SAT-422

Background: Hyperthyroidism due to Graves' disease (GD) is an autoimmune condition caused by thyroid stimulating hormone receptor (TSHR) autoantibodies. Autoantibodies to the TSHR can stimulate or block thyroid hormone production, therefore testing specifically for stimulating antibodies would be beneficial for diagnosis of GD.
Objectives: The primary objective of the first phase of this trial is to assess the diagnostic capability of the Siemens Thyroid Stimulating Immunoglobulin (TSI) immunoassay in diagnosing GD and to compare it with the Roche TSH Receptor Antibody (TRAb) assay.
Design and Methods: Two hundred patients with suspected GD are being enrolled in this single-center multiphase prospective cohort study. Consenting patients undergo biochemical testing including thyroid stimulating hormone (TSH), free T3 (FT3) and T4 (FT4), TRAb and TSI measurements. GD diagnosis was confirmed by endocrinologists that were blinded to TSI results.
Results: To date, 85 patients were included in the analysis, of which 66 were diagnosed with GD. For the primary analysis, all patients taking anti-thyroid drugs (ATD) at time of sample collection (n=14) were removed. The respective sensitivity, specificity, negative predictive value (NPV), and positive predictive value (PPV) for TSI was 98, 84, 94 and 94%, which were comparable to those generated by TRAb (98, 95, 95, and 98%). In patients with clinical findings of GD (ie. orbitopathy or goiter, n=33), both the TSI and TRAb assays had identical sensitivity and specificity at 96% and 80% respectively. In patients without orbitopathy or goiter (n=38), the TSI assay had perfect sensitivity and excellent specificity of 100% and 86% respectively (TRAb had 100% sensitivity and specificity). Sensitivity, specificity, NPV, and PPV were slightly lower for both TSI and TRAb in patients treated with ATDs compared to patients without treatment (TSI: 85, 84, 62, 95%; TRAb: 91, 95, 75, 98%). Of ten patients with GD and false negative TSI results, nine were on ATDs. Of this subset, four patients had discordant results between TSI (negative) and TRAb (positive). Notably, one of these patients had normalization of their FT3 and FT4 on the day of sample collection.
Discussion and Conclusion: Based on our preliminary results, TSI is an excellent marker for diagnosing GD, particularly in untreated GD patients. The performance of the TSI assay has been comparable to the TRAb assay and correlates well with clinical findings. Discordant false negative results were only seen in patients on ATD. One potential explanation is that the TSI assay is detecting a decrease in stimulating autoantibodies when there is normalization of FT3 and FT4. Importantly, all discordant samples will be tested by a TSI bioassay to confirm diagnosis. Further patient enrollment is occurring, and prognostic assessment of these assays will soon be possible.

Tumor Biology

ENDOCRINE NEOPLASIA CASE REPORTS I

High Enhancement Washout by CT Imaging Does Not Exclude Pheochromocytoma/Paraganglioma: Review of Two Cases.

Feyza Erenler, MD, Ronald M. Lechan, MD,PHD.
Tufts Medical Center, Boston, MA, USA.

SUN-910

Background:
It is well known that delayed images from contrast-enhanced CT are useful in distinguishing adrenal adenomas from non-adenomas, with an absolute washout that exceeds 60% being most consistent with a lipid rich adenoma. We present two cases of an adrenal mass that met the criteria for a lipid rich adenoma by CT imaging, but found to be a pheochromocytoma (PCC) and paraganglioma (PGL).
Clinical Case
Case#1
An 82 yo woman presenting with tachycardia was found to have a 2.4 cm heterogeneously attenuating, left adrenal nodule with an absolute washout of 61% and a relative washout of 45%. The right adrenal was normal. Urinary catecholamine levels were elevated with an epinephrine (E) 38 mcg (2–24), norepinephrine (NE) 388 mcg (15–100), dopamine (DOPA) 175 mcg (52–480), metanephrine (MN) mcg 620 (90–315), normetanephrine (NMN) 1553 mcg (122–676) and vanillylmandelic acid 12.5 mg (< 6) on a 24h collection. Due to a cardiac resynchronization therapy device, an MRI could not be obtained. MIBG imaging was obtained and showed increased uptake in left adrenal gland, corresponding to the lesion identified on CT. The patient underwent laparoscopic adrenalectomy and the pathology confirmed a PCC.
Case#2:
A 74 yo man was found to have an incidental right adrenal nodule on CT imaging measuring 2.4 cm. Absolute washout was 83% and relative washout 68%. The left adrenal gland was normal. A follow up MRI obtained showed slight increase in T2 weighted images and no drop out on out of phase imaging, raising concern for a PCC. Urinary catecholamines were elevated including E 12 mcg (2–24), NE 280 mcg (15–100), DOPA 246 mcg (52–480), MN 175 mcg (90–315) and NMN 1298 mcg (122–676) on a 24-hr. collection. MIBG imaging further confirmed the diagnosis with increased uptake in the right adrenal gland. The patient underwent laparoscopic adrenalectomy then, converted to open right adrenalectomy through an anterior approach due to adherence of the tumor to the renal vein. The pathology revealed a PGL.
Conclusion:
PCC/PGL are rare but life-threatening neuroendocrine tumors that require early detection to reduce associated morbidities and mortality and improve surgical outcomes. CT is commonly used to characterize adrenal lesions and an absolute washout of >60% is most consistent with an adenoma. However, as demonstrated by these two cases, washout exceeding 60% can also be seen in non-adenomas, perhaps secondary to degeneration of the nodule causing necrotic or cystic changes or uncommonly, the presence of a high lipid content in the tumor [1]. Thus, when clinical suspicion is strong and/or there is a positive biochemical workup, confirmatory imaging should be considered to establish the diagnosis.
References:
[1] Blake, M. A., Kalra, M. K., Maher, M. M., Sahani, D. V., Sweeney, A. T., Mueller, P. R., ... & Boland, G. W. (2004). Pheochromocytoma: an imaging chameleon. *Radiographics*, *24*(suppl_1), S87-S99.