Diagnosis of a malignant adrenal mass:

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Table 2. Studies comparing urine steroid profiling results in patients with adrenocortical carcinoma (ACC) and patients with adrenocortical adenoma (ACA)

Author, year	Period of data collection	Type of study	Sample size (n)	Women (n, %)	Age of diagnosis (years)	Tumor size (cm)	ACC		ACA	
							n	Hormone excess	n	Hormone excess
Arlt, 2011 [1]	2003-2006	Retro-spective 6 centers	147	84 (57%)	ACA (median, ranges): 60 (19-84) ACC (median, ranges): 55 (20-80)	ACA (median, ranges): 2.6 (0.9-7.8) ACC (median, ranges): 9 (1.4-23)	45	None – 12 (27%) Cortisol – 11 (24%) Androgen – 7 (16%) Cortisol + androgen – 12 (27%) (2 also with aldosterone) Estrogen – 3 (7%) (in combination with cortisol in 2 and androgen in 1 patient)	102	None – 69 (68%) Cortisol – 14 (14%) Aldosterone – 13 (13%) Cortisol + aldosterone – 4 (4%) Androgen – 2 (2%)
Kerkhofs, 2015 [2]	2000-2011	Retro-spective 2 centers	152 (includes 18 non-cortical tumors)	100 (66%)	All adrenal tumors (mean, SD): 56(13)	All adrenal tumors (median, ranges): 3.5 (0.8-17)	27	None – 7 (26%) Hormone excess in 20 (74%) –single or in combination including: Cortisol – 18 (67%) Androgen in 14 (52%) Estrogen in 1 (4%)	107	None – 85 (79%) Cortisol – 19 (18%) Aldosterone – 3 (3%)
Velikanova, 2016 [3]	2014-2015	Retro-spective 3 centers	139	83 (60%)	Non-functioning ACA (median, ranges): 55 (50-61) Cortisol-secreting ACA (median, ranges): 48 (21-54) ACC (median, ranges): 43 (33-57)	Non-functioning ACA (median, ranges): 3.3 (2.3-4.5) Cortisol-secreting ACA (median, ranges):: 3 (2.5-4.2) ACC (median, ranges): 9.1 (7.2-11)	31	Hormone excess reported for cortisol only in 13 (42%) patients; other hormonal excess was not reported	108	None – 52 (48%) Cortisol - 44 (41%) Aldosterone - 12 (11%)

1. Arlt W, Biehl M, Taylor AE, Hahner S, Libe R, Hughes BA, Schneider P, Smith DJ, Stiekema H, Krone N, Porfiri E, Opocher G, Bertherat J, Mantero F, Allolio B, Terzolo M, Nightingale P, Shackleton CH, Bertagna X, Fassnacht M & Stewart PM. Urine steroid metabolomics as a biomarker tool for detecting malignancy in adrenal tumors. *J Clin Endocrinol Metab* 2011 **96** 3775-3784.
2. Kerkhofs TM, Kerstens MN, Kema IP, Willems TP & Haak HR. Diagnostic Value of Urinary Steroid Profiling in the Evaluation of Adrenal Tumors. *Horm Cancer* 2015 **6** 168-175.
3. Velikanova LI, Shafigullina ZR, Lisitsin AA, Vorokhobina NV, Grigoryan K, Kukhianidze EA, Strelnikova EG, Krivokhizhina NS, Krasnov LM, Fedorov EA, Sablin IV, Moskvin AL & Bessonova EA. Different Types of Urinary Steroid Profiling Obtained by High-Performance Liquid Chromatography and Gas Chromatography-Mass Spectrometry in Patients with Adrenocortical Carcinoma. *Horm Cancer* 2016.