

MRI of Thyroid Carcinoma: A Pictorial Review of Imaging Features, Local Tumor Extension, and Disease Spectrum

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Background:

- Thyroid carcinoma is the most common endocrine malignancy, with papillary thyroid carcinoma accounting for approximately 85% of cases. Although ultrasound is the primary imaging modality for evaluating thyroid nodules, magnetic resonance imaging (MRI) plays an important role in assessing locally advanced disease, extrathyroidal extension, invasion of adjacent structures, cervical nodal metastases, postoperative evaluation and disease recurrence.

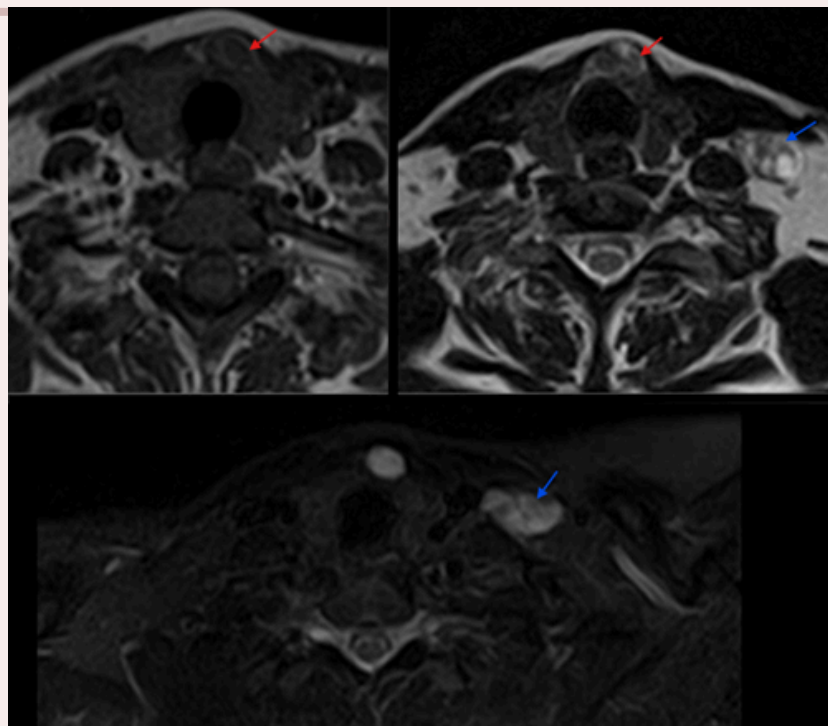
Objective:

- To familiarize radiologists and clinicians with the characteristic MRI appearances of thyroid malignancies and highlight the role of MRI in diagnosis, staging, treatment planning, and follow-up.

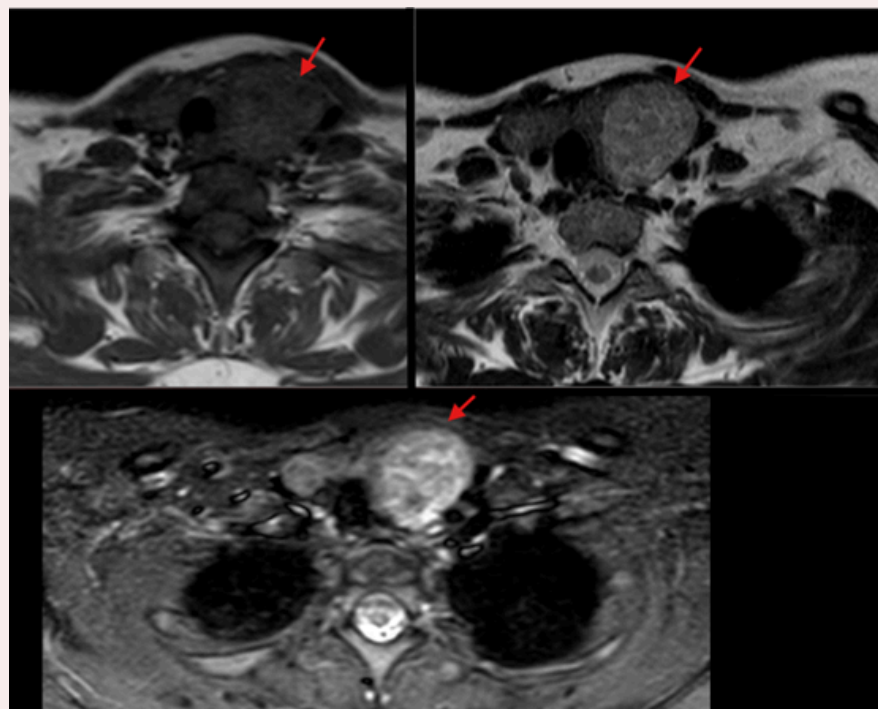
Methods:

- In this retrospective pictorial review, MRI examinations of histopathologically proven cases of thyroid carcinoma from our institutional database were included.

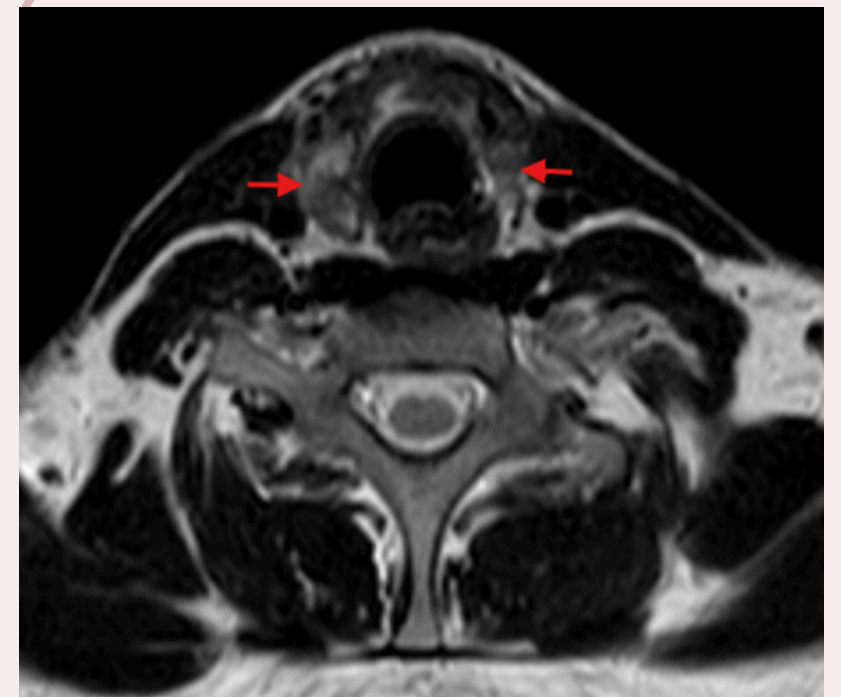
Imaging:



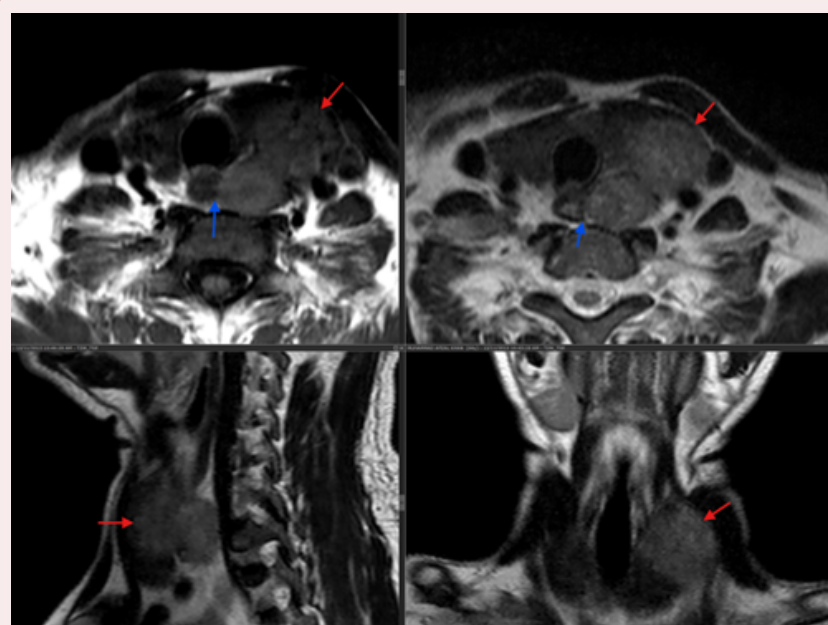
Papillary thyroid carcinoma: T1 hypointense, T2 & STIR hyperintense nodule arising from thyroid isthmus [red arrow]. No extrathyroidal extension. Enlarged left level IV lymph node [blue arrow].



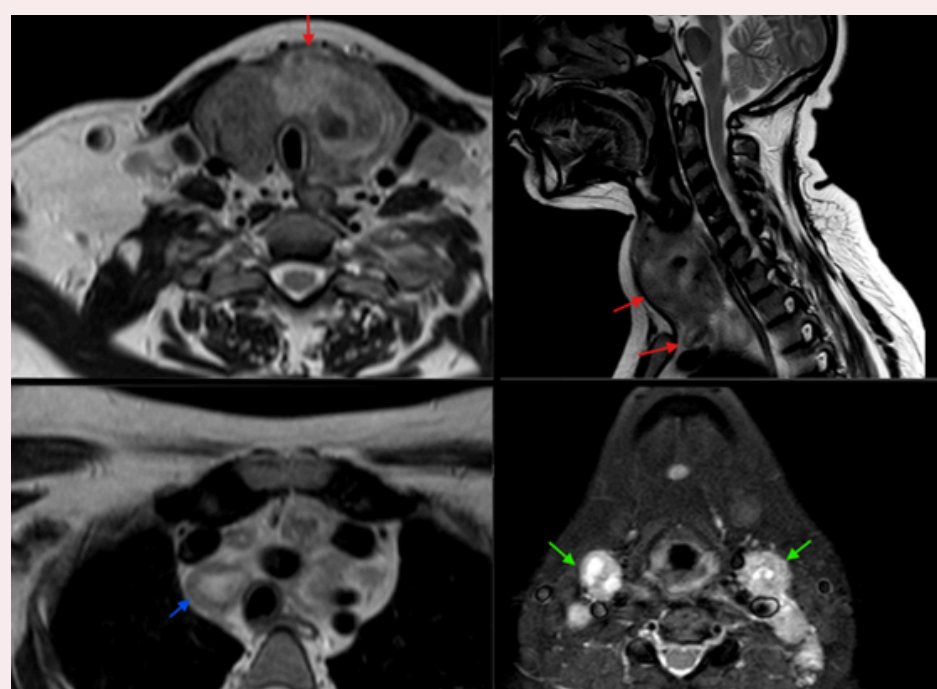
Follicular carcinoma: A mass arising from left thyroid lobe [red arrow] causing mass effect on left ICA, IJV and strap muscles. No extrathyroidal extension.



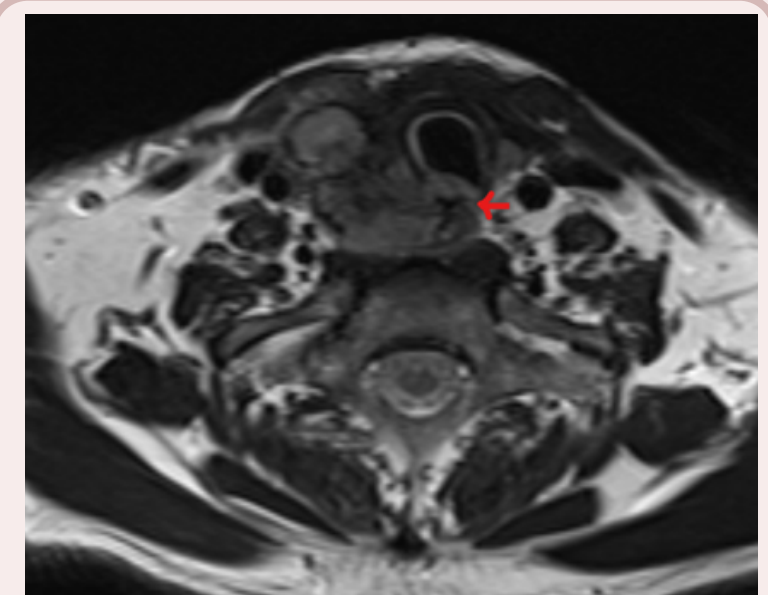
Residual disease: MRI shows T2 intermediate signal intensity nodules in bilateral thyroidectomy beds [red arrows]. Histopathology: Residual Papillary thyroid carcinoma.



Anaplastic thyroid carcinoma: A heterogeneous lobulated thyroid mass arising from left thyroid lobe [red arrow] extends beyond the thyroid gland into the tracheoesophageal groove [blue arrow] appearing inseparable from esophagus. Mass is abutting left ICA and IJV.



Medullary thyroid carcinoma: A lobulated mass involving both lobes and isthmus of the thyroid [red arrow] and the strap muscles. Inferiorly extending into the mediastinum. Mild narrowing of trachea due to mass effect. Bilateral cervical [green arrow] and mediastinal lymphadenopathy [blue arrow].



Disease recurrence (Medullary thyroid carcinoma): Follow up MRI after 1 year of left lobectomy shows a mass arising from right thyroid lobe, extending into the tracheoesophageal groove [red arrow] appearing inseparable from esophagus.

Conclusion

Familiarity with the MRI appearances of thyroid malignancies and their patterns of spread can improve diagnostic confidence, optimize staging, and support multidisciplinary patient management.