

AB022. Challenges in thymic imaging

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Background: Thymic imaging is challenging as there is overlap in the imaging appearance of a variety of benign and malignant thymic conditions on selected imaging modalities. CT is the most commonly used modality for mediastinal imaging, while MRI and FDG PET/CT are helpful when tailored to the correct indication. Each one of these imaging modalities has its limitations and technical pitfalls which may lead to an incorrect diagnosis and mismanagement. Our objectives are to review indications for thymic imaging, selection of different imaging techniques, common technical and interpretation pitfalls, and post-thymic malignancy treatment pitfalls, and to provide tips to avoid these pitfalls.

Methods: We conducted a comprehensive search of our database to identify cases exhibiting potential pitfalls in thymic imaging. Our analysis included cases from a 17-year period, spanning from 2005 to 2022. The review process involved a thorough examination of each case to identify key areas where errors in interpretation could arise. To ensure accuracy, two independent reviewers conducted the analysis and any discrepancies were resolved by consensus.

Results: CT's low contrast resolution hinders the characterization of cystic thymic processes and differentiation between thymic hyperplasia and thymic tumors. MRI can overcome these limitations but is subject to equivocal signal-drop with chemical shift imaging, size limitations, unusual signal for cysts, subtraction artifacts, pseudo-nodularity on T2 weighted imaging (T2WI), early imaging misinterpretation, flow and spatial resolution

issues hampering local invasion assessment, and overlap of apparent diffusion coefficient values between malignant and benign thymic entities. FDG PET/CT is not routinely indicated due to some overlap between FDG uptake in thymoma and benign thymic processes. However, it is useful for staging and follow-up of aggressive tumors, particularly for detection of occult metastatic disease. Pitfalls in imaging following treatment of thymic malignancies relate to post-thymectomy sternotomy streak metal artifacts, differentiating between post-surgical thymic bed changes and tumor recurrence, or human error with typical 'blind spots' for metastatic disease.

Conclusions: Understanding the advantages and limitations of each thymic imaging modality enables radiologists to select the correct imaging technique, improve the quality of imaging acquisition and measurements, and ultimately enhance diagnostic accuracy, ensuring appropriate patient management.

Keywords: Thymus; imaging; challenges

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the Institutional Review Board (IRB) of Sheba Medical Center (No.: DR08-0730) and individual consent for this retrospective analysis was waived.

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