

## Urinary Steroid Profiling for the Preoperative Identification of Adrenocortical Adenomas with Regression and Myelolipomatous Changes

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**Background:** Adrenocortical neoplasms are classically divided into adenomas (ACA) and carcinomas (ACC). Heterogeneous appearance and greater size are criteria to suggest malignancy, along with the urinary steroid profile (USP). The presence of regression and myelolipomatous changes in adenomas (ACA-RML) can contribute to confusion with ACC and its USP remains unknown. *Objective:* To evaluate the features of ACA-RML in comparison with other adrenocortical neoplasms.

**Design:** We selected consecutive ACA (11), ACA-RML (7) and ACC (13) cases for which USP analysis was performed before surgery and tissue was available for histological evaluation (King's College Hospital, 2005-2012). Cases were classified according to WHO and Armed Forces Institute of Pathology criteria. USPs were obtained by gas chromatography/mass spectrometry. Total excretion of individual steroids and indices (sums and ratios chosen to reflect steroid metabolic activity) were compared between ACA-RML, ACA, and ACC. Steroids that have proved to be useful markers of ACC were also compared empirically between groups, including tetrahydro-11-deoxycortisol, pregnene<sup>3,16,20</sup>-triols, 16 $\alpha$ - and 21-hydroxypregnenolone and tetrahydro-11-deoxycorticosterone.

**Results:** In comparison with ACA, tumors in ACA-RML were significantly larger ( $8.5\pm 2.4$  vs.  $3.5\pm 1.0$ ,  $P=0.002$ ), presented in older patients and showed relatively higher incidence in males. Mitotic figure counts were significantly lower ( $0.39\pm 0.04$  vs.  $0.93\pm 0.11$  in ACA,  $p=0.001$ ) and revealed higher frequency of apoptotic cells (100% vs. 9% in ACA,  $p=0.001$ ). The USP of ACA-RML showed no diagnostic features of ACC, along with lower levels of DHA and DHA metabolites.

**Conclusions:** ACA-RML reveals distinctive histological features, and lack of USP markers of malignancy. It is important to recognize ACA-RML because its size and heterogeneous appearance raise the possibility of ACC; in this context, USP is an important tool for a correct preoperative diagnosis.

Category: Endocrine Pathology