

Role of Color Flow Doppler (CFD) Ultrasonography in the Diagnosis of Thyrotoxicosis

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Background: Differentiating various etiologies of thyrotoxicosis like Graves' disease (GD) from thyroiditis is important in planning the specific treatment. Though ^{99m}Tc pertechnetate uptake scan is a frequently used for differentiate, but its limited availability and some contraindications has led to use of other modalities such as color flow doppler (CFD) ultrasonography.

Objective: To assess the usefulness of CFD ultrasonography in the diagnosis of various causes of thyrotoxicosis compared with ^{99m}Tc thyroid uptake scan.

Patients and Methods: This was a hospital based prospective study done on consecutive 65 treatment naive thyrotoxic patients attending the Endocrinology. Various clinical, biochemical parameters, Thyroid function test and ^{99m}Tc thyroid scanning were obtained. Conventional ultrasonography and CFD study were performed by experienced radiologist using a 7.5 MHz broadband linear transducer. Peak systolic velocity (PSV) in the inferior thyroid arteries were obtained on both right and left side.

Results: 46 patients had GD [males 17 (37%), females 29 (63%)] and 19 patients had thyroiditis [males 4(21%), females 15(79%)]. Blood glucose, lipid profile and calcium profile did not differ between GD and thyroiditis. T3/ T4 ratio less than 20 was seen in 94% patients with thyroiditis but was also seen in 69% patients with GD. Mean Total T3 and T3/T4 ratio of 20 helped in differentiating two groups ($p = 0.037$). ^{99m}Tc thyroid uptake percentage in patients with GD was 43.052 ± 0.77 , while in thyroiditis was 2.57 ± 6.33 ($p < 0.001$). Mean systolic velocity of inferior thyroid artery (m PSV-ITA), with cut off 30 cm/sec was appropriate to differentiate between GD and thyroiditis with sensitivity and specificity 91% and 89%, respectively. For ^{99m}Tc uptake scan, with cut off 7% had sensitivity and specificity of 100% and 89% respectively. Significant correlation between PSV-ITA and serum total T3 levels ($r = 0.52$; $p = 0.001$).

Conclusion: CFD ultrasonography is as good as ^{99m}Tc nuclear imaging in the differential diagnosis of GD from thyroiditis.

Keywords: Thyrotoxicosis; Graves' disease (GD); Thyroiditis; Color Flow Doppler (CFD) ultrasonography; ^{99m}Tc pertechnetate uptake scan

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