

Scientific Research Project Competition

Oral Presentations

120730

Periportal Lymphadenopathy: Is There a Correlation with Metabolic Dysfunction-associated Steatotic Liver Disease (MASLD) at MR Elastography?

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: Metabolic-associated steatotic liver disease (MASLD) is the most prevalent cause of chronic liver disease globally with increasing prevalence paralleling the obesity epidemic. Periportal lymphadenopathy has been anecdotally associated with hepatic inflammation and steatosis, but its diagnostic and prognostic value in MASLD remains poorly defined. This study evaluates the relationship between the severity of hepatic steatosis and its relationship with periportal lymphadenopathy in patients undergoing magnetic resonance elastography (MRE) with fat fraction (FF) quantification.

METHODS: A retrospective cohort of 190 adult patients undergoing MRE with FF quantification between January and October 2024 was analyzed. Patients with cirrhosis, hemochromatosis, or prior liver transplant were excluded. Hepatic steatosis was categorized by FF as normal (<6%), mild (6-17%), moderate (17-22%), or severe (>22%), as per vendor guidelines. Presence and number of periportal lymph nodes were recorded. Multivariable logistic regression adjusted for age and sex evaluated associations between steatosis severity and lymphadenopathy.

RESULTS / DISCUSSION: Periportal lymphadenopathy was observed in 24% of patients and was more frequent with increasing steatosis severity ($p = 0.008$). The proportion of patients with enlarged periportal lymph nodes differed significantly across steatosis severity ($p = 0.03$). A higher proportion of patients with severe steatosis had >2 enlarged nodes. Severe steatosis was associated with 3.2 times higher odds of periportal lymphadenopathy compared to normal FF (OR = 3.23, 95% CI: 1.19-8.79, $p = 0.022$).

CONCLUSION: Periportal lymphadenopathy is significantly associated with more severe hepatic steatosis in MASLD. Recognizing this association may reduce unnecessary investigations for isolated lymphadenopathy and inform non-invasive risk stratification strategies in MASLD management.

120836

Understanding the Canadian Interventional Radiology Landscape Through the Canadian Association of Interventional Radiology (CAIR) Database: A Descriptive Study

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PRESENTER'S LEVEL OF TRAINING: Resident

OBJECTIVE: Physicians in Canada are disproportionately concentrated in urban centers, with rural regions facing significant gaps in specialist care. The geo-spatial characteristics of Interventional Radiology (IR) in Canada have not been systematically studied. This study examines the distribution of Canadian Association of Interventional Radiology (CAIR) members and the sociodemographic characteristics of the populations they serve.

METHODS: A list of active members of the Canadian Association of IR (CAIR) was obtained in May 2025. Data from the Canadian Census was used to gather census division (CD)-level information on population size and demographics including data on ethnicity, income, education, employment, and income. CDs were grouped and compared between those with access to IR care and those without, compared between top and bottom quartiles for each population characteristic, and mapped.

RESULTS / DISCUSSION: Of 293 CDs in Canada, only 48 (19.6%) had at least one IR, leaving 31.6% of the national population without local access. IRs were strongly clustered in high-population CDs, with Toronto, Vancouver, and Montreal alone accounting for 56.5% of IRs. CDs with IRs had significantly higher mean populations (527,322 vs. 47,675; $p < 0.001$), median incomes (\$82,760 vs. \$75,821; $p = 0.002$), and educational attainment (31% vs. 16%; $p < 0.001$). Conversely, CDs with higher proportions of the population being Indigenous were less likely to have IRs (5% vs. 14%; $p < 0.001$).

CONCLUSION: CAIR member IRs are disproportionately concentrated in large urban centers, leaving substantial geographic disparities. Addressing this maldistribution will require coordinated strategies, including outreach models, telehealth integration, and national workforce planning.

122792

Value of Dual-Energy CT in the Diagnosis of Gangrenous Cholecystitis: A Preliminary Single-Centre Retrospective Analysis

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PRESENTER LEVEL OF TRAINING: Fellow

OBJECTIVE: Acute cholecystitis (AC) is among the top six causes of emergency department (ED) visits in North America. Gangrenous cholecystitis, a severe complication of AC, remains challenging to diagnose pre-operatively using conventional CT. Evidence supporting the incremental value of dual-energy CT (DECT) is limited. This study evaluated whether DECT-derived features improve diagnostic accuracy for gangrenous cholecystitis compared with conventional CT alone.

METHODS: Radiology and pathology reports from January 2020 to January 2025 were retrospectively matched, identifying 315 patients who underwent cholecystectomy within 7 days of CT acquisition within ED. Cases were reviewed independently by two radiology fellows. Patient demographics, diagnostic performance metrics and rate of agreement were assessed, comparing conventional CT alone versus CT with DECT-derived features.

RESULTS / DISCUSSION: A total of 48 patients were included (mean age 65 ± 18 years; 71% male), of whom 10 had gangrenous cholecystitis. The median time between CT and cholecystectomy was 3 days (IQR 2-4). Inter-reader agreement was 46/48 for conventional CT and 45/48 with DECT. The addition of DECT features increased sensitivity from 15% (95% CI: 0-30%) to 45% (95% CI: 25-65%). Specificity changed from 96.1% (95% CI: 91-100%) to 89.5% (95% CI: 82-96%).

CONCLUSION: Preliminary findings suggest that DECT features enhance diagnostic sensitivity for gangrenous cholecystitis and reduce false-negative interpretations compared with conventional CT alone. Although specificity decreased modestly, DECT appears to offer meaningful incremental diagnostic value. Ongoing analysis of the full cohort is required to confirm these early results.

123606

Prognostic utility of Left Atrial (LA) and Left Ventricular (LV) Strain by Cardiac Magnetic Resonance Imaging (CMR) in Patients with Takotsubo Syndrome (TTS)

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PRESENTER LEVEL OF TRAINING: Fellow

OBJECTIVE: To evaluate the prognostic value of LA and LV strain parameters derived from CMR in predicting major adverse cardiac and cerebrovascular events (MACCE) in patients with TTS.

METHODS: This retrospective study included 151 patients with TTS (January 2017-January 2025) who underwent 1.5-T CMR. Imaging was re-analyzed for LV volumes, function, wall motion abnormalities, native T1, global T2, extracellular volume, LA long-axis strain, and LV global longitudinal (GLS), circumferential (GCS), and radial strain (GRS). The primary endpoint was MACCE (all-cause death, heart failure hospitalization, recurrent TTS, stroke, or transient ischemic attack). Prognostic associations were evaluated using multivariable Cox regression adjusted for pre-specified covariates and Kaplan-Meier curves with log-rank tests after stratification by global T2 (>59.5ms) and LA long-axis strain (<21.4%).

RESULTS / DISCUSSION: Mean age was 67.2±13.1 years; 89.4% were female. The mean ±SD values for LV GLS, LV GCS, LV GRS, and LA long-axis strain were -12.0 ±3.9%, -13.7 ±4.7%, 23.0 ±12.8%, and 24.0 ±14.3%, respectively. Over a mean follow-up of 1,022±718 days, 26 patients (17.2%) experienced MACCE. In multivariable analysis, LA and LV strain parameters were not independently associated with MACCE, whereas higher global T2 remained significantly associated with events (HR 1.2, 95%CI 1.1-1.4; p=0.005). Kaplan-Meier analysis demonstrated significantly worse MACCE-free survival in patients with global T2 >59.5ms and LA long-axis strain <21.4% (log-rank p=0.007).

CONCLUSION: In patients with TTS undergoing CMR, LA and LV strain were not independently associated with MACCE in multivariable analysis; however, combined impaired LA strain and elevated global T2 identified a higher-risk subgroup with shorter time to MACCE.

123634

Tracking Disease Progression using Cardiac Imaging in Hypertrophic Cardiomyopathy: Serial Imaging Data from a Retrospective Multicenter Study

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PRESENTER LEVEL OF TRAINING: Medical Student

OBJECTIVE: To characterize longitudinal changes in hypertrophic cardiomyopathy through four key parameters - Maximum Left Ventricular Wall Thickness (MLVWT), Left Ejection Fraction (LVEF), Left Atrial Diameter (LAD) and Left Atrial Volume Indexed (LAVI) - and to assess the value of serial transthoracic echocardiography (TTE) and cardiac magnetic resonance (CMR) for monitoring disease progression.

METHODS: Patients were retrospectively enrolled from the National HiRO-HCM Registry. Each parameter was analyzed independently using serial baseline and follow-up studies from the same imaging modality, creating four corresponding study groups. Mixed linear models were used to calculate annualized change rates and quantify longitudinal trends.

RESULTS / DISCUSSION: The cohort included 1036 patients (37.7% female; mean age 50.7 ± 14.5 years) with a median follow-up of 5.31 years (IQR 2.48-9.64). Baseline values were: MLVWT 17.01 ± 4.46 mm (N = 638), LVEF 64.54 ± 6.95% (N = 597), LAD 39.59 ± 5.73 mm (N = 565), and LAVI 35.27 ± 12.77 mL/m² (N = 547). Over time, significant annualized increases occurred in MLVWT (0.065 ± 0.019 mm/year), LAD (0.315 ± 0.031 mm/year), and LAVI (0.528 ± 0.066 mL/m²/year), while LVEF decreased (-0.343 ± 0.039 %/year) (all p < 0.001). Follow-up duration explained only a small proportion of variability in parameter changes (R² < 0.07).

CONCLUSION: Longitudinal changes in key HCM imaging parameters were limited but statistically significant, reflecting the slow remodeling nature of the disease. However, inter-patient variability remained unexplained by time alone, highlighting the need to explore additional determinants of individual disease progression and ensure targeted monitoring.

123612

Evaluating Radiation Safety Knowledge and Dose Awareness Among Canadian Healthcare Trainees: A Multi-centre Study

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PRESENTER LEVEL OF TRAINING: Medical Student

OBJECTIVE: The utilization of medical imaging in Canada has doubled from 2000 to 2016. While advances in medical imaging technology have enhanced diagnostic capabilities, radiation exposure to patients and healthcare workers remains a consideration in clinical practice. Previous single-institution studies have identified knowledge gaps among trainees regarding radiation doses associated with common imaging examinations and core principles of radiation protection. However, a comprehensive assessment of radiation safety knowledge among the Canadian training programs has not yet been conducted. This study aims to evaluate radiation safety knowledge, dose awareness, and familiarity with radiation protection principles among medical, nursing, and radiography students, as well as residents from various specialties across Canada.

METHODS: A cross-sectional survey will be administered to 150 trainees via Qualtrics. The survey will assess self-reported knowledge, objective knowledge of radiation doses from common imaging studies, personal protective equipment use, and understanding of ALARA (As Low As Reasonably Achievable) principles. Descriptive and comparative statistical analyses will characterize responses across training levels and specialties. Participants may opt into semi-structured virtual interviews (30 mins) to explore sources of radiation safety education and perceived barriers to implementing best practices.

RESULTS / DISCUSSION: Data collection is ongoing with early results showing various levels of self-reported and demonstrated knowledge. We anticipate to identify variability across training site and practical barriers to radiation safety education implementation.

CONCLUSION: This study will provide the first national assessment of radiation safety knowledge among Canadian trainees across multiple disciplines. Findings will inform the development of standardized educational interventions to enhance radiation safety practices in training programs.



123584

Performance of CEUS LI-RADS v2017 Major Feature Combinations: Individual Patient Data Meta-Analysis

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PRESENTER LEVEL OF TRAINING: Medical Student

OBJECTIVE: The LI-RADS diagnostic algorithm uses contrast-enhanced ultrasound (CEUS) imaging features to standardize hepatocellular carcinoma (HCC) diagnosis in at-risk patients. However, the diagnostic performance of specific major feature combinations has not been comprehensively evaluated. The purpose of this study is to evaluate the diagnostic performance of CEUS LI-RADS v2017 major feature combinations for HCC in at-risk individuals across LI-RADS categories 3-5.

METHODS: A living systematic review and individual participant data meta-analysis was conducted, including studies using CEUS LI-RADS v2016 or v2017 in at-risk patients, identified through searches updated to February 2024. Observations were categorized per LI-RADS guidelines, and PPVs for HCC were calculated for major feature combinations in categories 3-5 using a random-effects one-step model. Risk of bias was assessed using a customized QUADAS-2 tool.

RESULTS / DISCUSSION: Thirteen studies were included, comprising 1575 patients (mean age, 62.8 ± 11.2 years; 79.3% male) with 1594 liver observations (median size, 37.1 mm). Pooled PPVs for HCC increased with higher LI-RADS categories: LR-3, 40.4% (95% CI: 27.2-55.1); LR-4, 69.7% (95% CI: 49.7-84.3); and LR-5, 95.1% (95% CI: 90.2-97.6). Major feature combinations performed similarly within each category. Most studies had moderate to high risk-of-bias due to retrospective design, but sensitivity analysis of low risk observations showed similar results.

CONCLUSION: CEUS LI RADS demonstrated progressively higher PPVs from LR 3 to LR 5, and major feature combinations performed similarly within categories, supporting internal consistency of the system. Although only PPVs were assessed, the results align with CT/MRI LI-RADS trends, with wider confidence intervals in CEUS reflecting smaller sample sizes.

123610

Automated and Anonymized On-Device Computer Vision Model to Classify CT-Suite Workflow and Derive Operational Performance Indicators

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PRESENTER LEVEL OF TRAINING: Medical Student

OBJECTIVE: Timely CT access depends on efficient patient throughput, yet most sites lack continuous, objective measurement of CT processes. We developed and evaluated a fully automated, privacy-preserving computer-vision (CV) method to classify CT room states and derive key performance indicators (KPIs) for CT workflow.

METHODS: A dual-spectrum ceiling camera provided visible video for on-device analysis and thermal video for anonymized ground truth. The system tracked room person-count and CT-bed occupancy to identify four in-room events (preparation, scan, discharge, empty). Thermal clips were double-annotated for the same in-room events by four readers blinded to model outputs; interrater reliability was quantified with Cohen's κ . Model performance was evaluated as overall and per-event accuracy and F1 (see Figure 1c for all metrics, and 1b for confusion matrix). Workflow KPIs included number of scans, patients per hour, cycle time, and scanner utilization.

RESULTS / DISCUSSION: We analyzed 47.62 hours of CT operating time across 3 days (July 28-30, 2025). Interrater agreement for dual-annotation was almost perfect ($\kappa=0.976$, 95% CI 0.9748-0.977). Overall model performance was 90.2% accuracy with macro-F1 79.2%. Per-event metrics are displayed in Figure 1b-c. KPIs (model vs ground truth) were: 51 vs 52 scans, patients per hour of 2.74 vs 2.68 ($p>0.99$), cycle time of 14.42 vs 16.45 minutes per patient and room utilization of 75.84% vs 70.80%.

CONCLUSION: Our CV approach accurately classified CT room states and produced practical KPIs without PHI or added staffing resources. This can support bottleneck identification, targeted interventions, and ongoing monitoring. Prospective, multi-site trials are planned to evaluate generalizability and operational impacts.