Comparison of quantitative MRI and CT wash-out (CT-WO) for differentiation of adrenal pheochromocytoma from adrenal adenoma.

Authors:
Abdulmohsen A, El-Khodary M, McInnes MD, Shabana WM, Flood TA, Schieda N.

Purpose:
To assess MRI/CT-WO for diagnosis of pheochromocytoma versus adenoma.

Methods:
39 pheochromocytomas resected from 2006-2013 were compared to 40 consecutive adenomas. A blinded radiologist measured: size, NECT-density, 70 sec. CT-enhancement, 15-min relative/absolute wash-out, chemical-shift (CS) signal intensity (SI)-index, T2W-SI ratio and area under the contrast-enhanced (CE)-MR curve (AUC-CE-MR). Comparisons were performed with multi-variate analysis.

Results:
There was no difference in age or gender between groups (p>0.05).
For CT: there was no difference in size (Adenoma; 4.4 ± 2.7mm vs. Pheochromocytoma; 6.9 ± 6.4, p=0.52) or 70 sec. enhancement (Adenoma; 81.5 ± 29.1 [50.0-135.0] HU, p=0.39). Adenomas had lower NECT-density (14.0 ± 20.9 [-19-52] vs. 34.8 ± 7.3 [20-48] HU, p=0.02) and higher relative/absolute 15-min-WO (64.8 ± 23.8 [23.1-115.3], 76.0 ± 9.3 [66.7-89.6] % vs. 22.2 ± 24.5 [-29.3-53.7], 33.1 ± 38.1 [-57.1-70.2] %, p=0.04, 0.01); however, 30% (3/10) pheochromocytomas showed absolute-WO in the adenoma range (>60%).
For MRI: adenomas were smaller (2.0 ± 6.4 mm vs. 5.0 ± 4.2, p=0.01), had higher CS-SI index (49.8 ± 24.8 [-7.3-86.0] vs. 0.3 ± 15.5 [-56.3-14.1] %, p=0.01) and lower T2W-SI ratio (1.6 ± 0.7 vs. 4.1 ± 2.2, p=0.01), with no difference in AUC-CE-MR (Adenoma; 271.5 ± 125.7 vs. Pheochromocytoma; 288.9 ± 265.3 sec., p=0.96).

Conclusion:
NECT density <10HU and chemical-shift signal intensity index >16.5% are diagnostic of adenoma. There is substantial overlap using other CT/MRI quantitative parameters.