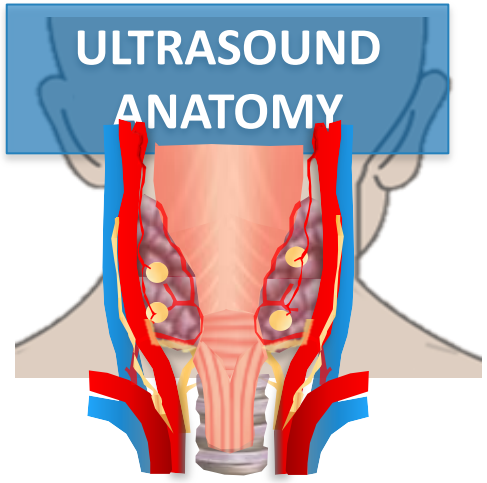
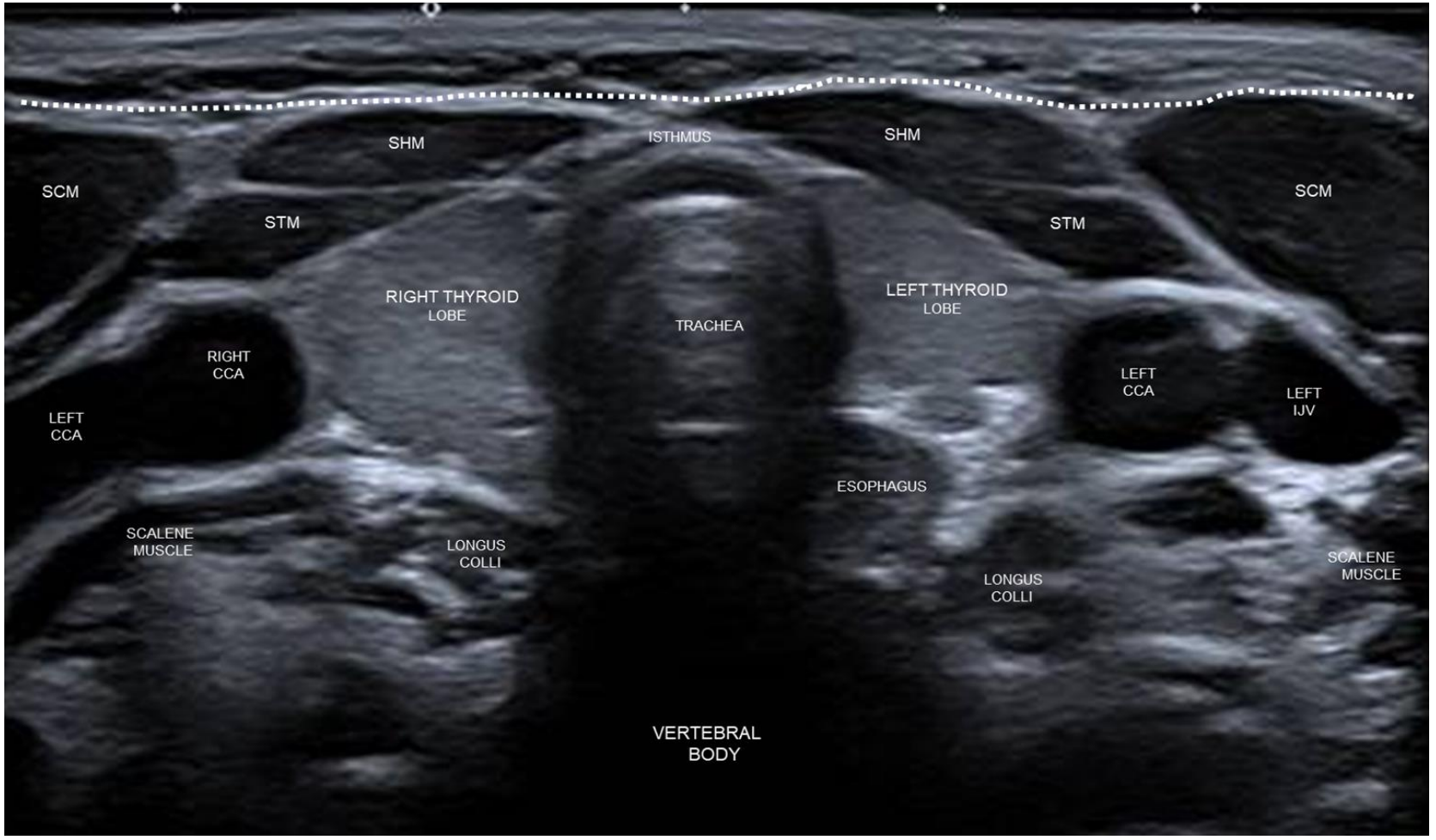
Anatomy of the parathyroid and adjacent structures



Anterior neck ultrasound B mode

- **locate the thyroid** in an axial view: two thyroid lobes united by an isthmus
- **locate adjacent structures**: carotid arteries, muscles, trachea, esophagus

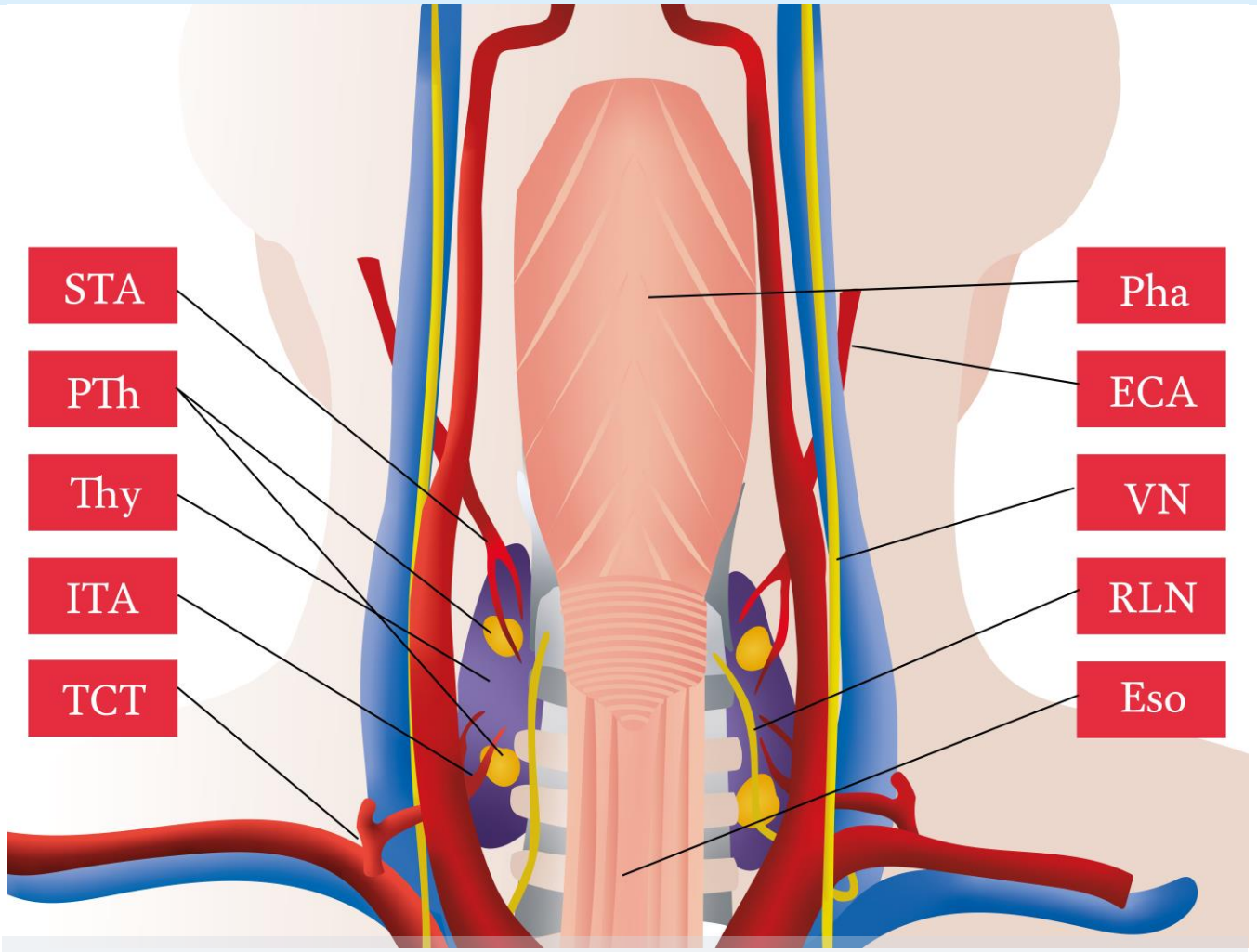


Ultrasound anatomy. Grayscale 14 MHz US image (transverse view) at the level of the thyroid middle lobe. CCA – common carotid artery. IJV – internal jugular vein. SCM – sternocleidomastoid muscle. SHM – sternohyoid muscle. STM – sternothyroid muscle. Dashed line - superficial layer of the deep cervical fascia.

Anatomy of the parathyroid and adjacent structures

Parathyroids

- Usually 4 in total, 2 in each side and posteromedial to the thyroid
- Located in the visceral space
- Close relation with inferior and superior thyroid arteries, carotid arteries, recurrent laryngeal nerve and vagal nerve
- Supranumerary glands may be found in the thymus.

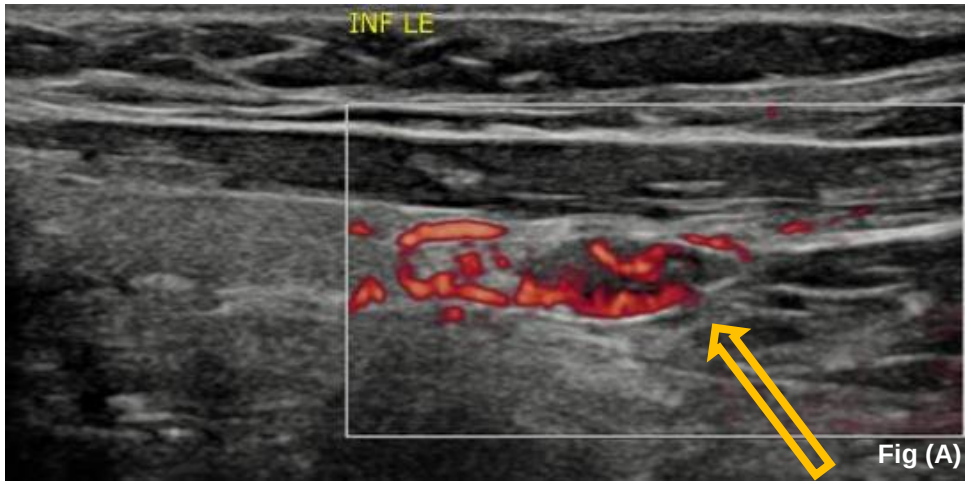


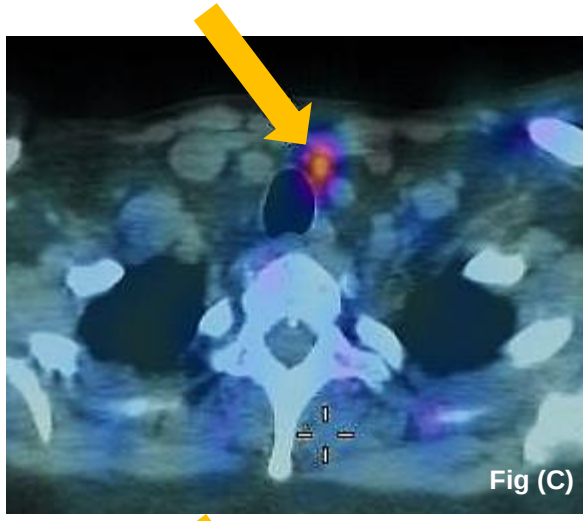
Posterior neck anatomy. STA - superior thyroid artery; PTh - superior and inferior parathyroid glands; Thy - thyroid; ITA - inferior thyroid artery; TCT - thyrocervical trunk; Pha - pharynx; ECA - external carotid artery; VN - vagus nerve; RLN - recurrent laryngeal nerve; Eso - esophagus

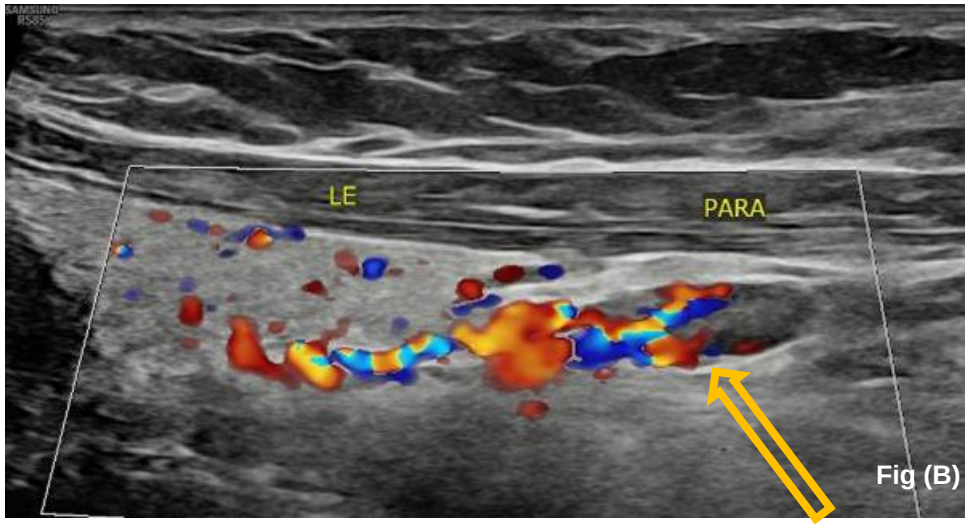
Ultrasound of the parathyroid glands: pathologic imaging findings

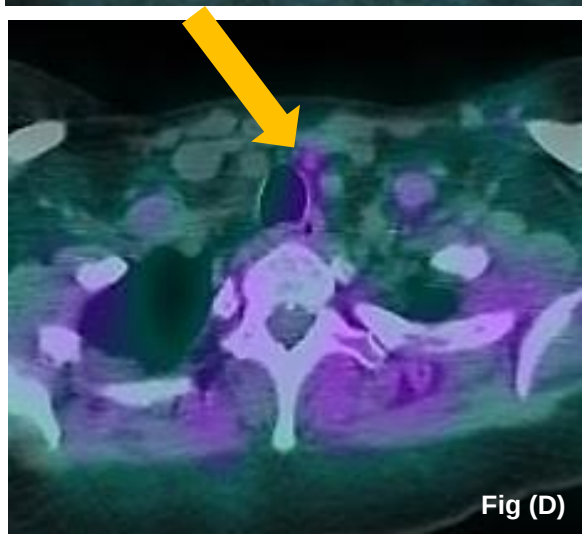
Pathologic findings

Parathyroid adenoma. Figs (A) and (B) – MVFI and color Doppler ultrasound showing a hypoechoic nodular formation located posteriorly to the lower third of the thyroid left lobe, extra-thyroidal. Fig (C) and (D) – SPECT-CT showing the nodule's radiotracer uptake in early images and persistence in late images.









Ultrasound of the parathyroid glands: atypical findings

Atypical findings

Parathyroid carcinoma – cystic degeneration.

Figs (A) and (B) – Gray-scale and color Doppler US of a patient with hyperparathyroidism and palpable anterior neck mass showing a large solid nodule with cystic degeneration posterior to the right thyroid lobe, deviating the trachea contralaterally, with central and peripheral vascularization. Figs (C) and (D) - PET-CT with FDG-18F shows high radiotracer uptake on the lesion and on multiple bones.

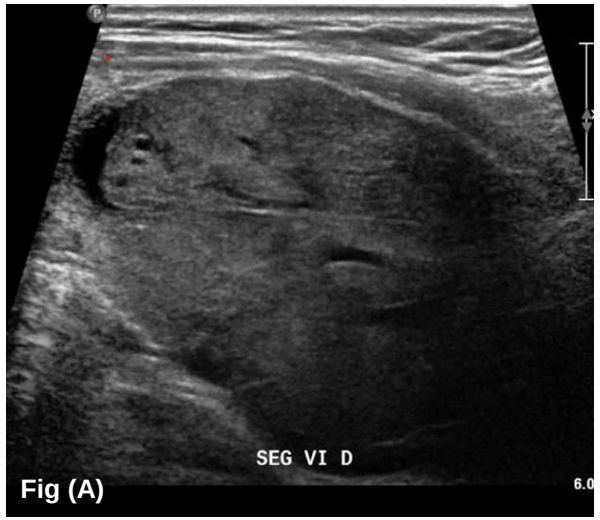


Fig (A)

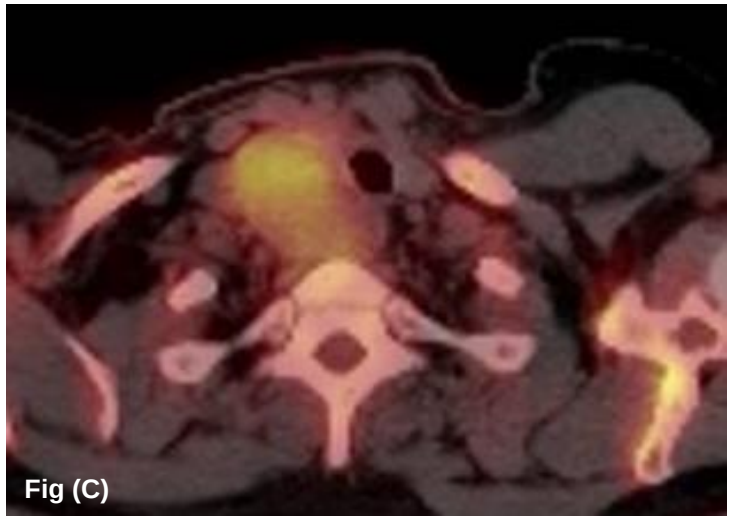


Fig (C)

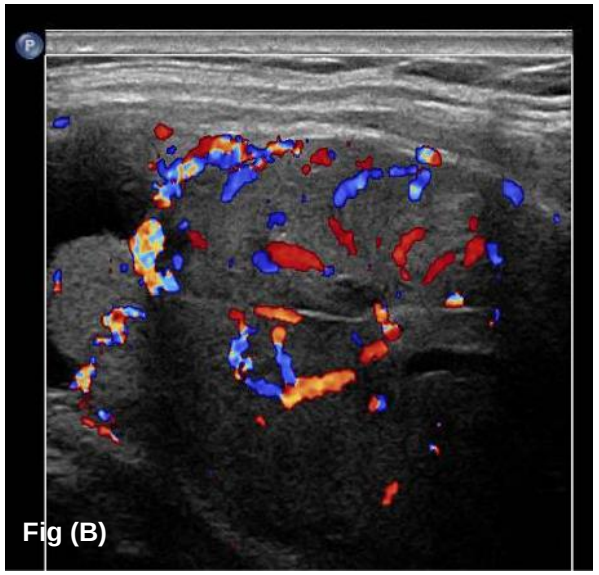


Fig (B)

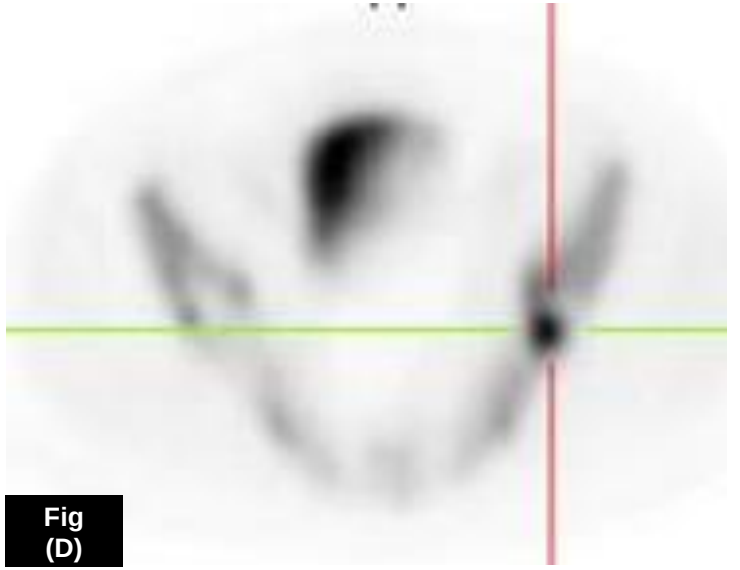
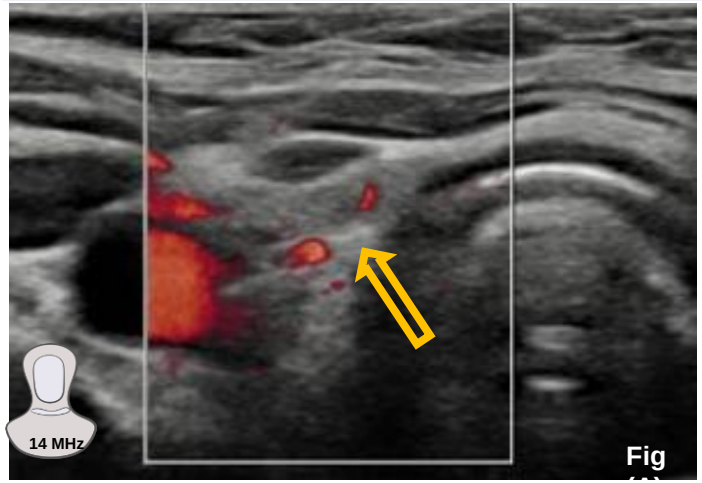


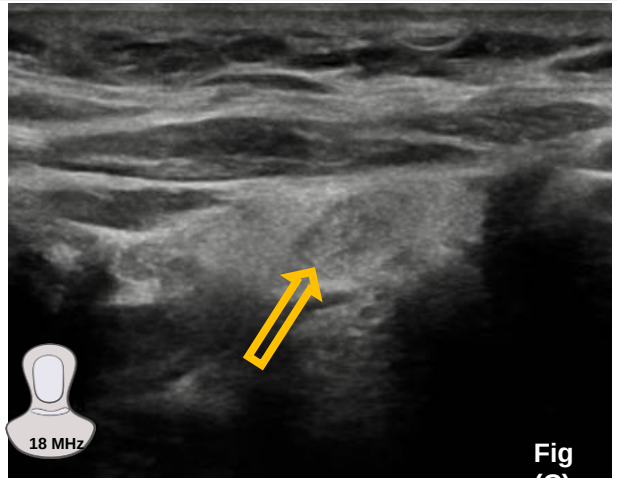
Fig (D)

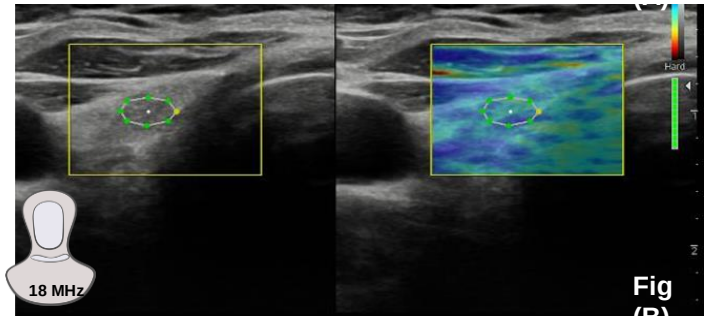
Case-based review with multimodality imaging: pearls and pitfalls

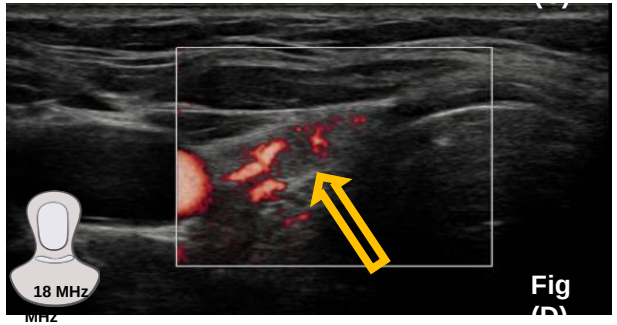
Post-operative thyroid and parathyroid: searching for new lesions

Hyperparathyroidism post thyroidectomy. Figs (A) – solid nodular hypoechoic formation in the thyroidectomy surgical cavity with regular contours and marked vascularization on MVFI Doppler ultrasound, as well as low elasticity contrast index (Fig B). 18MHz transducer helps better define its echogenicity and vascularization (Fig C and D)









Take-home point

Examination of post-operative thyroid and parathyroid

Fibrocicatricial tissue: elongated or inverted triangular hyperechoic area.

Hypoechoic nodules: thyroid lesion recurrence, parathyroid nodules, suspicious lymph nodes

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