

Quality Improvement Project Competition

Oral Presentations

123148

Reducing Wait Times for Outpatient Liver Biopsy in a Regional Health Authority in Canada

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PRESENTER LEVEL OF TRAINING: Medical Student

OBJECTIVE AND BACKGROUND: As the population ages and awareness of early cancer detection rises, healthcare systems face escalating demand for diagnostic investigations, leading to extended wait times for imaging and biopsy services. The purpose of this initiative was to shorten the interval between liver biopsy requisition and procedure completion for outpatients in a regional health authority in Canada. Our project goal was to reduce the median wait time from biopsy requisition to procedure by half.

METHODS: We prospectively collected biopsy requisition and procedure dates for all outpatients at the single medical imaging department for our health region as an outcome measure. There is no 'standard of practice' governing acceptable wait times for outpatient liver biopsies. The impact of delays in cancer diagnosis and treatment varies by tumour type and stage; on average, a 4-week delay in treatment has demonstrated a 6-14% increase in mortality. We documented which biopsies were performed as fine-needle aspirates (FNA) versus core biopsies, and how many angiography beds were appropriated for recovery of liver biopsy patients, as balancing measures. Interventions implemented included centralizing procedure bookings to a dedicated clerk, leveraging excess nursing capacity from the CT and Angiography units to assist with biopsy recovery, and introducing a dedicated proceduralist radiologist shift. A department-wide discontinuation of liver FNAs was simultaneously implemented. Data collection began October 2024 and ended September 2025.

RESULTS: At baseline, the median wait time from requisition to biopsy was 44 days (range 0-116). Following the discontinuation of FNAs, the median wait initially increased to 62.5 days (range 7-83). However, we ultimately achieved a median of 20 days (range 8-47) with exclusively core biopsies performed.

CONCLUSION: In Canada's complex, interdependent healthcare system, durable improvements depend on aligning cultural and structural changes. Targeted workflow redesign and stakeholder collaboration can translate directly into measurable gains in patient care.

123306

Dose Optimization and Image Quality in PET-CT: Aligning with Provincial Technical Recommendations

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OBJECTIVE AND BACKGROUND: PET/CT is inherently a higher-dose modality due to the combined radiation from the CT scan and administered radiotracer, with an average effective dose of 25 mSv. While technical advances have reduced CT-related exposure, FDG doses have remained static at around 5 MBq/kg. Our aim was to reduce PET/CT radiation dose by lowering the administered FDG activity, while confirming ongoing image quality. Image quality was assessed through compliance with the recently published Ontario Health provincial technical standards. A target of >90% was selected.

METHODS: Retrospective analysis comparing radiation dose and technical parameters for PET/CT scans performed before and after reduction of administered FDG dose. From April to June 2025, patients received 5 MBq/kg of FDG. Following pilot testing in July, the dose was reduced to 4.5 MBq/kg from August to October. Patient demographic data including age, sex and BMI were recorded as well as scan indication. Technical parameters assessed outside FDG dose included uptake time, bed position time, serum glucose, CT dose and scan coverage. Additional image quality metrics measured included mediastinal blood pool (MBP) and liver SUVmax, SUVmean, liver standard deviation and calculated SNR. This multidisciplinary initiative involved radiologists and nuclear medicine technologists.

RESULTS: FDG dose was successfully reduced from 5MBq/kg to 4.5 MBq/kg without compromising image quality. 100% of scans pre and post FDG dose reduction fell within the surveyed technical standards reported within the province. Variability in administered FDG dose was observed related to logistics from ordering, delivery, and timing, which affected tracer decay. Additional image quality metrics showed no significant differences pre and post dose reduction. Our results align with published literature demonstrating that dose optimization reduces radiation exposure while preserving diagnostic performance.

CONCLUSION: Successful reduction in FDG dose and subsequent radiation exposure was achieved without compromising image quality, with 100% of scans performed in alignment with provincial technical standards.

123341

Straining to Get It Right: Evaluating the Reporting of Right Heart Dysfunction in CT Pulmonary Angiograms

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OBJECTIVE AND BACKGROUND: Pulmonary embolism (PE) is a leading cause of cardiovascular mortality secondary to right heart dysfunction (RHD). The most robust signs of RHD include right ventricle to left ventricle ratio greater than 1.0, interventricular septal bowing, and inferior vena cava contrast reflux. Reporting these findings accurately and consistently is essential. The American Journal of Radiology (AJR) recommends structured reports as this promotes clarity, facilitates decision-making, and is preferred by clinicians. Our objective was to assess the current consistency of reporting RHD on positive PE studies at a Canadian Hospital and implement an intervention to improve this consistency.

METHODS: Pre-intervention, we conducted a retrospective chart review for positive PE studies that mentioned RHD between January 1, 2024 and June 30, 2025. Reports were analyzed for the consistency of describing RHD. Our intervention was an adapted template from AJR listing the three signs of RHD. Our goal was to achieve 100% reporting of the presence or absence of RHD and the three signs of RHD. Post-intervention studies between August 20, 2025 and October 20, 2025 were reviewed. Chi-square analyses were performed at a confidence interval of 95%, comparing pre- and post-intervention results.

RESULTS: 446 pre-intervention and 113 post-intervention studies were included. Post-intervention, we saw a statistically significant increase in reports describing all three signs of RHD (13% vs 37%, p-value <0.001). There was no difference in reporting the presence or absence of RHD (79% vs 80%, p-value 0.83), with a similar percentage of cases not reporting RHD post-intervention.

CONCLUSION: After implementing our template, we saw an improvement in describing the signs of RHD, but there is room for improving the interpretation of these findings to provide a meaningful report. We plan to continue this audit after introduction of PE-RADS and conduct a study comparing axial images versus 4-chamber reformat for reporting RV to LV ratio.

123363

Technetium-99m HMPAO Leukocyte Labelling Efficacy Between Nuclear Medicine Departments in a Canadian City

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PRESENTER LEVEL OF TRAINING: Resident

OBJECTIVE AND BACKGROUND: Combined technetium-99m (Tc-99m) hexamethylpropylene amine oxime (HMPAO)-labelled leukocyte and Tc-99m sulphur colloid (SC) bone marrow imaging is a well-established technique for diagnosing musculoskeletal infection. In this city, hospital facilities differ in leukocyte labeling capabilities. The Hospitals A & B perform on-site leukocyte labelling, whereas the Hospitals C & D receive labelled leukocytes from the city's central radiopharmacy. This quality-improvement initiative aimed to evaluate the leukocyte-labelling efficacy across the four hospitals.

METHODS: We targeted a 2:1 ratio between labelled leukocyte activity and SC activity based on our local practice. We expect $\geq 90\%$ of combined leukocyte and bone marrow imaging studies should meet this threshold. Pre-intervention data including patient demographics, labelled leukocyte activity, SC activity, and study positivity were collected for all combined Tc-99m-HMPAO leukocyte and Tc-99m-SC bone marrow studies at the various hospitals from November 1, 2023 to January 31, 2024. With collaboration from radiochemists at the radiopharmacy, a review of their leukocyte labelling protocol revealed the use of lower Tc-99m-HMPAO activity and shorter incubation times relative to other sites within the city. The intervention consisted of increasing the Tc-99m-HMPAO activity from 1.4-1.6GBq to 2.7GBq and the incubation period from 10 minutes to 15 minutes. Following the intervention implementation on January 1, 2025, post-intervention data were collected from May 12, 2025 to August 12, 2025.

RESULTS: Pre-intervention, only Hospital A met the target leukocyte to SC activity ratio, with Hospital B approaching the benchmark. After implementing the revised labelling protocol at the radiopharmacy, all four sites achieved the target ($p < 0.0001$).

CONCLUSION: Labelled WBC activity impacts the quality of combined Tc-99m-HMPAO leukocyte and Tc-99m-SC bone marrow studies. This audit identified suboptimal leukocyte labelling at select hospitals requiring off-site labelling. Protocol standardization successfully improved consistency and study quality across all centers.

123571

Diagnostic Performance and Surgical Delay in Parathyroid Imaging: A Calgary Zone Quality Improvement Initiative

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PRESENTER LEVEL OF TRAINING: Medical Student

OBJECTIVE AND BACKGROUND: Accurate adenoma localization in primary hyperparathyroidism (PHPT) enables minimally invasive parathyroidectomy. Nuclear medicine (NM) sestamibi imaging and four-dimensional CT (4DCT) are widely used, but strategies vary-some centres employ NM, 4DCT, or both modalities. Since the introduction of 4DCT in Calgary, its role in the PHPT pathway has not been studied. Anecdotally, many NM studies are non-localizing, prompting subsequent 4DCT and potential surgical delays. The purpose of this initiative was to assess whether local practice achieves published benchmarks for diagnostic accuracy.

METHODS: 200 patients who underwent NM and/or 4DCT before parathyroidectomy were reviewed retrospectively. Patients were excluded if they lacked biochemical evidence of PHPT or if surgery had not yet occurred. Operative findings served as the reference standard. A per-gland analysis was performed to calculate sensitivity and positive predictive value (PPV), and these results were compared with published ranges.

RESULTS: 85 patients met inclusion criteria. NM demonstrated a sensitivity of 36.8% and a PPV of 68.6%, values that fall well below the published sensitivity range of 67-86% and the reported PPV of approximately 91%. 4DCT achieved a sensitivity of 60.3% and a PPV of 80.9% - near the lower end of the published sensitivity range of 62-88% and PPV range of 84-90%, but more closely approximating expected benchmarks than NM. The findings indicate that NM performance in Calgary is substantially lower than reported in the literature, often necessitating additional 4DCT and plausibly contributing to delays in operative management. By comparison, 4DCT demonstrated performance closer to benchmark values, though still slightly reduced. Improving NM imaging technique and reporting, or alternatively shifting toward broader initial use of 4DCT, may reduce the need for sequential imaging.

CONCLUSION: NM parathyroid imaging in Calgary performs significantly below published benchmarks. Broad stakeholder engagement-including surgeons, radiologists, and technologists-will be required to improve diagnostic performance and streamline imaging pathways.

123608

Ultrasound and Gallbladder Polyps: Appropriateness of Current Reporting Practice and Follow-Up Recommendations

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PRESENTER LEVEL OF TRAINING: Resident

OBJECTIVE AND BACKGROUND: There is significant variation in reporting practices and management recommendations of gallbladder polyps visualized on ultrasound. This is likely due to multiple different, often changing guidelines, and paucity of data on malignant potential of polyps. New research suggests most polyps are benign and previous management recommendations were too conservative. We utilize the 2022 SRU consensus on the Management of Incidentally Detected Gallbladder Polyps, which the CAR endorsed in June 2025, with clear risk stratification and management based on polyp morphology, size, and patient risk factors.

METHODS: 2420 abdominal ultrasounds performed over three months were reviewed for the presence of gallbladder polyps. 141 cases met inclusion criteria. Each report was assessed for polyp number, size, morphology, and appropriate follow-up recommendation based on the SRU guidelines. Our intervention stage then recommended use of Powerscribe templates and technologist worksheets containing the endorsed guidelines. Following intervention, another 1391 abdominal ultrasounds performed over two months were reviewed. 91 cases met inclusion criteria. The third month of post-intervention data will be presented at the CAR meeting.

RESULTS: Pre-intervention, 111/141 cases (79%) reported number of polyps, 136/141 (96%) reported polyp size, and 12/141 (9%) reported polyp morphology, with only 40/141 (28%) providing appropriate follow-up recommendation using the referenced SRU guidelines. After two months of post-intervention data, 80/91 (88%) reported number of polyps, 89/91 (98%) reported polyp size, 33/91 (36%) reported polyp morphology, and 72/91 (79%) provided the appropriate management recommendation.

CONCLUSION: Before intervention, our institution had wide variability in polyp characterization and management recommendations. Preliminary post-intervention results show improved consistency of polyp description and adherence to the 2022 SRU guidelines. However, polyp morphology remains infrequently reported, emphasizing difficulty in assessing morphology of small polyps. Overall, post-intervention results are promising to reduce patient anxiety and judiciously use healthcare funds to decrease unnecessary follow-up exams and surgical referrals.

123613

Preparing Residents for AI-Integrated Radiology Practice: Needs Assessment and Curriculum Innovation at a Canadian Radiology Program

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PRESENTER LEVEL OF TRAINING: Resident

OBJECTIVE AND BACKGROUND: Artificial intelligence (AI) is increasingly embedded in radiology workflows, creating an urgent need for resident training that supports safe, effective, and informed patient care. However, specific AI learning needs and preparedness of radiology residents in Canada remain ill-defined. The purpose of this initiative was to evaluate resident knowledge, confidence, and educational needs related to AI and to develop a structured, reproducible curriculum.

METHODS: A cross-sectional, single-site, anonymous survey was distributed to radiology residents (n=44; 75% response rate) across all training years. Measures included prior AI exposure (eg. coursework, degree), confidence across AI competencies (eg. understanding AI outputs, model limitations, and ethical/regulatory considerations), attitudes toward AI, barriers to AI-work-related participation, and preferred curricula formats. Quantitative responses were analyzed descriptively and qualitative responses analyzed thematically. Results were compared against best-practice guidelines for AI education in radiology to identify gaps relative to desired competency standards. A multidisciplinary team of radiologists, residents, data scientists, and medical educators used this data to design a five-module curriculum.

RESULTS: Most residents (93%) reported no formal background in AI, yet 75% used AI tools in clinical and educational contexts and 64% were optimistic about AI's impact on radiology. The majority (68%) expressed low confidence in key competencies. Residents felt current teaching was insufficient and lacked relevance, strongly endorsing a desire for a structured, longitudinal curriculum emphasizing practical skills, clinical use cases, and clear pathways to AI research participation. Barriers to research involvement included lack of mentorship and limited data access. These findings informed an interactive, new five-module curriculum covering machine and deep learning fundamentals, ethics/bias, regulation, deployment, and research engagement.

CONCLUSION: There are significant gaps in AI preparedness among radiology residents. The new proposed curriculum represents a targeted quality-improvement intervention to enhance resident readiness for AI-integrated clinical practice. Future steps include implementation, iterative refinement, and potential expansion to national residency programs.

123638

Striking a Balance: Neuroimaging in the Vertiginous Patient

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OBJECTIVE AND BACKGROUND: Non-contrast CT and CTA head and necks are frequently requested for patients with vertigo, despite known low diagnostic yields. While no Canadian guidelines exist, the American College of Radiology (ACR) recently released consensus guidelines on appropriate imaging utility in the work-up of vertigo. The goals of this quality improvement study were to: 1) Evaluate department compliance with ACR consensus guidelines on CT imaging for vertigo, 2) Evaluate clinical factors influencing imaging requests and scan outcomes in the vertiginous patient.

METHODS: Imaging reports for CT scans performed for vertigo over the past three years were collected from a Canadian Hospital (n=1554). From these, pertinent data were extracted, including patient age, vertigo features, neurologic deficits, risk factors, and imaging findings. These data were used to determine case compliance with the 2023 ACR guidelines, namely that CT scans be performed only for patients presenting with either: 1) Acute persistent vertigo with neurologic deficits on physical exam, or, 2) Chronic recurrent vertigo associated with brainstem/cerebellar localizing deficits. Our primary outcome was the percent of compliant scans, with a target of 100%. Secondary analyses assessed the influence of vertigo features and extracted clinical variables on scan outcomes using Chi-squared tests and logistic regression. False discovery rate was used to correct for multiple comparisons, with significance set at $q < 0.05$.

RESULTS: Only 10.6% of CT scans were compliant with ACR guidelines. Detection rates of underlying pathology were greater in cases compliant vs non-compliant with ACR criteria (14.8% vs 4.6%, OR=3.6, 95% CI=2.2-6.1). Presence of localizing neurologic deficits was the only clinical variable predictive of imaging pathology in logistic regression (OR=4.0, 95% CI=1.7-5.3).

CONCLUSION: Our findings suggest CT scans are over-utilized in the work-up of vertigo. Further, the data supports the utility of focal neurologic deficits in selecting patients for imaging. This should be emphasized in future quality improvement interventions.

