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4DCT of Parathyroid glands

-Dr. Parang Sanghavi

4DCT is a CT technique for preoperative localization of parathyroid adenomas in eutopic as well as ectopic locations.

It has the combined advantages of traditionally used modalities like USG and nuclear scintigraphy; it has excellent anatomic localization and the dynamic enhancement characteristics help differentiation from thyroid nodules and lymph nodes (Figs 1, 2).

The technique involves a plain study followed by a contrast study in arterial and delayed phases. The first 3 dimensions are multiplanar reconstructions of the CT (Fig. 1) and the 4th dimension is the enhancement pattern (Figs. 1, 2). The parathyroid adenoma typically shows arterial hyperenhancement (Figs. 1, 2) followed by washout of contrast in the delayed phase.

It has high diagnostic accuracy for single gland disease and high specificity for multi-gland disease as well. It can accurately predict the side of single gland adenomas, facilitating a focused and directed operative approach.

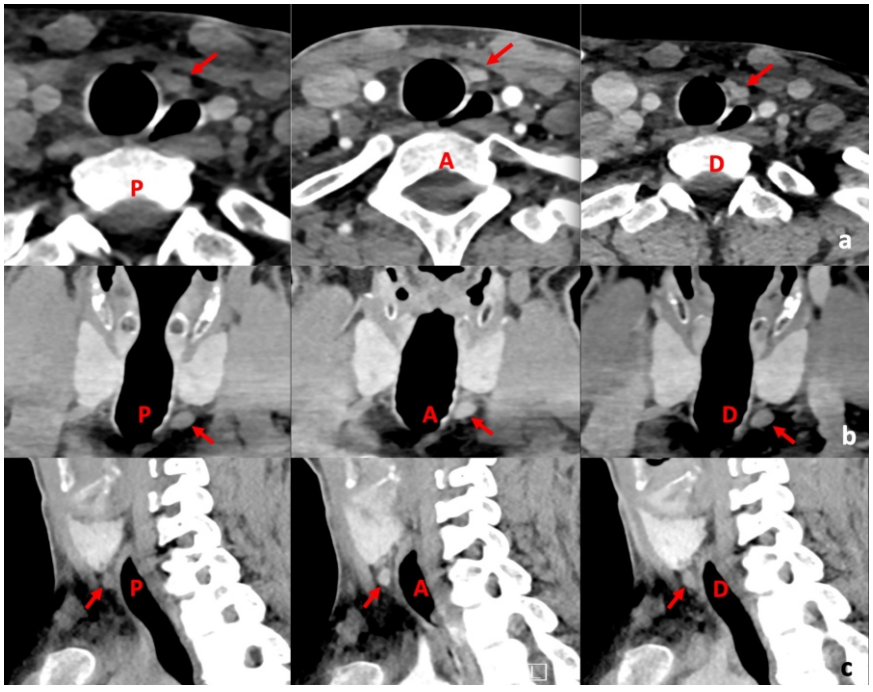

Fig 1: 27-years old man under evaluation for hyperparathyroidism. The axials sections (top row) show a hypodense nodule to the left of the trachea on the plain (P) study with arterial (A) hyperenhancement (arrow) and wash-out of contrast on the delayed (D) phase of the study, characteristic of a parathyroid adenoma. The coronal (middle row) and sagittal (bottom row) reconstructions help accurate localization of the parathyroid adenoma, inferior to the lower pole of the left lobe of the thyroid gland.

4DCT of Parathyroid glands

At a glance:

- 4DCT has emerged as a useful imaging modality for localization of parathyroid adenomas with high diagnostic accuracy.
- It is useful both for eutopic and ectopic adenomas as well as for single gland and multi-gland disease.
- It has the combined advantages of traditionally used modalities; USG and nuclear scintigraphy
- It can accurately differentiate adenomas from mimics like thyroid nodules and lymph nodes.

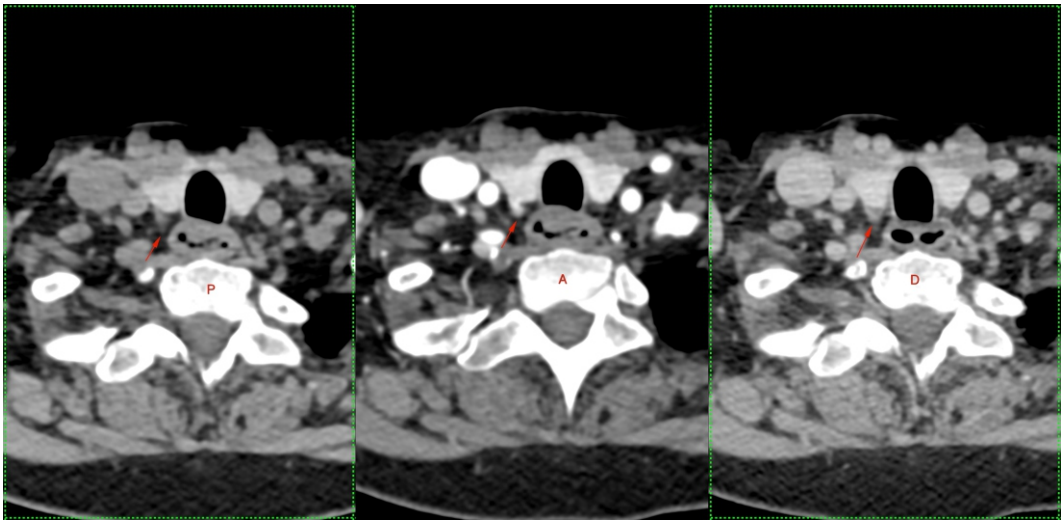

Fig 2: 69-years old woman with a family history of hypercalcemia and under evaluation for hyperparathyroidism. The axial sections show a small hypodense nodule at the posteorinferior corner of the right lobe of the thyroid gland on the plain (P) study with arterial (A) hyperenhancement and wash-out of contrast on the delayed (D) phase of the study, characteristic of a parathyroid adenoma.

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