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The Department of Radiology undertakes radiology service at IMSUT hospital. Our expertise includes general diagnostic radiology, neuroradiology, clinical nuclear medicine, and radiation therapy. Board-certified radiologists at the Department of Radiology conduct all examinations of CT, MRI, and nuclear medicine. Radiological reports are made by the radiologists. In addition, several clinical studies are being conducted in collaboration with other departments or institutions. We also investigate the technical aspects of molecular imaging with intact small animals for its application to preclinical studies using an optical imaging system and MRI.

The Department of Radiological Technology constitutes the hospital radiology service together with the Department of Radiology. Plain radiography, dual-energy X-ray absorptiometry, and barium studies are also available at the Department of Radiological Technology, other than CT, MRI, and radioisotope examinations. More than 10,000 patients visit our department every year. Radiologic technologists at the department make an effort to provide high-quality medical images in daily practice as well as to reasonably reduce radiation exposure of a patient during the examination.

Feasibility study of direct CT lymphangiography in mice: comparison with interstitial CT/MR lymphangiography.

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In the present study, we aimed to establish a CT lymphangiography method in mice via direct lymph node puncture. We injected healthy mice (n = 8) with 50 μl of water-soluble iodine contrast agent (iomeprol; iodine concentration, 350 mg/mL) subcutaneously into the left-rear foot pad (interstitial injection) and 20 μl of the same contrast agent directly into the popliteal lymph node (direct puncture) 2 days later. Additionally, we performed interstitial MR lymphangiography on eight mice as a control group. We calculated the contrast ratio for each lymph node and visually assessed the depiction of lymph nodes and lymphatic vessels on a three-point scale. As a result, the contrast ratios of 2-min post-injection images of sacral and lumbar-aortic lymph nodes were 20.7 ± 16.6 (average ± standard deviation) and 17.1 ± 12.0 in the direct puncture group, which were significantly higher than those detected in the CT or MR interstitial lymphangiography groups (average, 1.8-3.6; p = 0.008-0.019). The visual assessment scores for sacral lymph nodes, lumbar-aortic lymph nodes, and cisterna chyli were significantly better in the direct puncture group than in the CT interstitial injection group (p = 0.036, 0.009 and 0.001, respectively). The lymphatic vessels between these structures were significantly better scored in direct puncture group than in the CT or MR interstitial lymphangiography groups at 2 min after injection (all p ≤ 0.05). To sum up, in CT lymphangiography in mice, the direct lymph node puncture provides a better delineation of the lymphatic pathways than the CT/MR interstitial injection method, which we believe that direct CT lymphangiography will be the first choice for the evaluation of lymphatic pathways in mice.

Early detection of hypervascularization in hepatocellular carcinoma (≤ 2 cm) on hepatic arterial phase with virtual monochromatic imaging: Comparison with low-tube voltage CT.

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This study aims to assess the diagnostic value of virtual monochromatic image (VMI) at low keV energy for early detection of small hepatocellular carcinoma (HCC) in hepatic arterial phase compared with low-tube voltage (80 kVp) CT generated from dual-energy CT (DE-CT). A total of 107 patients with 114 hypervascular HCCs (≤2 cm) underwent DE-CT, 140 kVp, blended 120 kVp, and 80 kVp images were generated, as well as 40 and 50 keV. CT numbers of HCCs and the standard deviation as image noise on psoas muscle were measured. The contrast-to-noise ratios (CNR) of HCC were compared among all techniques. Overall image quality and sensitivity for detecting HCC hypervascularity were qualitatively assessed by three readers. The mean CT numbers, CNR, and image noise were highest at 40 keV followed by 50 keV, 80 kVp, blended 120 kVp, and 140 kVp. Significant differences were found in all evaluating endpoints except for mean image noise of 50 keV and 80 kVp. Image quality of 40 keV was the lowest, but still it was considered acceptable for diagnostic purposes. The mean sensitivity for detecting lesion hypervascularity with 40 keV (92%) and 50 keV (84%) was higher than those with 80 kVp (56%). Low keV energy images were superior to 80 kVp in detecting hypervascularization of early HCC.

Publications

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