C+) and no contrast (C-) CT imaging with that of a previously validated semi-automatic software

METHODS: 40 C+ studies and 16 C- studies of AAAs between the renal arteries and common iliac bifurcation with diameters ≥35mm, slice thickness ≤2mm are obtained from the Centre Hospitalier de l'Université de Montréal. The AAAs are first segmented on a semi-automatic software (ORS Visual) with manual adjustment of the aortic envelope, then segmented on a fully automatic software (PRAEVAorta) using artificial intelligence. Comparisons are made on the maximum diameters (Dmax) as well as volume parameters.

RESULTS / DISCUSSION: C+: mean Dmax for ORS Visual is 72.6mm compared to 70.2mm for PRAEVAorta with a difference of 2.4mm (CI 95% [1.30; 3.46]; p ≤0.001). C-: mean Dmax for ORS Visual is 64.7mm compared to 62.2mm for a difference of 2.5mm (CI 95% [0.73; 4.19]; p ≤0.005). Dmax correlation is 0.979 for C+ and 0.983 for C-. Bland-Altman analysis shows a slight systematic bias of about 2mm in favour of ORS. Mean total operation time for ORS is 15min versus 2.3min for PRAEVAorta. Volumetric analyses are ongoing.

CONCLUSION: PRAEVAorta and ORS segmentations are visually comparable. Though inter-method correlation is excellent, PRAEVAorta's Dmax measures tend to be systematically smaller. The possibility of obtaining AAA segmentations with complete morphological parameters even on non-contrast images rapidly and in a reproducible manner will improve clinical follow up and decision making.

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Evaluating the Outcomes and Trainee Performance of a Canadian Medical Imaging Clinician Investigator Program

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: The study sought to use research productivity to measure the University of Toronto's Medical Imaging Clinician Investigator Program's (MI-CIP) trainee performance and compare research productivity of MI-CIP trainees with MI-non-CIP and General Surgery (GSx) CIP trainees.

METHODS: We identified residents who completed an MI-CIP, MI-non-CIP and GSx-CIP from 2006-2016. In each group of trainees, we assessed three research productivity outcomes with non-parametric tests at 7 years post-CIP completion/post-graduation and on a lifetime basis. Research productivity outcomes include the number of total publications, the number of first-author publications, and the publication's average journal impact factor (IF).

RESULTS / DISCUSSION: We identified 11 MI-CIP trainees (male/female: 9[82%]/2[18%]),74 MI-non-CIP trainees (46[62%]/28[38%]) and 41 GSx-CIP trainees (23[56%]/18[44%]) trainees. MI-CIP trainees had statistically significant higher research productivity than MI-non-CIP in all measured outcomes. The median (interquartile range, IQR) number of total publications of MI-CIP vs MI-non-CIP trainees was 6.0(10.0) vs 0.0(2.0) at 7 years post-CIP and 13.0(18.0) vs 1.0(4.0) lifetime. The median (IQR) first-author publications of MI-CIP vs MI-non-CIP trainees was 2.0(4.0) vs (0.0)(1.0) at 7 years post-CIP and 5.0(5.0) vs (0.0)(1.0) lifetime. The median (IQR) average journal IF of MI-CIP vs MI-non-CIP trainees was 3.9(3.2) vs 0.0(2.6) at 7 years post-CIP and 3.4(1.3) vs 1.4(2.7) lifetime. Between MI-CIP and GSx-CIP trainees, there were no significant differences in research productivity in all measured outcomes.

CONCLUSION: MI-CIP trainees actively conducted research after graduation. These trainees demonstrated early research engagement before residency. The similar research productivity of MI-CIP vs GSx-CIP trainees shows success of participating MI-CIP trainees.

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Energy Stewardship in MRI

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University of Saskatchewan

PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: MRI scanning is energy intensive. We aimed to determine our department's MRI energy consumption and evaluate potential methods of saving energy.

METHODS: Both MRI scanners (1.5T and 3T) were equipped with energy data loggers for 1 week in August 2021. Energy use was calculated (per time unit) for inactive downtime (department closed), active downtime (between cases) and individual cases (including subspeciality) using PACS time stamps. Carbon emissions were calculated using local emission conversion factor of 0.51 CO2/kWh.

RESULTS / DISCUSSION: Total week MRI energy consumption was 7,612.1 kWh with estimated emissions of 3,882.3 kg CO2. The 3T and 1.5T scanners actively scanned for 51 and 47 hours respectively, but the 3T scanner used 70.4 % of total energy consumption. Energy use per minute was higher in active than inactive downtime and highest while actively scanning. Average emissions per minute active scanning was 0.16 kg CO2/min and 0.43 kg CO2/min for the 1.5T and 3T scanners respectively.

CONCLUSION: Our weekly MRI emissions were 3,882.3 kg CO2, similar to an annual Canadian passenger vehicle emissions of 3,830 kg CO2. By applying shorter imaging protocols and limiting downtime between cases we can reduce our case specific and overall carbon emissions.

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Multiclass Labelling of Foreign Hardware on Chest Radiographs Using a Convolutional Neural Network

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: To assess the accuracy of transfer learning with a pre-trained convolutional neural network (CNN) in detecting multiple classes of medical devices and other foreign bodies on chest radiographs.

METHODS: A total of 2000 de-identified, publicly available chest radiographs were binary labelled for the presence of 18 different types of foreign bodies by two radiology fellows. The images were split into training and validation data sets (80:20 ratio). A pre-trained ResNet50 convolutional neural network model based on weights obtained from ImageNet was loaded from the TensorFlow environment. The top layer was removed and replaced with a single densely connected layer. The ResNet50 pretrained model expects a 224 x 224 x 3 channel input. The x-ray images were down sampled to 224 x 224 using simple averaging.

RESULTS / DISCUSSION: After several epochs the neural network could correctly classify the presence or absence of different medical devices or foreign objects with an accuracy of 78-99% on the validation data set, and 10/17 classes were detected with >90% accuracy. This model did show high average specificity (98% [93-100%]) but variable sensitivity (57% [11-100%]) across classes, likely attributable to the small size of the dataset and high similarity in form and position of several devices.

CONCLUSION: Transfer learning using a pre-trained neural network permits high accuracy classification of foreign bodies and medical devices on chest radiographs and represents an important step towards more accurate and rapid confirmation of device presence. Larger datasets and improved annotation will be required to further improve the performance of future models.

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Assessing the (f)utility of renal ultrasound in acute kidney injury: a retrospective review

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: To determine the utility of renal ultrasound in detecting clinically significant urinary tract obstruction in the context of acute kidney injury.

METHODS: A cohort of adult patients who underwent renal ultrasound for acute kidney injury between January 2019 and December 2021 were retrospectively reviewed. The number of renal ultrasounds that identified urinary tract obstruction and the patient characteristics associated with these studies were recorded.

RESULTS / DISCUSSION: A total of 2087 adult renal ultrasounds were performed for acute kidney injury during this two year period. Bilateral hydronephrosis was seen in 3.4% (72) of the 2087 studies. 74% (53) of these patients had high risk medical history including previous bilateral hydronephrosis, known urinary retention, or known pelvic neoplasm. Overall, bilateral obstruction was only seen in 19 (0.9%) low risk patients without concerning medical history. While renal ultrasound is commonly ordered in the context of acute kidney injury, clinically relevant obstruction was seen in less than 1% (19/2087) of low risk patients with no known risk factors for obstruction. Renal ultrasound should instead be delayed in this patient population until other, more common, causes of acute kidney injury are ruled out. More selective ordering practices can reduce the number of unnecessary studies completed while still detecting clinically relevant disease.

CONCLUSION: Renal ultrasound has limited utility in the evaluation of acute kidney injury in low risk patients without known risk factors for bilateral obstruction.

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The Next Generation Trial – The First Ten Months: Assessing 18F-PSMA-1007 Positron Emission Tomography in the Primary Staging of Prostate Cancer Patients

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: The objective of this study is to determine the accuracy and role of prostate specific membrane antigen (PSMA) PET and multiparametric MRI (mpMRI) in the primary locoregional staging of intermediate and high-risk prostate cancer.

METHODS: The Next Generation Trial (NCT05141760) is a prospective phase II study assessing 18F-PSMA-1007 PET and mpMRI for locoregional staging of clinically significant prostate cancer in men undergoing radical prostatectomy and bilateral pelvic lymph node dissection. The design of this study is a validating-paired cohort, with final histopathology following surgery as the gold standard comparator.

RESULTS / DISCUSSION: Between March and December 2022, 156 patients were assessed for eligibility. 82 patients have met inclusion criteria, while 64 have been excluded. 70 patients have received both their PSMA PET and mpMRI scans. 35 have received prostatectomy. 9 patients have received complete trial specific blinded imaging and pathology reviews. Among the 9 patients included in this preliminary dataset, 4 had PSMA PET concordant with the final pathology staging, while 2 had mpMRI concordant with the final pathology staging. Largest source of staging discordance was microscopic extra prostatic extension identified on pathology, not identified on imaging. Additionally, PSMA-PET has a trend of greater concordance for secondary non-dominant nodules.

CONCLUSION: From this initial analysis, there is a trend of prostate cancer patients who are more accurately staged using 18F-PSMA-1007 PET compared to mpMRI, particularly when there is multifocal disease. As more blinded imaging and pathology results are compiled, this initial data will be further clarified and the quality of evidence increased.

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Novel applications, benefits and barriers of procedural-based simulation in Canadian radiology residency and fellowship programs

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: The purpose of this study is to explore the thoughts, opinions and knowledge of key stakeholders to determine the necessary elements to develop a procedural simulation curriculum for Canadian radiology residency and fellowship programs.

METHODS: The study comprised of semi-structured, audiotaped interviews with radiology residents, fellows and staff who train or practice in Canada. Thematic analysis was conducted to identify any trends or relationships to further our understanding on the research question.

RESULTS / DISCUSSION: Twenty five interviews were conducted with radiology residents and staff across eight Canadian educational institutions. A tabulated matrix was used to organize the major themes identified. Fifteen emerging major themes were identified in total. For example, the theme labelled Slim Sim Use emphasized the paucity of simulation currently being used in Canadian radiology programs. A key informant stated "We don't have anything. I know we have a sim centre, but not for radiology… Anesthesiology uses it." The theme labelled Sink or Swim highlighted how rising procedural volumes no longer afford an appropriate amount of time to residents to perform procedures independently. One of the key informants stated "Sometimes you just have to push the resident out of the way or you know you won't get home before 5pm. "

CONCLUSION: Simulation has the potential to serve as an effective training tool and credentialing medium to assess procedural competency prior to practice. Further national discussions are needed before a procedural simulation curriculum can be developed and systematically integrated into Canadian radiology programs.

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Quality assurance of CT head studies for surgical navigation with reduced contrast dose during SARS-CoV-2 related contrast shortage: Lesson from a crisis

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: Intravenous contrast injection protocol for certain CT studies at our institute was revised in June 2022 to tackle the global shortage of iohexol. This included reduced contrast dose for CT head studies performed for neuro-navigation (from 90mL to 70mL). We performed quality assurance for these studies.

METHODS: Consecutive CT scans before (n=32) and after (n=32) contrast dose reduction were reviewed. Demographic data was obtained from the chart. Subjective observations made by two radiologists in consensus included overall study quality (Likert scale of 1 to 5), location, margins and internal characteristics that were compared with MRI (reference standard) findings using fisher's exact test. Superior sagittal sinus attenuation, used as objective measurement of enhancement, and lesion size were compared using student's t-test. Institutional database was searched for any study requiring repetition or deemed non-diagnostic by the reporting radiologist and for any comment in the operative notes.

RESULTS / DISCUSSION: The average age (61.1 ± 12.8 years and 61.6 ± 14.9 years) and body surface area (1.9 ± 0.3 m2 and 1.9 ± 0.2 m2) of both groups was not significantly different ($p>0.05$). There was no significant difference in objective ($p>0.05$) or subjective ($p>0.05$) enhancement between the two groups. There was no significant difference between CT and MRI for lesion location, margins and internal enhancement characteristics in both groups ($p>0.05$) (Table 1). No study required repetition or was reported non-diagnostic. There was no adverse comment about study quality in operative notes.

CONCLUSION: Reduced contrast dose neuro-navigation CT head studies are not different in quality compared to the conventional studies.

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Redesigning the Undergraduate Radiology Curriculum – A Case Study

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: Didactic radiologic teaching is far removed from the day-to-day work of radiologists, and does not give students a representative example of how radiologists practice. This single-institution study compares didactic teaching to interactive PACS based teaching, assessing the performance and enjoyment of undergraduate students.

METHODS: This study compares medical students during a pre-clerkship "Core Content Boot Camp". Students were randomized into four groups, two of which were given a didactic lecture, and two taught through a PACS based interactive method. Students completed pre- and post-tests as well as satisfaction surveys.

RESULTS / DISCUSSION: Students in all groups demonstrated a statistically significant improvement between their pre- and post-test scores. While students in the interactive groups scored slightly higher in the post-test, this was not statistically significant.

Students in interactive teaching groups rated their sessions more favourably, and gave a mean rating of 4.1 of 5, compared to a mean of 3.0 given to the didactic sessions.

Students in the interactive group were more likely to agree that the teaching method was the best way to teach the information presented, while students in the didactic groups were overall neutral.

Students from all groups would use interactive teaching if given the choice.

CONCLUSION: This single institution study demonstrates that undergraduate medical students prefer interactive teaching methods while learning radiology. As radiologists, it is our responsibility to deliver teaching in a way that is engaging and interesting. Ideally, this would lead to greater understanding and appreciation of radiology amongst future physicians.

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Factors Associated with Recurrent Disease After Resection of Colorectal Carcinoma Liver Metastases: A Multi-Centered Population-Based Study

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: To evaluate what factors are associated with liver disease recurrence in patients with resected colorectal cancer liver metastases (CRCLM).

METHODS: Patients with resected non-mucinous CRCLM between January 2014-March 2020 were retrospectively identified from a population-based cancer registry. Dates of diagnosis, surgery, and if applicable, death, were obtained from the registry. Each patient's imaging was reviewed to document the earliest date of hepatic disease recurrence. The hepatic disease-free survival (HDFS) and overall survival (OS) were calculated using a census date of 24 September 2022. The following tumoral and imaging factors were evaluated for impact on HDFS and OS: interval between pre-operative imaging and surgery (<30 days, 30-60 days, and >60 days); pre-operative imaging modality (contrast-enhanced CT vs. MRI, <60 days only); presence of extrahepatic disease at time of liver resection (yes vs. no); and Metroticket Tumor Burden Score (MTBS, <5 vs. >/=5), where MTBS^2 = (largest axial dimension of CRCLM)^2 + (number of CRCLM)^2. Survival curves for HDFS and OS were compared using the log-rank test.

RESULTS / DISCUSSION: 142 patients (mean age 61±11 years, 97 males, 53 females) were included. Log-rank results for HDFS and OS were as follows, respectively: pre-operative imaging interval (p=0.35 and p=0.91); pre-operative imaging modality (p=0.052 and p=0.28); presence of extrahepatic disease at surgery (p=0.86 and p=0.02); and MTBS (p=0.03 and p=0.02).

CONCLUSION: In our population, tumoral-related factors MTBS and presence of extrahepatic disease at surgery were significantly associated with adverse patient outcomes. Pre-operative imaging interval and imaging modality were not associated with HDFS and OS.

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Evaluating the resident call structure in Canadian diagnostic radiology postgraduate medical education programs

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: To delineate and compile the resident call structure of all diagnostic radiology (DR) postgraduate medical education (PGME) programs in Canada.

METHODS: The project is a collaboration between the CAR Resident and Fellow Section (RFS) call subcommittee and the Canadian Association for Interventional Radiology (CAIR) RFS. A questionnaire was developed and distributed to the CAR RFS representatives, as well as the chief/senior/lead residents, of all 16 Canadian DR PGME programs. The questions pertained to 1) institutional information, 2) resident body makeup, 3) call structure and frequency, 4) call preparation, 5) on-call supports, and 6) on-call responsibilities.

RESULTS / DISCUSSION: As of December 2022, 15 of the 16 Canadian DR PGME programs have completed the questionnaire. Select highlights from the preliminary data include that 8 (53%) programs have a structure that sometimes necessitates working continuously for at least 24 hours. All programs cover CT and 14 (93%) also cover ultrasound—out of the 14, seven (50%) have ultrasound scanning responsibilities for residents. Nine (60%) institutions require residents dictate full reports, one (7%) requires a structured report with no incidentals, and 5 (33%) require only a basic preliminary with an impression. In 10 (67%) programs, all examinations done on-call have the same responsibilities including less urgent examinations (e.g., routine inpatient follow-ups). Although 4 (27%) programs allow remote PACS access, none allow residents to be on-call remotely.

CONCLUSION: Dissemination of this data may be helpful for residents seeking to calibrate their call structure in the face of growing diagnostic imaging volumes and call burden nationwide.

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Measuring changes in undergraduate medical student radiology knowledge and perceptions following a one-week comprehensive boot camp

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: To measure change in radiology knowledge, confidence in radiology skills, and perceptions pertaining to radiology following a one-week boot camp elective for undergraduate medical students.

METHODS: Pre-clerkship medical students were enrolled in a five-day comprehensive radiology elective including sessions on image interpretation, procedural skills, and appropriate image ordering. A 21-question multiple choice pre- and post-elective knowledge quiz was administered utilizing radiology questions from the validated AMSER STARs database. Questions were chosen based on the AMSER "Must See" radiology diagnoses. Additionally, a pre- and post-elective survey was administered assessing radiology career interest, confidence in radiology-based skills, and the perceived importance of radiology-based skills in specialties other than radiology. Responses from the assessments were analysed anonymously using paired t-tests.

RESULTS / DISCUSSION: 15 students enrolled in the course and 14 completed all assessments. The average score on the quiz increased from 50.1% to 66.0% ($p<0.001$). On the post-elective survey, most students reported increased confidence in radiographic interpretation (64.3%), ultrasound interpretation (78.6%), CT/MRI interpretation (57.1%), general radiology knowledge and procedural skills (78.6%), and in their ability to order appropriate imaging tests (71.4%) compared to the pre-elective survey. Average student satisfaction with the elective was 8.1 out of 10. 14 students (100%) agreed or strongly agreed that improving their radiology knowledge, procedural skills, and image ordering skills would benefit them on non-radiology clinical rotations.

CONCLUSION: After a one-week radiology elective, pre-clerkship medical students increased their radiology knowledge and most students demonstrated improved confidence in image interpretation, procedural skills, and appropriate ordering. The elective was well-received by learners and instructors.

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Outcome in Acute Ischemic Stroke During the COVID-19 Pandemic

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: To determine the effect of the pandemic on outcomes of large vessel occlusion (LVO) acute ischemic stroke (AIS) patients treated with endovascular therapy (EVT).

METHODS: Data were obtained from a prospectively maintained database at five Canadian stroke centers from periods before (March 11, 2019, to March 10, 2020) and during the pandemic (March 11, 2020, to March 11, 2021).

RESULTS / DISCUSSION: This study included 1039 patients who underwent EVT for anterior circulation AIS. Baseline characteristics are comparable except for lower initial NIHSS in the peri-pandemic group (16 vs 14, pre vs peri, $p<0.0001$). Mean time from last seen normal (LSN) to ED (255.8 vs 289.4 min; $p=0.0005$), LSN to puncture (330.2 vs 380.6; $p<0.001$), ED to Angiography (79.7 vs 93.3 min; $p=0.001$), CT to recanalization (142 vs 161.1 min; $p=0.038$) and LSN to recanalization (373.9 vs 430.8 min; $p=0.002$) is longer in the peri-pandemic period. There is no difference in mean time from angiography to puncture (14 vs 14.3 min; $p=0.70$) or puncture to first pass (25.6 vs 24.6 min; $p=0.52$). Furthermore, patients who underwent EVT during pandemic are more likely to have worse functional outcomes (modified Rankin Scale, >2) after adjusting for the same time interval from LSN to puncture (32.9% to 42.9%, $p=0.37$, under 150 mins; 41.6% to 52.3%, $p=0.15$, 151-240 mins).

CONCLUSION: Our results indicate an increase in key time metrics of EVT in AIS during pandemic. However, our findings suggest that the worsening function outcome of EVT patients during pandemic is beyond the observed time delay.

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Brain Tumor Reporting and Data System (BT-RADS): Diagnostic Accuracy and Reliability in Predicting Glioma Progression

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PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE: To assess the diagnostic accuracy and reliability of the Brain Tumor Reporting and Data System (BT-RADS) in predicting glioma progression in post-treated glioma imaging.

METHODS: This prospective multicentric study enrolled patients with a history of partial or complete resection of high-grade gliomas. All patients underwent two consecutive follow-up brain MR examinations. Five neuroradiologists independently evaluated the MRI examinations using the BT-RADS. The reference standards were re-operation evaluation and clinical and imaging follow-up. The interreader agreement (IRA) was assessed using kappa statistics.

RESULTS / DISCUSSION: The final analysis included 73 patients: 47.9% showed tumor progression and 52.1% showed no tumor progression. According to readers 1, 2, 3, 4, and 5, BT-RADS 3 showed tumor progression in 51.4%, 68.6%, 57.2%, 45.7%, and 42.9% of patients, respectively, whereas BT-RADS 4 showed tumor progression in 31.4%, 20%, 25.7%, 37.1%, and 45.7% of patients, respectively. Considering > BT-RADS 3a as the cutoff value for tumor progression, the sensitivity, specificity, and accuracy of BT-RADS ranged between 68.6-85.7%, 84.2-92.1%, and 78.1-86.3%, respectively, according to the reader. The overall IRA of the BT-RADS for assessing tumor progression was good (κ= 0.75). IRA was moderate for the enhanced component (κ= 0.45), good for the FLAIR component (κ= 0.67) and mass effect (κ= 0.69), and very good for new lesion detection (κ= 0.89).

CONCLUSION: The BT-RADS has high diagnostic accuracy and reliability for predicting tumor progression in post-treated glioma patients.

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Usefulness of MRI-Based Local Surveillance after Surgical Treatment of Musculoskeletal Soft Tissue Sarcomas: A Systematic Review and Meta-Analysis

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PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE: To evaluate the usefulness of MRI-based surveillance for musculoskeletal STS represented by (1) the proportion of local recurrences (LRs) discovered by imaging versus clinically, (2) the characteristics of LRs detected by imaging versus clinically, and (3) the impact of imaging surveillance on survival.

METHODS: Medline, Embase, Scopus, and Cochrane CENTRAL databases were searched systematically through November 2022 for primary research published in English or French. The risk of bias was assessed using an adapted Newcastle-Ottawa scale. Random effects meta-analyses of the proportion of LRs discovered by imaging, stratified by imaging surveillance intensity, were conducted.

RESULTS / DISCUSSION: A total of 4821 titles and abstracts were identified, and 19 studies were included. All studies were retrospective cohorts. There was substantial variability in follow-up approaches. The risk of bias was moderate in 37% and high in 63% of studies. The pooled proportion of LRs detected by imaging was 58% (95% confidence interval 43-73%) with high-intensity surveillance and 7% (4-11%) with low-intensity surveillance ($p<0.01$). The comparison of LRs' characteristics (size, depth, grade, location, margins) detected by imaging versus clinically identified inconsistent results between studies. Trends toward better survival for imaging-detected LRs or more frequent imaging use were noted in four studies.

CONCLUSION: When used at a high frequency, MRI-based surveillance can detect many clinically occult LRs, although the studies were small, occasionally conflicting, and of poor quality. A survival benefit could be associated with imaging use, however further research is needed to evaluate the causality of any observed survival differences.

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Automated 3D segmentation of intracerebral hemorrhage

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: To develop a 3D deep learning model to segment intracranial hemorrhage (ICH) on non-contrast computed tomography (CT)

METHODS: CT scans containing ICHs were extracted from a public database (RSNA Kaggle competition 2019) for which our team performed manual annotations (n=125, additional annotations in progress). The training, validation, and test subsets were divided into an 80:10:10 ratio. A 3D Unet, a U-shaped convolutional neural network architecture, was developed in PyTorch and trained to segment ICH regions that were manually delineated. The performance of the model was evaluated by the Dice coefficient (degree of spatial overlap).

RESULTS / DISCUSSION: We obtained average Dice scores of 0.77,0.76 and 0.69 on the training/validation/test subsets with a preliminary 2D version of the model. In comparison to the 2D segmentation algorithm, we expect a superior performance of the 3D model due to a better spatial representation of the region of interest. We expect to achieve a Dice coefficient of at least 0.75 on the test subset. The model is still under development and the results will be available at the time of the meeting.

CONCLUSION: An efficient segmentation model will allow a more accurate quantification of the volume of ICH which is an important predictor of expansion prediction and enable automated follow-up of these lesions.

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Evaluation of an institutional biopsy size threshold of 2.5 cm for benign appearing breast masses in patients 20-35 years old

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PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE: Young patients frequently present with palpable breast masses. At our institution, a clinical practice guideline (CPG) was developed that recommends biopsy of a palpable benign appearing mass if 2.5 cm or greater. A retrospective evaluation was performed to determine the appropriateness of this biopsy size threshold.

METHODS: The inclusion criteria were all biopsied masses in patients age 20-35 from January 2014 – to June 2022. It was inferred that all masses that met the CPG would have been given a risk category of 4A. All 4A malignancies were evaluated retrospectively to determine if they met the CPG, and were a potential successful pickup of the CPG. All 4A biopsies for the most recent 18 months were reviewed to determine how many cases in total met the CPG.

RESULTS / DISCUSSION: Of the total 336 biopsies, there were 6 malignancies given a risk rating of 4A. None clearly met the CPG. All were biopsied for reasons other than size alone (growth, shape, margin). Therefore, the 2.5 cm size threshold did not find any additional cancers. There was no significant difference between the dimension of malignant versus benign masses (p=0.24). 22 of 70 biopsies in the last 18 months (31%) were biopsied due to the CPG, none were malignant.

CONCLUSION: Increasing or eliminating the size threshold for biopsy could decrease low yield but invasive procedures in young patients. In light in growing waitlists and need for efficient use of resources, this change could help our institution prioritize biopsy of more suspicious findings.

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A.I. Supports Mammography Image Quality Improvement

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PRESENTER'S LEVEL OF TRAINING: Other medical professional

OBJECTIVE: Image quality optimization is critical to accurately diagnose breast cancer. Inadequate positioning causes image deficiencies and accreditation failures. Visual assessments of positioning are non-standardized. There is a paucity of data on population-level mammography (MG) positioning error rates and benchmarks. Artificial Intelligence (A.I.) may make it feasible to establish benchmarks for MG quality improvement initiatives.

METHODS: MG positioning was assessed on 188,609 mammograms from September 1st, 2021 to April 15, 2022 at NorthShore University HealthSystem. Positioning errors were measured using A.I. algorithms to assess CC exaggeration, missing inframammary fold (IMF), inadequate and concave pectoralis muscle, and stratified by body habitus and acquisition parameters (compression pressure, laterality, patient age, and breast size) to validate expected associations.

RESULTS / DISCUSSION: Statistical significance ($p<0.001$) was noted for the following: CC exaggeration error rate of 0.22 by laterality, IMF missing error rate of 0.46 by breast density, breast volume and compression pressure, nipple not in profile error rate of 0.59 by breast volume and breast area, sagging error rate of 0.07 by compression pressure, and error rates of 0.18 for inadequate pectoralis muscle length and 0.08 for concavity of pectoralis muscle by breast thickness.

CONCLUSION: Standardizing MG positioning quality assessments is essential to deliver equitable quality of care. A.I. decision tools may help establish standardized population-based benchmarks of MG positioning error rates supporting MG quality improvement initiatives that could include training and educational interventions.

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Accuracy of Multiparametric Prostate MRI for the Assessment of Extra-Prostatic Disease Extension: Histopathologic Correlation Post Radical Prostatectomy

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McMaster University

PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE: To assess the diagnostic accuracy of mpMRI in identifying EPE in men undergoing radical prostatectomy.

METHODS: A retrospective study was conducted at a single institution, including men who underwent mpMRI and radical prostatectomy between 2018-2020. The presence or absence of EPE on pre-operative MRI as well as tumor size was documented and compared with the post-surgical pathology.

RESULTS / DISCUSSION: 117 men were included (mean age 62.6 years, range 47-75). Mean tumor size was 15.1 mm. The sensitivity of mpMRI in the assessment of extra-prostatic extension was 51.1 % with a negative predicted value (NPV) of 63.4%. The specificity was 71.4% with a positive predicted value (PPV) of 60.9%.

CONCLUSION: Pre-operative MRI shows moderate accuracy in predicting EPE in men undergoing radical prostatectomy.

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Driving mammography image quality improvement using A.I. in Guyana during the COVID-19 pandemic

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PRESENTER'S LEVEL OF TRAINING: Other medical professional

OBJECTIVE: Georgetown Public Hospital Corporation (GPHC), an under-resourced healthcare organization in Guyana, provides nascent mammography (MG) screening with RAD-AID International. MG is performed by medical imaging technologists (MITs) onsite and interpreted by breast radiologists remotely. The COVID-19 pandemic limited adequate positioning guidance to MITs. This study aims to evaluate the impact of A.I. on MG image quality at GPHC and the feasibility of using A.I. in a remote reading environment.

METHODS: An A.I. mammography quality platform (densitas® intelliMammo™) was deployed and provided technologists with positioning feedback. Pre- and post-adoption positioning error rates were assessed on 5 positioning errors including, CC exaggeration, inadequate pectoralis muscle length, inframammary fold (IMF) missing, nipple not in profile and pectoralis muscle concave (n=1482). Pre- and post-adoption positioning errors were compared and an interview was conducted to understand quality improvement experiences, workflows and challenges in software adoption.

RESULTS / DISCUSSION: Post-adoption MG positioning error rates were statistically significantly lower ($p<0.05$) on 4 of 5 positioning errors for MITs who used A.I. software versus those who did not. MG positioning error rates were statistically significantly lower ($p<0.05$) post- versus pre-adoption for all positioning errors for engaged MITs. Post-adoption, MIT–radiologist communication improved with more frequent feedback and quantitative A.I. results sparking development of educational positioning training videos.

CONCLUSION: A.I. drove MG image quality improvements at GPHC by reducing MG positioning error rates and enhancing MIT-radiologist communications to guide effective, remote, MG positioning training.

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Thoracolumbar fascia ultrasound shear strain analysis in patients with nonspecific low back pain

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PRESENTER'S LEVEL OF TRAINING: Other medical professional

OBJECTIVE: Thoracolumbar fascia (TLF) biomechanical dysfunction is a potential pain generator in nonspecific low back pain (NSLBP). We investigated ultrasound Lagrangian TLF shear strain imaging indices in participants with NSLBP and asymptomatic volunteers before and after a massage technique.

METHODS: Radiofrequency (RF) data loops of the right and left lumbar paraspinal soft tissues were acquired in the sagittal plane during passive lumbar flexion using a Terason t3000 system and a 12L5 transducer. Participants were randomized (1:1) to receive a Real (bilateral 2.5-minute lengthwise stroking) or a Sham massage technique. (Figure) Strain analysis was performed in a region of interest encompassing the TLF and the erector spinae epimysium. Intraclass coefficient correlation and mixed-effect model were computed to assess the data post-processing inter-reader reliability and the shear strain indices.

RESULTS / DISCUSSION: Sixty-four participants [32 NSLBP patients and 32 asymptomatic volunteers; (57 ± 9 vs 51 ± 10 years old ($p=0.016$)] were enrolled. The inter-reader agreement was excellent (ICC=0.950). Time-normalized cumulated (C|ShS|) ($p=0.005$), and maximum absolute (Max|ShS|) ($p=0.022$) shear strain indices were higher in the NSLBP group compared to volunteers at baseline. The Max|ShS| was decreased in the volunteers after the Real massage ($p=0.025$). (Table)

CONCLUSION: Shear strain indices may be potential markers of the TLF in NSLBP. Higher shear strain could result from a dyskinetic instead of a coordinated shear plane motion of the paraspinal muscular and connective tissues. The impact of a massage on volunteers also deserves to be further explored.

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Air within air: Prevalence of air cysts in post infective lungs on HRCT

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PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE: To find the prevalence and extent of air cysts in post infective lungs on HRCT Chest in era of COVID-19.

METHODS: This was a cross sectional observational study conducted at radiology department of Rehman Medical Institute Peshawar Pakistan from 1st March 2020 to 30 Oct 2020. 177 patients selected were HRCT proven COVID-19 pneumonia. All patients had cough and shortness of breath. Age range was 16 to 70 years. CT Chest was performed on 128 slice MDCT scanner. Patients with history of chest intubation were excluded from our data. CT findings were listed as 1) increased density in lung with non visualization of underlying vessels i.e. consolidation 2) increased density in lung with visualization of underlying vessels i.e. ground glass haze 3) linear bands i.e. atelectatic bands 4) small air filled cavities with thin wall (<2mm) i.e. air cysts. Data was collected and analysed using Microsoft Excel and SPSS version 20.

RESULTS / DISCUSSION: Our results showed that air cysts were found in 22 of our cases (12%). Pneumomediastinum and pneumothorax was a complication observed with presence of air cysts and was seen in 8 of the patients (2 with pneumothorax and 6 with pneumomediatinum). There were 2 cases with incidentally noted emphysematous cysts, not related to infective disease. Ground glass haze was the most common finding observed (n=175) followed by subsegmental atelectasis (n=99) and consolidations (n=98).

CONCLUSION: We concluded from our results that air cysts were seen in 12% of post-infective lungs in era of COVID-19 pandemic.

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Clinical study of an embolizing and sclerosing gel for varicose veins in a porcine model: correlation between histology and imaging findings

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE: To optimize long-term results of varicose veins treatment, a temporarily radiopaque, sclerosing and embolizing gel was developed and tested on a porcine model. Imaging and histology analysis were performed to determine the level of venous occlusion. The purpose is the determine the correlation between imaging and histology.

METHODS: 15 domestic pigs were divided into 3 groups. In the first group, the internal maxillary vein (IMV) was embolized with gel and coils (n=9) and the internal gluteal vein (IGV) was embolized with gel (n=7) and coils (n=2). In the second and third groups, IMV or IGV were embolized with gel and coils. IGV and IMV occlusion were compared at T30 between imaging and histological analysis findings.

RESULTS / DISCUSSION: At T30, 100% of the coils in IGV have migrated and 50% in IMV. Complete vein occlusion rate at T30: IGV without coils 8/11 on histology and 9/12 on imaging, IMV without coils 2/5 on histology and 5/6 on imaging, IMV with coils 4/5 on histology and 6/6 on imaging. On histology, veins with stable coiling had a higher quantity of gel in the lumen. In total, 3/10 IMVs with complete occlusion on imaging demonstrated partial occlusion on histology, no other discrepancies were noted. All imaging findings for IGVs correlated with histology analysis.

CONCLUSION: The gel shows good occlusion results, on histology and imaging analysis, especially when combined with stable coiling. Partial occlusions on histology that appear complete on imaging may simply be artefactual. Immunohistochemistry will be done to exclude the presence of an endothelial recanalization phenomenon.

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Dual Energy CT analysis of Coronary Artery Plaque in Gout: A case/control comparison

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PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE: Gout is a known independent risk factor for cardiovascular disease with increased risk of myocardial infarction and other conditions reported and correlation between increasing serum uric acid levels cardiac risk.

Diagnosis of Gout is often aided by Dual Energy Computerised Tomography techniques whereby the composition of soft desposits can be determined via DECT characteristics. We aimed to utilise DECT in the setting of Cardiac Calcium scoring to assess for the presence, and composition, of coronary artery plaque in a cohort group of patients with a history of gout and a control group of non-gout patients.

METHODS: Patients with gout were recruited prospectively from Rheumatology services and referred for DECT Coronary Calcium scores with independent analysis via dedicated software algorithms designed to assess for the presence of Monosodium Urate deposition in the coronary arteries.

Control patients were recruited retrospectively from an analysis of recent scans performed at our department and review of serum urate levels to exclude patients with incidental diagnoses of gout.

RESULTS / DISCUSSION: Evidence of monosodium urate deposition was found in only one of our cohort group in comparison with none of the control group suggesting that direct monosodium urate deposition in the coronary arteries is not directly causal of an increased cardiovascular risk.

CONCLUSION: Although Gout acts as an independent risk factor for cardiovascular disease, our study suggests that this is not related to detectable deposition of monosodium urate within the coronary arteries.

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Automatic Stratification of Patients with Suspected Community Acquired Pneumonia Using Deep Learning Applied to Chest X-Rays Acquired in The Emergency Department

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PRESENTER'S LEVEL OF TRAINING: Other medical professional

OBJECTIVE: To develop an automated imaging-based prognostication (IPRO) model that stratify patients based on their length of stay (LoS) from chest x-rays (CXRs) of patients presenting to the emergency department (ED) with a suspected diagnosis of community acquired pneumonia (CAP), including coronavirus disease 2019 (COVID-19).

METHODS: CXRs (posteroanterior and anteroposterior) from consecutive patients presenting to the ED with CAP at a tertiary care hospital system between January 2007 and December 2018 (n= 10,222) were used to train a two-dimensional convolution neural network, InceptionNet, to predict in-patient (IP) admission. IPRO was retrospectively validated on CAP patients presenting to the ED between January 2019 and June 2021 (n=4,223; 54% males, median age=63 [18-106] years; 28% diagnosed with COVID-19). We evaluate performance amongst risk quartiles and report on median LoS and hazard ratio (HR).

RESULTS / DISCUSSION: IPRO accurately predicted IP admission (AUC=0.80) and stratified patients between the lowest and highest quartiles with HR=2.45 ($p<0.001$) in the reported test set (figure). Overall, median LoS for patients in the highest risk quartile was 6.1 days compared to 0.2 days in patients in the lowest risk quartile. Within the COVID-19 subpopulation, median LoS in the highest quartile was 7.2 days, while the lowest quartile median LoS was 0.2 days.

CONCLUSION: Deep learning applied to CXRs of patients presenting to the ED with CAP, including COVID-19, can stratify patients based on their LoS. Subject to prospective testing, IPRO has the potential to triage CAP patients presenting in ED and may inform clinical decision.

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Predictors of successful endovascular thrombectomy of M2 occlusion in acute ischemic stroke

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: To investigate the variables that affect the successful endovascular reperfusion of isolated M2 occlusion.

METHODS: M2 occlusion was defined as isolated clot anywhere within the M2 branch of the middle cerebral artery. A prediction model of successful endovascular reperfusion defined as modified Thrombolysis in Cerebral Ischemia (mTICI) score of 2b, 2c and 3 and unsuccessful endovascular reperfusion defined as mTICI score of 0, 1 and 2a was developed from demographics (age, sex), clinical factors (NIHSS at the time of presentation to hospital), imaging characteristics (ASPECTS, ICA occlusion, presence of Intracranial arterial disease (ICAD), CT perfusion (CTP)-based ischemic core and mismatch volume estimation), and treatment (tenecteplase/alteplase use and periprocedural complications) variables from 64 patients who underwent endovascular thrombectomy at Kingston Health Science Centre.

RESULTS / DISCUSSION: The only statistical significant predictor of a successful endovascular reperfusion was CTP-based ischemic core volume (smaller core volume) ($p<0.05$). None of the other imaging characteristics were found to be statistically significant predictors of successful endovascular reperfusion. 32.8 % of patients had hemorrhagic transformation post-EVT, while the periprocedural complications occurred in 6.3 % of the patients.

CONCLUSION: The CTP-based ischemic core volume is the most important predictor of successful endovascular reperfusion of M2 occlusion. Post-EVT hemorrhagic transformation was found to be common among these patients, however periprocedural complications were low.

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Feasibility and imaging findings of a Novel Sclerosing and Embolizing Gel for Varicose Vein Treatment in a Porcine Model

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: Venous recanalization is a limitation following embolization for venous insufficiency. We tested feasibility of venous embolization using a temporarily radio-opaque gel composed of chitosan and Sodium Tetradecyl Sulfate (CH-STS), combining mechanical occlusion and endothelial ablation, in a porcine model.

METHODS: In 15 pigs, internal maxillary (IMV) and inferior gluteal (IGV) veins were embolized. For 9 animals (group1), IMV was embolized proximally with coils before injecting gel distally; no coil inserted in IGV. Six animals had gel injection and coiling only in IMV(group2,n=3) or IGV(group3,n=3). Vein thrombosis was assessed by DSA and CBCT, and gel migration to lung by CBCT, both at D0 and D30.

RESULTS / DISCUSSION: Mean Likert score at D0 for radiopacity was 4.8/5 and injectability 3.8/5. Gel was no longer radiopaque at D30.

At D0, one animal had minimal gel migration to lungs (group1).

At D30, coil migration was observed in 6/12(50%) IMVs(group1;2) and 3/3 IGVs (group3). Complete thrombosis on imaging was observed in 11/12(92%) IMVs(group1;2) and 9/12(75%) IGVs (group1;3). One animal with coil and gel migration had a patent IMV; three animals with coil and gel migration had permeable IGVs.

Gel migration to lungs at D30 was observed in 14/15 animals and more severe in presence of coil migration. The only animal with no coil migration and no IGV embolization had no gel migration to lungs.

CONCLUSION: CH-STS produces excellent thrombosis. Coil protection minimizes risk of gel migration in this challenging model. Further tests in a model reproducing flow condition of varicose veins are needed.

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Pulmonary Inflammatory Pseudotumors: Can Computed Tomography Appearances and Evolution Predict Final Diagnosis?

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PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE: To review the clinical, computed tomography and pathological findings of pulmonary inflammatory pseudotumors diagnosed with CT-guided percutaneous transthoracic needle biopsy, and to determine whether CT appearances may predict a final benign or malignant diagnosis.

METHODS: Retrospective study of lung lesions diagnosed as IPT on initial CT-PTNB, over a 6-year period at a tertiary academic hospital. Patients with CT scans performed within one month from needle biopsy and with final diagnosis of pseudotumor or malignancy were included. CTs performed immediately before and after the CT-PTNB were reviewed for characteristics of the biopsied lesion, presence of additional lesions and potential ancillary findings. When available, FDG/PET-CT results were recorded. Temporal evolution was assessed by comparing CT scans performed before and after the index CT.

RESULTS / DISCUSSION: IPTs were single in 45% of cases, measuring between 6-62 mm (mean 23 mm). The majority of lesions were peripheral (85%) and solid (85%); only one was pure ground-glass. Most lesions had irregular interfaces (60%) or spiculations (25%); only 7% showed smooth margins. Calcification (mostly central) was seen in only 20%. Cavitation was infrequent (13%). PET-CT demonstrated lower SUVmax values for IPTs compared to malignancies. The majority of IPTs remained stable (32%) or decreased in size (45%) after a median follow-up of 20 months.

CONCLUSION: Compared to lung malignancies initially diagnosed as IPT, definite IPTs demonstrate larger size, lower SUVmax values and tended to remain stable or decrease in size on follow-up. Combined with pathology, these features could reassure a benign etiology when IPT is diagnosed on needle biopsy.

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Utilization of Bowel Ultrasound Parameters for the Assessment of Ustekinumab Treatment Efficacy in Fibrostenotic Crohn's Disease

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: Fibrostenotic Crohn's disease (CD) leads to obstruction and poor quality of life. Medical therapies aim to reduce inflammation and disease burden. Treatment efficacy cannot be guided by symptoms or endoscopy changes. It requires imaging with quantifiable measurements to assess response over time. CT is limited by ionized radiation and lacks dynamic assessment. MR is costly with limited accessibility. Bowel Ultrasound is safe, radiation free, with similar accuracy that MR and allows for stricture characterization. Study aims to use bowel ultrasound to determinate the efficacy of Ustekinumab.

METHODS: Retrospective study evaluates bowel ultrasound changes at baseline and 12 months following Ustekinumab initiation. Strictures were defined, as increased bowel wall thickness (BWT), narrowed lumen and prestenotic dilatation or inability to pass colonoscope. Changes of, BWT, luminal diameter, poststenotic diameter (PSD), hyperemia, inflammatory fat, dysfunctional peristalsis, were recorded and analyzed using paired t-tests or chi-square tests.

RESULTS / DISCUSSION: 18 strictures identified, 55% males with median CD of 10 years. 67% of TI strictures were naïve. Between pre and 12 months post-ustekinumab therapy scans, there was significant improvement in BWT, 8.2mm versus 7.2mm ($p=0.048$), and inflammatory fat ($p=0.0027$). No significant difference in stricture length, lumen diameter, hyperemia, and dysfunctional peristalsis.

CONCLUSION: First study to report the efficacy of Ustekinumab in small bowel CD strictures using bowel ultrasound. Bowel ultrasound parameters can be use to evaluate therapy response. Ustekinumab improves bowel thickness and inflammatory fat but doesn't improve luminal narrowing nor PSD, hallmark of fibrostenosis. Larger studies are needed to evaluate the role of bowel ultrasound in treatment response.

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MRI Hip at 3T versus MRI Hip Arthrography for Detecting Labral Tears

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PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE: To compare the diagnostic accuracy of conventional magnetic resonance imaging (MRI) to MR arthrography (MRA) performed at 3T in the identification of hip labral abnormalities in patients requiring hip arthroscopy.

METHODS: A retrospective review of 126 cases of individuals that received both their imaging and arthroscopic surgery in the Regina Qu'Appelle Health Region (RQHR) between 2015 and 2022. The findings from the operative report and radiology report obtained from Sunrise Clinical Manager are compared with one another to determine the sensitivity and specificity of both MRI and MRA hip across various field strengths, including 3.0T.

RESULTS / DISCUSSION: 3.0T MRA had greater accuracy than 3.0T MRI, with a sensitivity of 1.0 vs. 0.95 and specificity of 1.0 vs. 0.96. In terms of the diagnostic accuracy of MRA at lower field strengths (1.5T and 1.0T) compared to 3T MRI, MRA had a slightly greater sensitivity of 0.98 vs. 0.95, but 3T MRI demonstrates greater specificity with 0.95 vs. 0.43 for MRA.

CONCLUSION: Overall, MRI and MRA hip demonstrate good accuracy in detecting labral abnormalities. Both techniques are valuable methods of investigation for labral tear when used in combination with clinical suspicion based on patient symptoms and physical exam findings. 3.0T MRA was more accurate than 3.0T MRI. 3.0T MRI had better specificity than MRA at lower field strengths. However, 1.5T MRA was more slightly more sensitive than 3.0T MRI.

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Splenic Ruptures- A Descriptive Summary

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PRESENTER'S LEVEL OF TRAINING: Other medical professional

OBJECTIVE: To determine the frequency of commonly associated findings within radiology reports.

METHODS: This was a retrospective chart review of patients who received a splenic rupture diagnosis over a period of 10 years. Only patients imaged using CT were included. "Splenic rupture" and "ruptured spleen" were the two key search terms used for searching the database from October 1st, 2012, to October 1st, 2022. Data was extracted from each report and categorized by age, sex, history, and presence of key findings including hematomas, splenomegaly, active extravasation, acute fractures and enlarged lymph nodes.

RESULTS / DISCUSSION: A total of 24 patients were identified, with only 5 of the patients being imaged for ruling out splenic ruptures. The age of the patients ranged between 14-85 years old with a mean age of 54.9 years. 18 of the patients were male and 6 were females, respectively. Out of these, 6 (25%) were reported as trauma patients. 12 (50%) presented with hematomas, 6 patients (25%) presented with splenomegaly, 15 (62.5%) had active extravasation, 4 (16.7%) had acute fractures and 3 (12.5%) had enlarged lymph nodes. Additional abdominal findings were reported most in the colon and liver (both 25%).

CONCLUSION: Patients diagnosed with splenic ruptures presented with heterogenous findings. The majority of scans were not ordered to specifically rule out splenic trauma, and CT imaging served as an effective tool to detect solid organ injuries such as splenic ruptures.

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Does the day of the week influence the number of whole-body CT scans dictated for suspected polytrauma patients at a level 1 trauma center?

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PRESENTER'S LEVEL OF TRAINING: Other medical professional

OBJECTIVE: To explore the association between the day and the number of scans conducted using the whole-body Rapid Imaging Protocol in Trauma (RIPIT).

METHODS: Reports using RIPIT protocol from October 1st, 2021- October 31st, 2022, were retrospectively reviewed. The total number of scans were counted and categorized per day. A Poisson regression model was created using RStudio to evaluate the significance of association between the day of the week and the number of scans. Chi-square deviance test was used to assess the model relative to the intercept-only model containing no other parameters.

RESULTS / DISCUSSION: 365 observations were included. On average, 1.95 ± 1.54 scans were dictated per day. At $\alpha = 0.05$, none of the p-values of the estimated coefficients were significant. This suggests there is not enough evidence to show any of the days were significantly different than 0 and hence, not significantly associated with the count of scans.

The full model was compared with the nested intercept-only model. The p-value was found to be $1.35 \cdot 10\text{-}05 < 0.05$, indicating significant evidence to conclude the model containing all the days of the week did not fit the data better than the intercept-only model.

CONCLUSION: There is no significant association found between any of the days with the number of RIPIT scans dictated at VGH.

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Cerebrovascular Disease in Young Adults: A Case-Based Review

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. Review the common etiologies and prevalence of cerebrovascular disease (CVD) in young adults and how this compares to elderly patients.
2. Categorize the differential diagnosis based on the general imaging appearance of vascular stenosis, hemorrhage, and occlusion in conjunction with the location of the abnormality.
3. Practice the diagnostic approach previously reviewed with multiple vignette-style young adult CVD cases with questions accompanying each case focused on differential diagnosis, prognosis, and management.
4. Discuss clinical presentation, key imaging findings, differential diagnosis, and management of each presented case.

BACKGROUND: Cerebrovascular disease (CVD) can result from blood vessel narrowing, rupture, or thromboembolism which may present on imaging as vascular stenosis, hemorrhage, or occlusion, respectively. As an emerging public health issue with debilitating effects on young adults, recognizing the similarities and differences between young adults and elderly patients for the etiologies and prevalence of various types of CVD is imperative for optimal patient outcomes. For the purposes of our educational exhibition, young adults are defined as those aged 18-50 years old.

CONCLUSION: Recognizing the similarities and differences of the prevalence and etiology of CVD in young adults and elderly patients is imperative for radiologists, as timely diagnosis is crucial for optimal patient outcomes.

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A Case-based Review of Chest Wall Masses with Radiologic-Pathologic Correlation

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. Review commonly encountered benign and malignant lesions in the chest wall.
2. List the strengths and weaknesses of various imaging modalities for the workup of chest wall masses.
3. Identify common benign and malignant features of chest wall masses on different imaging modalities.
4. Solidify the presented information with several chest wall mass cases along with radiologic images and pathologic correlations.

BACKGROUND: The chest wall contains many organ systems and tissue types including fat, muscle, bone, cartilage, nerves, and vessels. Each of these tissues can give rise to benign or malignant pathology resulting in a broad differential diagnosis for chest wall masses. At times, certain benign lesions may appear malignant on imaging, making diagnosis more challenging and necessitating a multidisciplinary/multimodality approach. Because imaging plays an essential role in the process, understanding the imaging limitations is imperative to avoid misdiagnosis.

CONCLUSION: Identifying the etiology of chest wall masses can be challenging and often requires a multidisciplinary and multimodality approach. Having the understanding of various imaging modalities used in the workup of chest wall masses is vital for diagnosis and patient management.

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DECT in the Acute Setting – Bowel Trauma

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PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE:

1. Highlight the value of Dual Energy CT (DECT) in traumatic bowel injury
2. Understand the principles of DECT and iodine overlay map
3. Illustrate the use of DECT and iodine overlay maps to improve diagnostic confidence and sensitivity in detecting bowel injury, contrast extravasation, free fluid, and reducing metal artifacts.

BACKGROUND: Traumatic bowel and mesenteric injuries (TBMI) have significant morbidity and mortality. The physical examination is often limited and sometimes not feasible in the trauma patient. Multidetector CT (MDCT) detection of TBMI is challenging and can be life saving. DECT utilizes iodine overlay, monoenergetic imaging and metal artifact reduction to enhance the conspicuity of TBMI. DECT may improve conspicuity of TBMI leading to increased diagnostic accuracy and confidence. The aim of the article is to review the state of the art and applications of DECT in bowel trauma.

CONCLUSION: TBMI are uncommon but clinically significant and can result in significant morbidity and mortality. TBMI diagnosis is clinically challenging in trauma patients. CT findings of TBMI can be non-specific or subtle. DECT improves conspicuity, diagnostic confidence, and accuracy in TBMI.

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Breast MRI Made Simple

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. Review the indications for breast magnetic resonance imaging (Br-MR) and the guidelines for annual screening with Br-MR.
2. List the advantages, contraindications and potential risks of Br-MR.
3. Solidify the knowledge with vignette-style cases.
4. Practice description of findings, differential diagnosis, and assign breast imaging reporting and data system (BI-RADS) categories with each case.

BACKGROUND: Breast cancer is the second leading cause of cancer deaths in women. Breast magnetic resonance imaging (Br-MR) is a vital tool used in many aspects of breast cancer including screening, staging, treatment response assessment, and image-guided core biopsy. Radiology residents and practicing radiologists are expected to have a thorough understanding of the different aspects of Br-MR, including indications and contraindications, advantages and disadvantages, imaging protocols, physics, and a knowledge of commonly encountered findings for benign and malignant lesions on Br-MR.

CONCLUSION: As Br-MR is involved in many aspects of breast care, it is essential for radiology residents and practicing general and breast radiologists to have a sound fundamental knowledge of Br-MR. After reviewing this educational exhibition, the audience should be confident to discuss and utilize the information reviewed with patients and clinicians.

34

Twin Reversed Arterial Perfusion (TRAP) sequence: A sonographic challenge

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PRESENTER'S LEVEL OF TRAINING: Other Medical Professional

OBJECTIVE:

1. To describe the TRAP sequence's epidemiology, pathophysiology, sonographic diagnosis, and prognosis.
2. To review the role of ultrasound in managing the condition by radiofrequency ablation (RFA).
3. To recognize the differential diagnosis of the TRAP sequence.
4. To appreciate the importance of the timely diagnosis of the TRAP sequence.

BACKGROUND: TRAP sequence constitutes 1 in 35000 pregnancies. The abnormal twin relies on the normal twin for survival in-utero. The condition is diagnosed sonographically in-utero by demonstrating reversed flow in the umbilical vessels of the abnormal twin. Radiofrequency ablation is the most common in-utero intervention for occluding umbilical arteries in the abnormal twin. The prognosis of an abnormal twin is 100% demise in the ex-uterine environment. Differential diagnoses of TRAP sequence are Intrauterine fetal death, fetus papyraceus, vanishing twin, and TTTS.

CONCLUSION: This educational exhibit highlights the salient features of the TRAP sequence. In the attached sonographic still image, "A" refers to normal twin while "B" denotes abnormal twin (i.e. Hemiacardius anceps in this case). In the same transverse image, "PL" describes the posterior location of the placenta. Note the prominent subcutaneous edema and the fluid-filled abdominal cavity in twin "B." The diagnosis of TRAP sequence in multiple gestations depends on the sonographer or the radiologist's awareness of this rare medical condition. The radiologist should be comfortable diagnosing TRAP sequence in twin pregnancies, especially during the late first &/or early second-trimester obstetrical ultrasound scans. Any negligence or delay in diagnosing the TRAP sequence can result in a grave prognosis for the normal twin(s). Once diagnosed, many clinicians advocate sonographic evaluation of the pregnancy at consistent regular intervals for the benefit of the normal twin. A healthy professional collaboration within the circle of care, especially among the radiologist and the obstetrician, is crucial for the best outcome of the TRAP sequence.

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Don't Forget About the IUD: A Multimodality Review of Intrauterine Device Positioning

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. Understand the importance of intrauterine device (IUD) positioning on imaging and its clinical implications.
2. Describe the appropriate positioning of an IUD and be familiar with its appearance on various imaging modalities.
3. Describe the strengths and pitfalls of various imaging modalities in the assessment of IUD positioning.
4. Recommend appropriate clinical or imaging follow-up for malpositioned IUD discovered on imaging.

BACKGROUND: Intrauterine devices (IUD) are used by over 150 million patients worldwide and are commonly visualized incidentally on imaging studies. The rate of IUD malpositioning detected on ultrasound has been quoted to be as high as 11%. The clinical implications of IUD malposition include pregnancy, injury to surrounding structures, vaginal bleeding, and dyspareunia. This educational exhibit offers a comprehensive review of IUD imaging findings, appropriate language to describe positioning, clinical implications, and recommended follow-up for IUD malpositioning.

CONCLUSION: Given the frequency with which IUDs are encountered in radiology, understanding the imaging characteristics, appropriate positioning, and clinical follow-up of IUDs on various modalities is important for radiologists to recognize. IUD positioning should be evaluated on all studies where an IUD is visualized, even when the indication is not for assessment of IUD. Radiologists should be able to confidently communicate pertinent findings of IUD malposition, its potential consequences, and appropriate follow-up to referring clinicians.

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Smashing through Satisfaction of Search: Cognitive Biases in Radiology and Strategies for Improvement

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McMaster University

PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. Briefly review common cognitive biases in radiology
2. Present salient case-based examples of common cognitive biases with key learning points
3. Offer strategies to improve biases in radiology using type II thinking

BACKGROUND: Errors are unfortunately common in radiology, occurring in 3-5% of studies performed. Decision making during image interpretation uses type I (quick, intuition-based processing) or type II thinking (slow and methodical). While type I thinking promotes efficiency in radiology reporting, it is prone to cognitive biases that predisposes to errors.

In this educational exhibit, we explore common types of cognitive bias using case-based learning and solutions to overcome mistakes by employing type II thinking utilizing a variety of day-to-day cases.

CONCLUSION: As radiology examinations become more complex and volumes increase, the radiologist must balance efficiency and patient safety. Cognitive bias predisposes the radiologist to interpretation error. We explored common types of cognitive bias, including examples (Figure 1) of anchoring, inattention, satisfaction of search, framing, and attribution biases, through case-based learning and offered techniques to overcome bias by leveraging type II thinking.

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Musculoskeletal Oncologic Interventions: Applications in palliative pain control in soft tissue and osseous metastatic disease

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Vancouver General Hospital

PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. To review the role of ablation and consolidation techniques in palliative soft tissue and osseous metastatic disease management
2. To present a pictorial review of application in a variety of cases
3. To discuss the technical considerations, benefits and limitations of treatment.

BACKGROUND: Musculoskeletal oncology intervention (MSK OI) is an emerging application for oncological patients, which compliments traditional arms of treatment including surgery, radiation and medical. In particular, MSK OI can be performed in tandem with other treatment. The evolution of practice in this area particularly addresses a gap in treatment when surgery is not viable and radiotherapy is not viable or adequate alone. The main focus of MSK OI is addressing pain management and prevention of skeletal related events leading to improvement in quality of life. Delays in the referral process may result in disease progression or pathological fracture rendering patient's unsuitable for MSK OI. Currently radiotherapy remains the mainline treatment for the management of painful osseous metastases. MSK OI similarly primarily addresses painful soft tissue and osseous metastatic disease. Other potential benefits include improving mobility through reinforcing weight and stress bearing bones and impeding tumor growth.

CONCLUSION: MSK OI offers complimentary treatment for palliative patients and addresses a gap in treatment when surgery is not viable and radiotherapy is not viable or adequate alone. These procedures are palliative in nature and not done with a curative intent. A multidisciplinary approach allows for a patient tailored treatment plan.

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The many faces of CNO: imaging features of chronic nonbacterial osteomyelitis with an overview of its radiological mimics

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE:

1. Identify the imaging findings in Chronic Nonbacterial Osteomyelitis (CNO) throughout the disease progression
2. Generate a differential diagnosis for sclerotic, lytic, or mixed bone lesions
3. Integrate radiological findings in conjunction with clinical assessment to facilitate an accurate diagnosis in the context of mixed sclerotic/lytic bone lesions
4. Describe the common pitfalls in diagnosis of CNO
5. Characterize the radiological findings of conditions that can mimic CNO and present with bone pain with sclerotic lesions on imaging

BACKGROUND: CNO is an autoinflammatory disease that predominantly occurs in pediatrics and adolescents but may rarely present in adulthood. Classically, it presents as sterile bone pain of insidious onset with associated swelling, focal tenderness, and warmth at the affected site often between age 9 and 11. CNO can affect any area in the body, but the most common locations are the metaphysis of long bones in the lower extremities, pelvis, clavicle, and vertebrae.

CONCLUSION: CNO remains a diagnosis of exclusion and is primarily diagnosed based on imaging with histopathology and biochemical markers being complementary. The differential diagnosis for radiological features of focal or multifocal lytic, sclerotic, or mixed lesions remains broad. Familiarity with radiological mimics of CNO will help training and practicing radiologists better guide clinical decisions of the care team and shorten the existing diagnostic delays.

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Predictors of Intracerebral Hemorrhage Expansion on CT

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE:

1. Review the classification of intracranial hemorrhages and define hemorrhage expansion
2. Importance of identifying intracranial hemorrhage expansion
3. Describe findings on imaging that can predict hemorrhage expansion

BACKGROUND: Hemorrhages can be categorized by the anatomic location of bleeding, separating hemorrhage into the intra-axial and extra-axial space. We will focus on intracerebral hemorrhage (ICH), a subtype of intra-axial hemorrhage, and the most lethal type of stroke with a 40% mortality rate in the first month. A modifiable and independent risk factor of ICH has been hemorrhage expansion (HE). For this reason, we will explore how to identify indicators of HE on non-contrast computed tomography (NCCT) and CT angiogram (CTA).

CONCLUSION: The early identification of pertinent imaging findings that predict hemorrhage expansion, such as hematoma volume, shape, and imaging density heterogeneity, can improve intracerebral hemorrhage outcomes.

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Rare solid pancreatic lesions: a pictorial view

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PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. Review the spectrum of non-adenocarcinoma rare pancreatic solid tumors.
2. Present representative cases of rare pancreatic solidtumours identified on CT
3. Discuss the imaging patterns and differentiating points between pancreatic ductal adenocarcinoma and other rare pancreatic solid tumors.

BACKGROUND: Pancreatic ductal adenocarcinoma (PDAC) and neuroendocrine tumors (PNET) comprise over 90% of all solid pancreatic tumours. As all the remaining lesions combined make up the remaining mere 10%, they are less well-described, and may cause diagnostic dilemmas and require invasive sampling. This pictorial review shares a summary of these uncommon solid pancreatic tumours with a focus on epidemiological profile and radiological descriptions.

CONCLUSION: Although these uncommon solid tumours of the pancreas form a small fraction of all pancreatic lesions, they represent a wide spectrum of pathologies. Accurate characterization on imaging and differentiation from ductal adenocarcinoma is pertinent due to differences in prognosis and management. Therefore, becoming familiarized with the radiological characterization of these lesions will help improve patient care and management plans.

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An Approach to Intrauterine Contraceptive Device (IUCD) Imaging and Complications

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Western University – Schulich School of Medicine and Dentistry

PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. Highlight the history of Intrauterine Contraceptive Devices (IUCD), which has been in use for almost 100 years.
2. Review the imaging appearance of normal and abnormally positioned IUCDs.
3. Present an approach to the evaluation and management of IUCD complications, such as malpositioning (expulsion, displacement, embedment and perforation), synchronous pregnancy and ectopic pregnancy.

BACKGROUND: Since its invention in the 1920s, IUCDs have become one of the most commonly used contraceptive methods worldwide. Modern copper and hormone-releasing IUCDs are as effective as tubal ligation in preventing pregnancy, but a 2 in 100 person per year pregnancy rate is reported. Ultrasound is the modality of choice to assess IUCD complications, which include malpositioning and synchronous/ectopic pregnancy. This review offers a comprehensive algorithmic approach to the interpretation and management of IUCD complications. An illustrated reference is integrated to provide clarity on the malpositioning spectrum and ensure accurate description of findings.

CONCLUSION: The radiologist plays a vital role in the evaluation of IUCDs, therefore it is important to be aware of the indications for imaging, normal and abnormal appearances of IUCDs, and common complications. All IUCD complications should be communicated to the ordering clinician, as the contraceptive efficacy may be decreased or prompt referral/intervention may be required.

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The World of Globe Pathologies – An Approach

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. Illustrate the anatomy of the globe and orbit.
2. Discuss the CT findings and management of common and uncommon ocular abnormalities in the emergency setting.
3. Present the indication and imaging appearance of common iatrogenic ocular interventions, such as silicone-oil injection, implanted glaucoma tube shunt and scleral buckle.

BACKGROUND: The radiologist plays an important role in the diagnosis of globe abnormalities on imaging, especially in the emergency setting. A diverse range of ocular pathologies can manifest as CT findings in the globe, including masses, traumatic injuries, and infectious/inflammatory processes. Additionally, iatrogenic ocular devices and interventions which are incidentally encountered are reviewed. A structured differential case series will illustrate the typical imaging appearance of various globe pathologies, and allow trainees to quickly recognize the diagnoses and facilitate prompt referrals.

CONCLUSION: Timely recognition of globe pathologies in the emergency setting can facilitate prompt clinical intervention and prevent devastating consequences such as vision loss.

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Practical strategies to transitioning to a Competency-Based Medical Education curriculum

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. Outline potential challenges in transition to a CBME program
2. Identify practical strategies that program leads, educators, and learners may implement to mitigate CBME-related challenges
3. Provide practical suggestions for residents to maximize learning in a CBME curriculum

BACKGROUND: In July 2022, Canadian Diagnostic Radiology residency programs transitioned to a competency-based medical education (CBME) curriculum. While CBME confers several advantages over the traditional model, concerns that have arisen include increased administrative burden, varying levels of buy-in amongst stakeholders, and logistical issues with coordinating concomitant CBME and traditional residents during the transition. Based on a literature review and evaluation of our program, we present key practical strategies to help educators and residents in the ongoing transition and implementation of CBME.

CONCLUSION: Early awareness of potential challenges and strategies to address these challenges can help educators and residents facilitate a smoother transition to a CBME curriculum.

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Dual Energy CT in Acute Neurological Conditions

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE:

1. Understand the basic principles of CT and DECT acquisition and material characterization using DECT.
2. Highlight the added value of using DECT in the setting of acute neurological conditions in detecting pathologies not seen by SECT, increasing diagnostic confidence, and improving patient's prognostication.
3. Review current applications of DECT in acute neurological conditions such as detecting brain edema, intracranial and spinal hematomas, bone marrow edema, and intracranial and spinal infections.

BACKGROUND: DECT is an evolving tool with many useful applications in the setting of acute neurological conditions because of its increased ability over single energy computer tomography (SECT) in performing molecular composition analysis. While magnetic resonance imaging (MRI) is the gold standard for most diagnostic neuroimaging, DECT offers faster acquisition times than MRI along with increased tissue characterization than SECT, making it an ideal imaging modality for acute neurological conditions.

CONCLUSION: Many clinical applications of DECT in acute neurologic conditions exist and offer benefit over SECT because of its molecular composition analysis, and over MRI because of its greater speed of image acquisition.

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Providing imaging support to the marginalized population of British Columbia.

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PRESENTER'S LEVEL OF TRAINING: PhD Student

OBJECTIVE:

- Review the telehealth services provided by the Department of Radiology, at the Vancouver General Hospital.
- Understand the role of teleradiology in medical imaging.
- Describe the medical imaging trends via teleradiology service.

BACKGROUND: Vancouver General Hospital (VGH) is providing teleradiology services to the Northern Health region of British Columbia. This study is a retrospective chart review, looking at all consecutive imaging studies that were read via the telehealth program at the VGH from NHA May 27th, 2022 till November 23rd, 2022.

NHA has twelve facilities. During this period, the radiologists at VGH read 1167 imaging studies. The highest number of imaging studies were read from Fort St. John Hospital 37%; followed by 32% from Mills Memorial Hospital; and 11% from Price Rupert Regional Hospital. In our sample data, 1057 (90.57%) were CT scans; 45 (5.39%) were US, 45 (3.9%) were X-rays, and there was 1 MRI. By age group, we had noted that 71 (6.1%) were between > 0 to 19 years of age; 139 (11.9%) were between 20 to 29 years of age; 134 (11.5%) were between 29 to 39 years old, 150 (12.9%) were in the range of 39 to 49 years; 673 (57.7%) were over 50 years of age. By shifts, 377 (32.3%) imaging studies were read at VGH during the day shift; 587 (50.3%) were read during evening shift; and 203 (17.4%) were read during the night.

CONCLUSION: Telehealth at VGH is playing a significant role in providing valuable access to diagnostic imaging to the Northern Health Region.

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Metaplastic Breast Carcinoma: Pictorial review and presentation of an unusual case

Julia Garcia Prieto, Philippe Echelard, Andrew Chan

University Health Network

PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. Review the incidence, clinical presentation and radiologic features of metaplastic carcinoma.
2. Discuss the pathophysiology of this rare type of breast cancer, to provide a better understanding of the correlation between radiologic and pathologic findings.
3. Present a radiologic and pathologic pictorial review of metaplastic breast carcinoma, including an unusual case with extensive osseous differentiation.

BACKGROUND: Metaplastic carcinoma (MC) is a rare type of breast cancer accounting for less than 5% of breast carcinomas. This term includes a heterogeneous group of neoplasms consisting of ductal carcinomas that undergo metaplastic transformation into non-glandular mesenchymal tissue. The Wargotz and Norris classification differentiates four variants of metaplastic carcinomas: spindle cell, squamous cell, carcinosarcoma and matrix-producing carcinomas. Within the matrix-producing group, metaplastic carcinoma with chondroid differentiation (MCCD) is an infrequent variety showing an extensive cartilaginous or osseous component.

CONCLUSION: Metaplastic carcinoma is a rare breast malignancy that includes a wide range of histopathologic subgroups, which can make accurate diagnosis a challenge. A deeper understanding of this entity can facilitate prompt recognition and confident radiologic-pathologic correlation.

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Application of Dual-Energy Computed Tomography in evaluation of acute intracranial pathologies

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE:

1. Explain the basic principles and clinical application of dual-energy computed tomography (DECT) compared to conventional CT.
2. Highlight the benefits and limitations of DECT in assessment of acute intracranial pathologies, including hemorrhage, stroke, and traumatic brain injury.
3. Discuss the future direction of DECT in assessment of acute intracranial pathologies.

BACKGROUND: Conventional CT has been critical in the prompt diagnosis of acute intracranial pathologies. However, it is limited by its ability to discriminate between similar materials such as calcium and iodine. DECT's differential attenuation based on imaging at two energy levels allows for improved differentiation and characterization of tissue relative to conventional CT. This has led to emerging clinical applications in the evaluation of intracranial hemorrhage, stroke, and traumatic brain injury.

CONCLUSION: DECT offers a powerful set of reconstruction algorithms to support the radiological evaluation and interpretation of acute intracranial pathologies without compromising image quality or radiation dose.

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Pelvic Ring Fractures: A Review for Radiologists

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. Review anatomy of the pelvis and important stabilizing structures.
2. Radiographic and CT pictorial review of the patterns of pelvic ring fractures and Young-Burgess classification system.
3. Highlight common pitfalls on the traumatic pelvic radiograph and overview general management of pelvic ring fractures.

BACKGROUND: Injury to the bony pelvis is associated with significant morbidity and mortality. This often occurs from major trauma, such as motor vehicle accidents or falls from a height. Radiologists play a crucial role in the rapid and accurate identification and classification of pelvic injuries to guide prompt management. The ringlike configuration of the pelvis and predictable patterns of injury can be classified by the Young-Burgess system to determine pelvic stability.

CONCLUSION: Recognizing common patterns of injury to the bony pelvis is essential to help guide early management and to reduce morbidity and mortality. Understanding pelvic anatomy, using the Young-Burgess classification, and being aware of common pitfalls on the pelvic radiograph will help radiologists in prompt and accurate diagnoses.

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Hypersensitivity Pneumonitis: Review of the 2020 Guidelines with Interactive Cases and a Helpful Checklist

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PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

- To review the HRCT findings of HP, notably fibrotic HP.
- To analyze the HRCT categories for HP diagnosis proposed in current guidelines.
- To provide practical clues for HP diagnosis applying these guidelines and for the differential with most common fibrotic interstitial lung diseases.

BACKGROUND: The clinical and HRCT diagnosis of HP, particularly fibrotic HP, is often challenging and until recently, these challenges were compounded by inconsistent diagnostic criteria and lack of consensus guidelines. The proposed 2020 guidelines are the first major attempt to provide a consistent approach to the multidisciplinary diagnosis of HP, with well-defined clinical, radiological and histopathological diagnostic criteria.

CONCLUSION: Radiologists play an essential role in the diagnosis of fibrotic ILD, commonly caused by fibrotic HP. It is therefore crucial for radiologists to be aware of the main points of the recently proposed HP guidelines, notably the HRCT categories for HP diagnosis, to assist in multidisciplinary diagnosis and management.

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Fibrotic Interstitial Lung Disease eLearning Modules

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PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. Define the patterns of idiopathic pulmonary fibrosis (definite, probable, indeterminate and alternative diagnosis) based on the ATS guidelines.
2. Identify the radiological features of the above patterns.
3. Complete didactic and case-based quizzes.
4. Go through anonymized test cases on a DICOM viewer platform.

BACKGROUND: Online interactive modules (eLearning) are a useful tool with a significant impact on learner´s knowledge and post training testing. They provide flexibility as they are not bound by geographical constraints and allow for self-paced learning. They can be incorporated into more comprehensive teaching sessions to supplement primary content.

Fibrotic interstitial lung diseases (ILDs) are a heterogeneous group of conditions affecting the pulmonary interstitium. Their patterns and presentations on imaging can be explored via online modules to help novices learn de novo or allow more advanced readers to optimize their knowledge.

CONCLUSION: Fibrotic interstitial lung diseases are an enigmatic and often confusing topic. Through an integrated, modular and hands-on method our educational poster will enable learners to hone their skills and avoid misdiagnosis.

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Anatomic-based Approach to Soft Tissue Tumours

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. Review the World Health Organization classification of soft tissue tumours.
2. Understand the role of imaging in the diagnosis and management of soft tissue tumours.
3. Learn an approach to benign and malignant soft tissue tumours based on characteristic location and imaging appearance.

BACKGROUND: Soft tissue tumours are pathologically, radiologically, and prognostically diverse, with 12 different classifications and over 70 subtypes. This exhibit reviews the WHO classification scheme for soft tissue tumours and the role of imaging in workup and treatment. We present a diagnostic approach to benign and malignant soft tissue tumours in common and characteristic anatomic locations, including the chest, trunk, and extremities. Imaging appearances of these tumours with a focus on MRI and appropriate differential diagnoses will be presented.

CONCLUSION: Although the imaging appearances of soft tissue tumours can often be non-specific, certain lesions have characteristic appearances and present in characteristic locations. Our educational exhibit reviews these features to improve diagnostic confidence in trainees and radiologists when faced with these clinical scenarios.

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Aborted Whipple Procedures: What the Radiologist Needs to Know

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PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. Review the classic imaging appearance of PDAC.
2. Discuss imaging findings that predict preoperative resectability of PDAC according to NCCN criteria.
3. Review the benefits of a multidisciplinary approach to the workup of patients with suspected PDAC.
4. Highlight preoperative imaging findings and radiology-specific workflow that may help surgeons better determine patient eligibility for surgery.

BACKGROUND: Pancreatic cancer is the 3rd most common cause of cancer death in Canada. The Whipple procedure increases survival rates but is reliant on accurate and timely preoperative imaging to confirm eligibility for surgery. Although features of PDAC are well-established in the literature, it still remains a diagnostic challenge and resectability features may be overlooked by less experienced radiologists. We review the most important imaging features of resectability and present cases from our institutional database of aborted Whipple procedures from 2011-2022.

CONCLUSION: All radiologists who read preoperative scans of patients with PDAC should know how to most accurately diagnose and properly assess PDAC resectability. Differentiating resectable from non-resectable PDAC is crucial to avoid unnecessary surgical interventions that may negatively impact patient care.

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Decoding nipple discharge; Imaging spectrum of ductal pathology

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PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

- Identify what differentiates physiologic nipple discharge from pathologic discharge.
- Describe an approach to the diagnostic workup of patients presenting with nipple discharge.
- Discuss the prevalence, epidemiology, and pathologic subtypes of papillary lesions
- Identify other pathologic causes of nipple discharge and describe their imaging features.

BACKGROUND: Nipple discharge a common clinical concern, accounting for 2-5% of all medical visits by women and a considerable cause of anxiety for both patients and practitioners. Although nipple discharge can be associated with underlying malignancy, the most common causes are benign. Pathologic discharge is caused by both benign and malignant entities with a wide spectrum of imaging appearances. We outline an approach to diagnostic work up in these cases and present the spectrum of imaging findings encountered.

CONCLUSION: Evaluation of nipple discharge first requires a thorough clinical history and physical examination to determine if the discharge is pathologic or physiologic. When pathologic discharge is identified, a multimodal imaging approach with histopathological correlation is required for appropriate management.

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Prostate MRI Quality and Case-Based Application of the PI-QUAL Score

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PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. Review the minimum technical requirements for prostate MRI acquisition
2. Understand the application of the PI-QUAL score and its implications through a case-based review
3. Highlight current evidence on available techniques to improve prostate MRI quality.

BACKGROUND: High diagnostic quality of prostate MR imaging is essential for both detection and exclusion of clinically significant prostate cancer. PI-RADS version 2.1 has established minimum technical requirements for prostate MR acquisition, however patient-related factors are also important. The PI-QUAL score allows for more objective assessment of image quality with good inter-reader reproducibility, informing the degree of certainty in MRI-directed decision-making. There are many tools available to improve quality from both a centre-level and a patient-level perspective.

CONCLUSION: The PI-QUAL score allows for objective assessment of prostate MRI quality and informs confidence in MRI-directed decision-making.

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Artificial Intelligence in Stroke Imaging

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE:

1. Describe the basic principles and domains of artificial intelligence (AI).
2. Explain concepts of detection, classification, segmentation, prediction, and prioritization in ischemic and hemorrhagic stroke imaging.
3. Explain how AI can support radiologists in clinical practice for acute stroke patients.
4. Discuss current limitations and future directions for the use of AI in stroke imaging.

BACKGROUND: Artificial intelligence (AI) is a growing area of research in radiology. Currently several domains exist within AI, including machine learning, deep learning, supervised learning, unsupervised learning, and reinforcement learning. We focus on the use of AI specifically in the setting of ischemic and hemorrhagic stroke imaging through detection, classification, segmentation, prediction, and prioritization. We also discuss how AI can support radiologists beyond imaging and pathology, such as triaging, optimizing scheduling, ensuring patient safety, and decreasing imaging timing.

CONCLUSION: Understanding the use of AI in acute stroke imaging may help radiologist adapt new technologies to improve patient care and clinical practice.

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Rapidly Progressing Encephalopathy with Unique Presentation

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE:

1. To describe the normal anatomy and pathophysiology of Creutzfeldt-Jakob disease (CJD).
2. To discuss common CJD imaging findings.
3. To discuss a case of Heidenhain variant CJD with unique diffusion weight imaging (DWI) findings and initial unique ophthalmic presentation.

BACKGROUND: CJD is a rare transmissible spongiform encephalopathy caused by prions. The Heidenhain variant of CJD displays isolated visual symptoms without any sign of ocular disease, and often involves the parieto-occipital cortex. We report a 59-year-old female with Heidenhain variant CJD. She presented with left homonymous hemianopia but had normal imaging findings (Figure 1A). She then experienced rapid progression of disease and displayed unique imaging findings, including normal basal ganglia. Research Ethics Board approval was obtained from Horizon Health Network.

CONCLUSION: It is important for radiologists to understand unique presentations in CJD in order to supplement their understanding of common imaging findings in the diagnosis of CJD.

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Thyroid Ablation: Review of Indications, Anatomy, and Technique

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. Discuss the role of image-guided percutaneous thermal thyroid ablation in treating benign and malignant thyroid conditions.
2. Review the pre-procedural and anatomic considerations when performing thyroid ablation.
3. Describe the technique of performing thyroid ablation.

BACKGROUND: Ultrasound (US)-guided thyroid ablation is emerging as a safe, minimally invasive treatment modality for suitable benign and malignant pathologies. There are a variety of devices and techniques, most notably radiofrequency ablation (RFA), which have garnered growing interest as an alternative to surgery with robust evidence for its safety and efficacy. Radiologists must understand the indications, pre-procedural considerations, technical approach, and potential complications associated with this procedure.

CONCLUSION: US-guided ablation is indicated for benign thyroid nodules causing compressive or cosmetic issues, or for small autonomously functioning thyroid nodules with contraindications to surgery and radioactive iodine. The procedure may also be considered for certain malignant pathologies including suitable primary papillary microcarcinomas or recurrent papillary thyroid carcinomas in individuals who decline or are unfit for surgery. Cytologic diagnosis must be sought pre-procedurally by fine needle aspiration or core needle biopsy to confirm a benign etiology, or to guide curative or palliative intent for cases of malignancy. Other pre-procedural considerations include subjective voice assessment, co-morbidities requiring additional monitoring or affecting sedation, and pre-procedural US for anatomic considerations. Important anatomic landmarks include the tracheoesophageal groove, which houses the recurrent laryngeal nerve, as well as other nearby structures including the anterior jugular veins and vagus nerve. The technical approach to thyroid RFA is somewhat unique compared to ablation in other organs, and typically involves a three-step approach: (1) local anesthetic infiltration for analgesia and hydrodissection, (2) trans-isthmic insertion of the electrode, and (3) ablation using a "moving shot technique". Complications are rare but may include injury to the recurrent laryngeal nerve, thyroid nodule rupture, hematoma formation, or superficial burns. Future areas of investigation will focus on the optimal role for ablation in primary malignant and indeterminate nodules, as well as prognostic factors that determine ideal applications of varied ablation devices and techniques.

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Foot and Ankle injuries in ice hockey athletes

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UBC

PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. To understand the factors predisposing Ice Hockey athletes to foot and ankle injuries.
2. Know the common anatomic structures at risk of injury and group them.
3. Define patterns of injury and most commonly injured structures.

BACKGROUND: Ice Hockey is a high intensity contact sport where high speeds, direct contact, hard playing surface and use to rigid skates predispose the athletes to injuries. Our study focuses on foot and ankle injuries in particular.

Our institution's database was searched for ankle and foot imaging performed on ice hockey players. A total of 335 cases were recruited from 2000 to 2019, which included all the imaging modalities.

The osseous injuries of the foot and ankle were divided into medial (medial malleolus, navicular, medial cuneiform, 1st metatarsal and phalanges), lateral (lateral malleolus, Calcaneus, cuboid, 5th metatarsal and phalanges) and central based (the rest of the tarsals, metatarsals and phalanges) on the anatomic location. Osseous injuries of the foot were subcategorized into injuries to the hindfoot, midfoot and forefoot.

Ligamentous injuries were divided into high and low ankle sprains. Low ankle sprain was divided into medial (deltoid ligament), lateral (ATFL, PTFL and calcaneofibular ligaments) and central (spring ligament) injuries.

CONCLUSION: Direct and indirect injuries to foot and ankle are most predominant in the lateral structures. Foot injuries were most commonly sustained in the mid foot.

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Improving Disease Detection and Quantification in the Bowel: A Complete Sonographic Evaluation

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University of Calgary

PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE:

- Perform endovaginal sonography for visualization of bowel pathology located deep in the true pelvis
- Understand the contribution of CEUS to show perfusion at the capillary level
- Appreciate the benefit of measurement of bowel wall stiffness

BACKGROUND: Grayscale and color Doppler (CDI) ultrasound techniques comprise standard assessment of the bowel. However, we are aware that GI ultrasound is frequently performed without the benefit of endovaginal sonography, contrast enhanced ultrasound (CEUS), and elastography. The lack of these technologies accounts for unexplained GI symptoms in many patients with negative scans. We describe the benefits of utilizing these techniques.

CONCLUSION: Endovaginal sonography, CEUS, and elastography are readily available and should be utilized for evaluation of the bowel as they improve detection of disease activity, stricture and other complications.

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Occupational Lung Disease in Modern Canada – Tips and Tricks for the Radiologist

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PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. Identify the most commonly encountered occupational lung diseases in Canada.
2. Highlight imaging findings of both traditional and emerging occupational lung diseases.
3. Offer a differential diagnosis for common imaging findings and highlight distinguishing features.
4. Review anticipated complications of occupational lung disease and patient management.

BACKGROUND: Occupational lung disease (OLD) encompasses a group of disorders arising from inhalation of dusts or chemical antigens in the workplace. Despite improvements in workplace safety, OLD is still encountered in regular clinical practice. Imaging, particularly high-resolution CT, plays a key role in diagnosis and radiologists must be aware of common presentations. As industry and manufacturing techniques evolve, there are associated new exposures with new manifestations of OLD. We review both classic imaging findings and highlight appearances of some novel exposures.

CONCLUSION: Radiologists play a key role in the diagnosis of occupational lung disease. An awareness of imaging findings of the sequelae of both traditional and novel exposures is essential.

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Role of Contrast-Enhanced Ultrasound in Hepatobiliary and Bowel Applications: A Single-Centre Retrospective Review

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE:

1. Review the mechanisms of CEUS and its advantages and disadvantages as an imaging modality
2. Examine clinical indications of CEUS in hepatobiliary and bowel applications
3. Determine hepatobiliary and bowel CEUS' impact on patient management

BACKGROUND: Contrast-enhanced ultrasound (CEUS) injects microbubble contrast intravenously to increase visualizing organs and microvascular perfusion on ultrasound. Some its advantages include having real-time assessment, low adverse reactions, and being cost-effective. However, CEUS has yet to see widespread adoption in Canada, and is primarily performed at select academic centres. This study is a retrospective review of the hepatobiliary and bowel CEUS program at Juravinski Hospital and Cancer Centre (JHCC) that analyzes reduction in wait time to diagnosis and impact on patient management.

CONCLUSION: At JHCC, CEUS has been valuable for inconclusive cases and renally impaired patients. CEUS can decrease wait times and costs for characterization of hepatic lesions, gallbladder polyps and abdominal inflammatory disease progression. In many cases, further imaging was avoided, alleviating CT/MR wait times.

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Imaging findings of early cholangiocarcinoma in patients with primary sclerosing cholangitis: what not to miss

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. list and explain the common imaging findings of PSC,
2. recognize imaging findings suggestive of the early development of CCA in PSC patients as well as techniques for optimizing early detection
3. recognize benign complications of PSC that have imaging findings which can mimic CCA.

BACKGROUND: Cholangiocarcinoma (CCA) is the most common primary hepatobiliary malignancy in primary sclerosing cholangitis (PSC) patients; lifetime incidence of CCA in PSC patients ranges from 5 to 20% and up to 50% of cases are observed concurrently or within 1 year of PSC diagnosis. The only curative treatment available is resection or liver transplantation. However, the disease is often detected in an advanced and unresectable stage, giving a median survival of only 5 months when curative treatment is unavailable.

CONCLUSION: The development of CCA is a devastating complication of PSC. Recognition of features suggestive of early CCA in routine follow-up in PSC patients by radiologists is essential in diagnosing the disease in an early or premalignant state, thereby hopefully improving prognosis and treatment options.

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Gender Distribution in Canadian Diagnostic Radiology – What we can do to improve the gap

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE:

1. Highlight the current status of underrepresentation of females in radiology in Canada
2. Identify underlying causes of the gender gap in radiology.
3. Provide potential strategies to close the gap.

BACKGROUND: Statements of equity, diversity, and inclusion have been issued by Faculties of Medicine across the country. Despite the demonstrated benefits of equity and inclusion, women remain underrepresented in Canadian Radiology, and there has been little progress in bridging this gap. In this study, we systematically reviewed the literature to present the status of women in Radiology. In addition, we offer potential solutions for national associations and radiology departments to increase diversity with the ultimate goal of improving patient care.

CONCLUSION: Potential solutions to increase diversity include increasing preclinical observerships, improving program culture and work environment, increasing female representatives, supporting radiology resident parents, and increasing mentorship opportunities. Implementing these solutions is likely to close the gender gap in radiology and promote an increased interest by women in radiology and its specialties.

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An approach to lateral shoulder impact injuries: what the radiologists need to know

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PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE:

1. Review the normal anatomy of the shoulder.
2. Describe the types of injuries that can be sustained from lateral shoulder impacts (LSI), including soft-tissue and osseous injuries.
3. Outline a systematic approach for LSIs and what not to miss.
4. Discuss the specific role of dual-energy computed tomography (DECT) in supporting the radiological evaluation of LSI injuries

BACKGROUND: The shoulder girdle is often injured and requires imaging in lateral impacts (e.g., in sports or pedestrian impacts), and can account for up to 4% of emergency department visits. Injuries may involve the clavicle, humerus, scapula, rotator cuff muscles, and the acromioclavicular and glenohumeral joints. To increase diagnostic accuracy, systematic search patterns are often utilized by radiologists. A systematic approach to common injuries encountered in LSIs may be useful for radiologists and trainees who evaluate acutely presenting patients.

CONCLUSION: A systematic search pattern for LSIs allows radiologists to efficiently and accurately identify soft-tissue and osseous injuries that may facilitate urgent diagnoses in an acutely presenting patient.

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Structured Reporting of musculoskeletal MRI and its clinical importance in radiology practice

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PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE:

1. Describe the layout and definition of structured reporting.
2. Understand the role of Structured Reporting in musculoskeletal (MSK) MRI in trauma, inflammatory processes as well as tumours.
3. Highlight each component of structured MSK MRI report describing all its components with relevant examples from cases.
4. Illustrate the clinical significance of structured reporting in radiology practice.

BACKGROUND: The radiology reporting formats keep changing with time,vary in each institute and as per radiologist preference. The reporting formats have evolved over time. This change is mainly due to increase of dependence of clinicians on radiological reports and their demand for uniformity in radiological reports. These changes have led to structured reporting formats.

This review offers a simplified, yet comprehensive, step-by-step approach to structured reporting. It also integrates a review of important components of a structured MSK MRI report with example from daily cases, which will ensure precise use of reporting template and accurate description of findings. This will also highlight the clinical significance of each structured format in daily radiology practice.

CONCLUSION: The concept of structured MSK MRI reporting is a great step towards uniformity and has clinical significance due to problem oriented approach, which makes it a good learning tool as well as impressive way of putting forward our opinions.

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Imaging Road-map to the Heart : Post processing MDCT Techniques in Diagnosing Severity of Coronary Artery Disease.

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Rehman Medical Institute Peshawar, Pakistan

PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE:

1. Learn the approach to easy interpretation of CTA coronary.
2. Describe different post processing techniques to assess coronary artery lumen for presence of atherosclerotic disease.
3. Describe vessel analysis tools in grading atherosclerosis, patency of grafts and in-stent disease.
4. Highlight the factors affecting coronary artery appearance on CTA.

BACKGROUND: Role of MDCT in the evaluation of coronary atherosclerosis is established to determine coronary artery stenosis, patency of bypass grafts or stents or to detect anomalous anatomy. For the interpretation CTA coronaries different post-processing MDCT techniques are available, such as multiplanar reformation, maximum-intensity projections, direct volume rendering, virtual coronary angioscopy or the vessel analysis tool. In this educational review we discuss the strengths of the different post-processing techniques available with an emphasis on how to avoid false-positive and false-negative results.

CONCLUSION: CT coronary angiogram with post processing techniques especially the vessel analysis tools is very useful in grading severity of coronary atherosclerosis.

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HRCT chest for diagnosing small airway diseases

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Rehman Medical Institute Peshawar, Pakistan

PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE:

1. Describe technique and protocol in thin section HRCT chest.
2. Illustrate the signs of small airway diseases on HRCT chest.
3. Describe role of post processing techniques and paired imaging in reaching final diagnosis.
4. Review and understand the terminology in different patterns of small airway diseases.

BACKGROUND: MDCT is a powerful diagnostic tool in the assessment of both large and small airway disease. HRCT is the imaging technique of choice for suspected bronchiolitis. The spatial resolution on a HRCT scan which allows direct assessment of medium-sized airways, but not of smaller airways. There are certain signs of diseased small airways, with which they can be identified. In this exhibit, we aim to focus on the technique and post processing in illustrating different patterns of small airway disease.

CONCLUSION: HRCT plays instrumental role in characterization and detection of small airway diseases which, until relatively recently, had been regarded as being beyond the scope of radiological imaging. There is improvement in diagnosing mosaic pattern and centrilobular nodules by use of post processing techniques like MinIP and MIP.

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Cross-Sectional Imaging Spectrum of Upper GI Emergencies – Common, Rare and Exotic

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PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE:

1. To describe the imaging manifestations of upper GI emergencies and discuss the clinical manifestations of specific imaging findings.
2. To discuss the diagnostic strategy in patients with suspected upper GI emergencies.
3. To discuss the role of imaging in the management of these patients.

BACKGROUND: Upper GI Emergencies are common and can result in significant morbidity and mortality. Imaging plays a vital role in the management of these emergencies by identifying the condition and also aids in the detection of complications. The purpose of this exhibit is to provide a detailed review of a wide spectrum of upper GI emergencies that that can present to the emergency department and to discuss the role imaging, particularly multidetector computed tomography (MDCT) in the evaluation of these patients.

CONCLUSION: Imaging plays a key role in the evaluation of patients presenting with upper GI emergencies. Knowledge of various entities and their imaging features can help the emergency radiologist to promptly triage the patients, thereby facilitating appropriate management.

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The Use of 3D Printing in Interventional Radiology (IR)

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University of Toronto

PRESENTER'S LEVEL OF TRAINING: Medical Student

OBJECTIVE:

1. To learn about the history of 3D printing in interventional radiology.
2. To learn about the process of using DICOM imaging to make 3D-printed prototypes.
3. To learn about the current usage of 3D printing in interventional radiology: benefits, risks, and future opportunities.

BACKGROUND: The demand for personalized and precision medicine is on the rise. 3D printing is proving itself to be a beneficial technological innovation for the medical field that has increased the scope of care, and preciseness of intervention, and that has reduced costs and improved the efficiency of therapeutics.

The number and complexity of 3D-printed models from DICOM images acquired and interpreted by radiologists are growing exponentially, and radiologists will benefit from a fundamental understanding of its principles and applications.

CONCLUSION: The number of 3D-printed models generated from DICOM images for planning interventions and producing implants is growing exponentially. Radiologists should at a minimum be familiar with 3D printing as it relates to their field, including types of 3D printing technologies and materials available to create 3D-printed anatomic models, published applications of models to date, and the clinical benefits in radiology.

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Interstitial Lung Abnormalities – Clinical, Radiological and Pathological Correlation

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[1]CHU de Québec, [2]IUCPQ

PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

- Recognizing subtle interstitial lung abnormalities
- Accurately describing ILAs (interstitial lung abnormalities)
- Properly classifying the subtypes of ILAs

BACKGROUND: In our study, we found that many of the initial reports did not mention interstitial lung abnormalities that were present on the initial study, even though all radiologists at our institution are thoracic radiologists, because the entity was not as well described before the Fleischner Society's position paper. ILAs are underreported in clinical practice, especially in outside centers. ILAs need to be described when present, as well as categorized in their proper subtypes, because they are associated with different clinical outcomes. A more thorough understanding of the radiopathological association of ALI is needed. This could help to better phenotype patients at high risk for adverse outcome. Moreover, by detecting early subclinical stages of potentially severe fibrosis, this could have a major implication in understanding the initial pathophysiology of these diseases and allow investigation of the relevance of initiating earlier treatment.

CONCLUSION: It is important to be aware of subtle interstitial lung abnormalities when present in patients; they are often the first manifestation of an underlying idiopathic interstitial pneumonia. They should warrant either followup at large intervals, pneumology consultation or additional high resolution CT scan Earlier recognization of these abnormalities can also help identify patients which are more prone to post-operative complications and better pre-op risk stratification.

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A rare case of sickle cell-disease related mastitis

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PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. Knowledge of the spectrum of presentations of sickle cell-related breast disease, including suppurative and non-suppurative mastitis
2. Outline the imaging features of non-suppurative mastitis resulting from sickle cell crisis
3. Explore the possible pathophysiology of non-suppurative mastitis in sickle cell crisis
4. Outline important differential diagnoses

BACKGROUND: Sickle cell disease is the commonest heritable hematological disorder in the United States with approximately 100,000 Americans affected. The disorder disproportionally (although not exclusively) affects persons of Sub-Saharan African ancestry and is characterized by defective hemoglobin beta chain synthesis. Although there are several well described multisystem manifestations of sickle cell disease, significant gaps in medical knowledge still exist, particularly regarding rarer presentations, such as those relating to the breast.

CONCLUSION: Sickle cell-related breast diseases are a small group of rare but important conditions that may be encountered by the breast radiologist. In this review, we have presented a rare case of unilateral non-infective mastitis resulting from sickle cell crisis. Diagnosis of such conditions may be challenging, particularly given the often non-specific imaging features, wide range of more common benign and neoplastic mimickers of these disorders as well as limited radiologist experience. Presence or absence of ancillary findings along with relevant medical history is essential in making an accurate and timely diagnosis.

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Potential Application of Ultra-Low Field Portable MRI in the ICU to Improve CT and MR Access in Canadian Hospitals – A Multi-Centre Analysis

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[1]Queen's University, [2]University of Toronto

PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE:

1. Understand the challenges of fixed CT and MRI imaging for ICU patients, contributing to increased wait times
2. Highlight the value of Portable MRI in ICU for a subset of neurological indications
3. Recommend use case scenarios for portable MRI in ICU patients that may free up space and help increase access for fixed CT and MRI units

BACKGROUND: Urgent cerebral imaging is commonly required in the ICU setting for critically ill patients. Typically, patients are transported from the ICU to the Radiology departments for assessment in fixed CT and MRI units. Transportation is associated with a substantial increase in risk and scanning of patients is time consuming.

The use of novel portable MRI technology in Canadian ICU settings offers the potential advantages of reduced transports of patients, earlier diagnosis, improved triaging, as well as the ability to perform frequent re-imaging at the bedside. This frees up time on fixed CT and MRI units, leading to enhanced flexibility to perform CT and MRI on other patients. However, portable MRI use case scenarios in Canadian institutions have not been established and potential beneficial effect on wait times has not been analyzed.

Via a multi-center retrospective analysis, ICU neuroimaging data was reviewed over a 12-month period. We defined clinical indications where portable MRI was best suited to assess patients in an ICU setting, rather than being transported to Radiology. We determined the number of the subset of patients who could potentially undergo portable MRI and calculated fixed CT and MRI scan times saved based on scanning these patients in ICU.

CONCLUSION: Based on the developed indications, portable MRI could potentially replace fixed CT in 21% (838) of ICU patients and fixed MRI in 26.5% (108) of ICU patients, freeing up space for 1676 additional patients being able to undergo fixed CT scans and 324 additional patients being able to undergo fixed MRI on an annual basis. Therefore, implementation of portable MRI in the ICU for a select range of neurological indications can have a significant positive impact on CT and MRI wait times in Canadian hospitals.

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Ultrasound and Magnetic Resonance Shear Wave Elastography: An Overview of Technique, Interpretation, and Pitfalls

Kevin A. Eng, Darryl Ramsewak

Western University

PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. Describe the steps to perform ultrasound (US) and magnetic resonance (MR) shear wave elastography (SWE) of the liver.
2. Interpret US/MR SWE examinations to provide reliable measurements of liver stiffness/fibrosis.
3. Recognize technical and patient factors that can lead to nondiagnostic exams or falsely elevated liver stiffness.

BACKGROUND: Cirrhosis is characterized by irreversible liver fibrosis and represents the common endpoint of chronic liver disease from many causes including viral hepatitis and non-alcoholic fatty liver disease. Detection of liver fibrosis in an earlier stage is important, as timely treatment can reverse fibrotic changes. Biopsy is the gold standard but can cause complications. Ultrasound and magnetic resonance shear wave elastography are non-invasive techniques that can be used to detect and quantify early liver fibrosis and monitor treatment.

CONCLUSION: US and MR SWE are non-invasive techniques for evaluating liver fibrosis. Knowledge of proper technique and awareness of pitfalls is important when interpreting these studies.

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DI Departments Across 5 Hospitals Implementing Region Wide Paperless and Standardized Requisition Workflows for External and Internal Referrals as Part of the LUMEO Health Information System Project

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PRESENTER'S LEVEL OF TRAINING: Other Medical Professional

OBJECTIVE:

1. Understand how "axe the fax" is being implemented for referrals from community providers into standardized workflows for all modalities for internal and external referrals.
2. Learn how a digital medical imaging requisition management system (MIRM) can standardize workflows for radiologists, technologists, and administrative staff.
3. See how real-time analytical capabilities can provide clinical and administrative leadership with insights into the performance of the DI departments across a region.

BACKGROUND: As an innovative part of the LUMEO project, the medical imaging departments of the 5 acute-care hospitals of Southeastern Ontario are "axing the fax" and standardizing referral forms, protocols, workflows, and waitlist management. Requisitions from internal and community providers will flow through a standardized workflow including electronic protocoling.

The LUMEO clinical transformation project is a region-wide implementation of the Oracle Cerner Millennium system. The scope of the project includes working with an integrated 3rd party medical imaging requisition management solution.

CONCLUSION: Retiring the fax machine, standardizing paperless workflows, referrals forms, protocols and wait list management increases efficiency and accountability while helping to improve access to imaging services.

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Developing diagnostic imaging referral guidelines for integration into clinical decision support systems

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PRESENTER'S LEVEL OF TRAINING: Other Medical Professional

OBJECTIVE:

1. Highlight the steps of how we are creating diagnostic imaging referral recommendations using a systematic and robust methodological approach.
2. Summarize our methods for conducting the systematic rapid scoping reviews.
3. Discuss the concepts of GRADE for guidelines and how they are incorporated when developing recommendations.
4. Illustrate how recommendations are converted into flow diagrams for integration into clinical decision support.

BACKGROUND: In 2012, the Canadian Association of Radiologists (CAR) released diagnostic imaging guidelines comprised of 338 clinical/diagnostic scenarios across 13 sections. In 2020, funded by the Canadian Medical Association, and in partnership with several national organizations, referring clinicians, radiologists, and patient and family advisors from across Canada, the CAR are redoing these referral guidelines. We have developed a rapid, systematic, transparent, and methodologically robust approach using concepts from GRADE for guidelines for integration into clinical decision support systems.

CONCLUSION: Using a systematic and robust methodology, 13 sections of guidelines will be provided, which will include recommendations for over 250 clinical/ diagnostic scenarios. These guidelines will be made publicly available for radiologists, referring clinicians, patients and family advisors and the public. Recommendations will be integrated into clinical decision support (CDS) systems to provide guidance to referring physicians to determine which imaging modalities are recommended for their patients. The overall goal is to reduce the number of tests that would not change patient management and help ensure the right test for the patient at the right time. Lastly, it should reduce wait times for patients requiring imaging.

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Test Yourself: Diffuse and infiltrative liver disease

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Vancouver General Hospital

PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. Illustrate the spectrum of imaging findings of diffuse and infiltrative liver diseases on US, CT and MRI through an interactive case-based format.
2. Review typical and atypical imaging findings of parenchymal liver diseases, with a focus on storage, vascular, infectious, inflammatory and malignant processes.
3. Highlight the role of MR and US Elastography, MRI quantification and Dual Energy CT in the assessment of liver disease.
4. Develop an algorithmic approach to diffuse and infiltrate liver disease based on most common imaging patterns.

BACKGROUND: Diffuse and infiltrative parenchymal hepatic disease is frequently encountered and often challenging to interpret. They are broadly divided into storage (for example fat, iron), vascular (for example ischemic, veno-occlusive disease, Budd Chiari), infectious, inflammatory (hepatitis), benign lesions (for example adenomatosis, hemangiomatosis, sarcoidosis, and malignant process (HCC, CCA, lymphoma and metastatic disease). Although a heterogenous cohort of diseases, many have specific imaging features. Thus, we provide a cased based review of these entities, pathogenesis, tips and pitfalls to guide interpretation.

CONCLUSION: Radiologists should be familiar with the key imaging features of diffuse and infiltrative liver disease to afford prompt diagnosis and management.

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Musculoskeletal manifestations of breast cancer therapy and how to differentiate them from metastasis

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SUNY upstate medical university

PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. Discuss different breast cancer treatments and how they can affect osseous structures.
2. Explore common musculoskeletal manifestations of breast cancer treatment, including a review of the common skeletal finding in MRI, Bone scan, and PET/CT after breast cancer treatment.
3. Review of the utility of fluoroestradiol F18 (Cerianna) in differentiating between bone metastasis and post treatment osseous changes.

BACKGROUND: Breast cancer often presents with over-expression of certain hormone receptors, such as estrogen (ER) and progesterone (PR), lending to a variety of hormone-based treatment options such as estrogen receptor modulators, and ovarian suppression, in addition to radiation and surgery. Bones are sensitive to the systemic treatments thereby leading to a variety of musculoskeletal manifestations in the setting of breast cancer treatments that radiologists should recognize. This review offers a simplified approach in recognizing the osseous imaging findings after breast cancer treatment.

CONCLUSION: In the setting of cancer, any new lesion tends to be suspicious, which can lead to confusion when determining if a lesion is metastatic or not. Undoubtedly, this is true in the setting of breast cancer when new skeletal lesions are identified. Naturally, the differential must include metastatic disease; however, trainees should be aware that there are a set of musculoskeletal manifestations after breast cancer treatment that emerge as osseous lesions, including bone density loss and post-radiation changes. These are not metastatic in nature, but just a sequelae of treatment. We hope to educate trainees in recognizing the most common osseous presentations of breast cancer treatment, such as marrow replacement, fractures, or density loss, while developing an approach when coming across these cases in the wild. Furthermore, we will discuss the use of fluoroestradiol F18, a new PET/CT agent, that can help distinguish metastatic disease ER+ disease from other lesions when used as an adjunct to biopsy.

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Pre- and Postoperative Imaging Evaluation of Ross Procedure Candidates: Anatomy, Complications, and What the Surgeons Wants to Know

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[1]Western University, [2]London Health Sciences Centre

PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

1. Discuss how the Ross procedure, a technically complex cardiac surgery which replaces a diseased aortic valve with a native pulmonary autograft, benefits young patients due to improved longevity and the ability of the native autograft to adapt overtime.
2. Review the relevant cardiac anatomy and MR imaging findings of the Ross procedure.
3. Illustrate how preoperative cardiac MR evaluation is integral for patient selection and surgical planning, while postoperative surveillance aids in diagnosing complications and quantifying myocardial remodeling as a measure of success.
4. Provide example cardiac MR protocols and synoptic reporting frameworks, with details tailored for the cardiac surgeon, which can be utilized to foster a strong multidisciplinary Ross program.

BACKGROUND: The Ross procedure replaces a diseased aortic valve with a native pulmonic autograft. It is effective and life prolonging for patients with aortic stenosis. There is renewed interest in this procedure in young patients, due to improved longevity and the ability of the native autograft to grow and adapt to the patient's own physiology over time. However, the procedure remains underutilized because of its great complexity. The cardiac MRI protocol and synoptic reporting framework presented herein facilitates this procedure to help promote a strong multidisciplinary Ross/Cardiac program. The relevant cardiac anatomy and imaging findings are reviewed.

CONCLUSION: Radiologists can help facilitate the technically complex Ross Procedure and improve patient outcomes by way of preoperative planning and postoperative surveillance. By implementing the protocol described herein, the radiologist can provide the surgical team with the information that they require to properly select patients and optimize positive outcomes.

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Approach to neoplastic and Non neoplastic Cystic Intracranial Lesions

Azza Reda, Santanu Chakraborty

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PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. To illustrate the imaging approach in diagnosis neoplastic and non-neoplastic cystic intracranial lesions.
2. To discuss the diverse types of intracranial cystic lesions and review updated guidelines regarding differential diagnosis of cystic brain lesions.
3. To illustrate features to differentiate between benign and aggressive cystic brain lesions, that can help in patient management and prevent unnecessary surgical resection.

BACKGROUND: Intracranial cystic lesions may be found in symptomatic cases or incidentally in routine CT or MRI. We discuss interesting aspects of intracranial cysts in terms of imaging, clinical and pathological description, and problems of differential diagnosis. These lesions need to be categorized since prognosis and treatment can be variable. Focusing on distinctive features of neoplastic and non-neoplastic lesions as well as differentiating between benign and aggressive cystic brain lesions, we can help in patient management and prevent unnecessary surgical resection.

CONCLUSION: There are a variety of intracranial cystic lesions found incidentally or as a sign of more aggressive disease. Recognizing the typical features and anatomical location for each lesion, the radiologist can provide a helpful differential diagnosis that will have a significant impact on the treatment plan for the patient and may prevent unnecessary procedures.

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Expected Changes on Computed Tomography after Stereotactic Body Radiation Therapy for Lung Cancer

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PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. Review the recent advances in radiotherapy technology for the treatment of lung cancer.
2. Describe the characteristic lung parenchymal changes on computed tomography after stereotactic body radiation therapy.
3. Understand how knowledge of treatment timeline and radiation field is crucial when evaluating expected change versus tumour progression/recurrence.

BACKGROUND: There have been substantial advances in radiotherapy technology for the treatment of lung cancer. Conventional radiotherapy delivered a high dose of radiation to tumours and surrounding lung parenchyma/structures. More recently, development of stereotactic body radiation therapy (SBRT) has allowed for precise focal delivery of high dose radiation to a lung tumour with rapid drop in the dose gradient outside of the target volume. This has led to improved local regional control while reducing the radiation dose to surrounding normal structures.

CONCLUSION: Awareness of the recent advances in radiotherapy technology and expected lung parenchymal changes from SBRT is essential in distinguishing normal post-radiation change from tumour progression/recurrence. Radiologists should be aware of the patient's last SBRT treatment as well as the radiation field for accurate tumour characterization.

Key findings and differential diagnoses post SBRT will be reviewed. Lung parenchymal changes after SBRT differ from those that occur after conventional radiotherapy on computed tomography (CT). With SBRT, changes are complex and usually do not occur before three months. Initial edema may be mistaken for tumour progression. Consolidation may develop within the target volume, with variation typically seen in the first two years. Radiation pneumonitis can be the earliest change on CT. Expected patterns post-SBRT include diffuse consolidation, diffuse ground-glass change, patchy ground-glass change, mixed patchy consolidation and ground-glass change, or no change. These patterns can gradually resolve or evolve into fibrosis by the two-year mark. Late radiation fibrosis may demonstrate mass-like consolidation, which can be mistaken for tumour recurrence.

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4D CTA novel imaging technology: problem solving for peripheral aneurysm care.

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[1]VGH, [2]UBC

PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE:

1. To understand the role of 4D-CTA in Emergency and Trauma Radiology
2. To learn about the benefits of the novel 4D-CTA technology.
3. To explore the possibility of further uses of 4D-CTA.

BACKGROUND: With technological advancement in diagnostic and interventional radiology, the complexity of cases has increased and with it the need for more advanced imaging. Four dimensional-CTA is a dynamic, high-resolution examination, with lower image noise compared with conventional CTA. This technique offers differing temporal resolution providing dynamic information regarding blood flow which can be adjusted depending on the clinical question, the vessel being imaged and the clinical question requiring diagnosis.

CONCLUSION: The technique utilizes rapid image acquisition, combined with table movement to acquire image over a fixed craniocaudal length, depending on the detector width of the CT scanner. A bolus of iodinated contrast is injected at a high rate (5-6ml/s) and data is acquired over a fixed scan volume at a set interval from 1.5s. The temporal resolution is set manually and can be adjusted depending on the vessel imaged and rate of predicted flow. For aortic imaging a shorter temporal resolution may provide more sensitive imaging however the scan time is shortened in order to modulate dose. This technique allows for lower contrast medium volume to be used and has utility in problem solving complex vascular pathology that conventional CTA cannot.

4D CTA provides high resolution dynamic imaging of the vascular system utilizing low contrast dose and has utility in problem solving complex vascular pathology.

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Tips and Tricks in the Assessment of the Post-Operative Spine

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PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. Recognize different types of spinal surgery and commonly used implants in spinal procedures.
2. Overview of imaging techniques used to optimize image quality in the post-op spine.
3. Identify expected and normal imaging findings in the post-op spine.
4. Review abnormal imaging findings and common complications.
5. Discuss key points of a post-op spine radiological report and what the surgeons want to know.

BACKGROUND: Spinal surgeries have been steadily increasing during the past decades with a subsequent increase in imaging studies to interpret. Imaging assessment of the postoperative spine requires knowledge of several key points (age, preoperative status, surgical procedure, time interval). This review offers a comprehensive approach to the assessment of the postoperative spine and includes a pictorial review of common and rare complications, including misplacement/failure of hardware, non-fusion, fluid collections, subsidence, vascular or spinal cord injury, etc.

CONCLUSION: The radiologist plays an important role in the precise interpretation of these studies, which can be often challenging due to the presence of metallic artifacts. Knowledge of the different spinal surgical techniques, of the signs of a successful intervention, expected normal findings, and complications in the postoperative patient will allow the radiologist make a more accurate interpretation. Radiologists need to be familiar with the postoperative findings with each imaging modality and address what the surgeons want to know.

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4D CTA in the assessment of aortic dissection following endovascular intervention

Sabeena Jalal[1, 2], Darren Klass[1, 2]

[1]VGH, [2]UBC

PRESENTER'S LEVEL OF TRAINING: Radiologist

OBJECTIVE:

1. To understand the role of 4D-CTA in a patient with type B dissection, postop TEVAR and endo-leak.
2. To learn about the benefits of the novel 4D-CTA technology.
3. To explore the possibility of further uses of 4D-CTA

BACKGROUND: 4D-CTA is a dynamic, high-resolution examination, utilizing rapid sequential image acquisition of the vascular system for problem solving.

The case: 51-year-old male, presented with a type A dissection, requiring ascending replacement, arch debranching and endovascular extension to celiac axis by TEVAR. Followup CTA demonstrated residual false lumen flow in the arch however the etiology of this flow was not apparent on the CTA. The aorta continued to expand and decision on further management was complicated by lack of definite etiology.

CONCLUSION: Decision was taken to perform a 4D CT angiogram using ultravist 370 (30 ml, injected at 6 ml/second with a saline chaser 30 ml injected at 6 ml/seconds). The parameters for image acquisition included no acquisition delay following injection, 110 mm craniocaudal imaging volume with a temporal resolution of 1.5s, and 30 phases of acquisition, for a total scan time of 44 seconds. The time resolved CT demonstrated antegrade false lumen flow from the leading edge of the ascending aortic stent graft. The contrast pooled in the arch false lumen with thrombosis for the residual false lumen from distal to zone 3 of the aorta. This was not apparent on the conventional CTA.

4D-CTA can be used as a problem solving tool in complex vascular scenarios where CTA has failed to answer the clinical question, using low volume iodinated contrast medium.

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Aerogenous Metastasis and Spread Through the Air Spaces (STAS) – Distinct Entities or Spectrum of the Same Process?

Mariah Obino, Carolina Souza, Oscar Osorio, Marcio Gomes

University of Ottawa

PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

- To present the proposed mechanisms and pathological findings described in AME and STAS as well as areas of uncertainty and their prognostic significance.
- To review the pathological and imaging characteristics of primary lung cancers with higher probability of spreading through the airspaces.
- To describe CT features suggestive of AME and their main differential diagnoses, including distinction from multiple synchronous primary adenocarcinomas.

BACKGROUND: Lung cancer metastasis may occur by hematogenous, lymphatic or transcoelomic (pleural) spread. Clinicopathological and imaging observations suggest that an additional mechanism of metastatic spread through the airways may occur, particulary in primary adenocarcinomas, and the term aerogenous metastasis has been proposed. More recently, the concept of spread through the airspaces (STAS), defined histologically as tumor cells spreading beyond the primary tumor into airspaces in the surrounding lung parenchyma, has been included in the 2015 WHO Classification for Lung Tumors. While important areas of uncertainty remain, the current definition of STAS differs from the concept of aerogenous metastases (AME). In AME, there is discontinuous spread of cancer cells from the primary tumor to adjacent or distant lung parenchyma, including contralateral lung, with characteristic CT features. In STAS, spread occurs to the lung surrounding the primary tumor and is defined histologically. Nonetheless, the pathophysiological mechanisms of AME and STAS may be a related phenomenon and arguably, AME may reflect progression of STAS, eventually manifesting as macroscopic lesions detectable on CT.

CONCLUSION: Metastatic spread through the airways may occur in primary lung cancers, particularly adenocarcinomas. While important areas of uncertainty remain regarding definition and pathophysiology, AME and STAS may share common pathogenetic mechanisms and may be part of the same spectrum of tumor spread through the airways, with potential prognostic and treatment implications.

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MRI Characterization of T1W Hyperintense Osseus and Soft Tissue Lesions

Muhammad Israr Ahmad, Adnan Sheikh

University of British Columbia

PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE: To review the MRI features related to the osseous and soft tissue lesions which are high signal intently on T1 weighted sequence and to demonstrate how MRI can play an important role on differentiating and characterizing these lesions on the basis of the T1 high signal intensity.

BACKGROUND: Different soft tissue and osseous lesions can have variable signal intensity on different sequences in MRI depending on the nature of the lesion and its contents. MRI can play an important role to differentiate the lesions according to their signal characteristics and therefore narrow down the differential and help in directing further steps of investigation and treatment.

CONCLUSION: This exhibit will help getting familiar with the common T1 weighted high signal intensity osseous and soft tissue lesions which can be characterized depending upon the level of high signal intensity as compared to the subcutaneous fat and skeletal muscles in addition to the anatomical location. The MRI can help differentiation these lesions and therefore unnecessary interventions can be prevented.

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Ten-Year Experience with computed tomography angiography (CTA) in the evaluation of post-traumatic neck vascular injuries in a tertiary pediatric center.

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Montreal Children's Hospital, McGill University, Canada

PRESENTER'S LEVEL OF TRAINING: Fellow

OBJECTIVE:

1. Highlight the usefulness of computed tomography angiography (CTA) for the assessment of pediatric post-traumatic neck vascular injuries.
2. Develop an approach for CTA imaging in traumatic neck injuries.
3. Discuss the clinical presentation, Glasgow Coma Scale (GCS) at the time of presentation as well as the Injury Severity Score (ISS) associated with vascular injury.

BACKGROUND: CTA is commonly ordered and performed in the context of both blunt and penetrating neck trauma to assess vascular structures. Arterial dissection, thrombosis and pseudoaneurysm are the common imaging findings in vascular injuries. The main risk factors are lower GCS and higher ISS. Given the ionizing radiation in CTA, the risk of radiation-induced thyroid disease and the side effects of intravenous contrast administration, radiation exposure should be limited to children with high-risk of vascular injury.

CONCLUSION: Our study confirms the low yield of CTA in pediatric patients with a traumatic neck injury. We need to review and adapt our imaging practice by narrowing CTA indications to children with lower GCS and higher ISS.

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Application of Metal Artifact Reduction Algorithm (iMAR).

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[1]VGH, [2]Vancouver Coastal Health, [3]Vancouver Imaging

PRESENTER'S LEVEL OF TRAINING: Other Medical Professional

OBJECTIVE:

1. To understand the role of iMAR in Emergency and Trauma Radiology
2. To learn about the benefits of the novel iMAR technology.
3. To explore the possibility of further uses of iMAR.

BACKGROUND: The image quality of a pelvic CT scan is affected by noise owing to a higher level of attenuation of the pelvic bone. Among patients who have metallic implants tend to aggravate this issue owing to beam hardening and exposure. Over the years metal artifact reduction algorithms have been developed to counteract the challenges of projection interpolation. These processes significantly decrease metal artifacts in images.

CONCLUSION: Radiologists are able to make certain diagnosis using iMAR, which they were not able to make without using iMAR, hence improving their diagnostic performance.

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Department of Radiology, Radiation Oncology and Nuclear Medicine: Iconography for the General Public in Clinical Imaging, Teaching and Research

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE:

- To illustrate the importance of interdisciplinary work between various sectors.
- To share the latest innovations in medical imaging.
- To show the ""patient journey"" within our Department.

BACKGROUND: This project aimed to illustrate the three clinical sectors of the Department, medical physics, as well as the fields of teaching and research, by means of ten thematic images.

The Forum's target audience was the general public, so it was crucial to make all content accessible and easy to understand.

CONCLUSION: All of the topics discussed reflected the integration of our three sectors into the Department, our work in clinical innovation and research, as well as our efforts to ensure the rigorous training of our next generation of medical specialists.

The importance of interdisciplinary work will become more and more important to radiologists, as pathologies and imaging modalities become more complex and varied.

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