Incidental adrenal mass: is 4 cm a good cut-off for surgical decision?

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INTRODUCTION & OBJECTIVES

Adrenal incidentalomas (AIs) are becoming increasingly common (nearly 4-7%). Although most of the lesions are benign, some could be functional and carcinomas. According to guidelines, surgery should be performed on non-functioning lesions with a diameter≥4cm, due to the increased risk of malignancy. However, many are benign.

The objective is to analyze our results, checking if the 4-cm cut-off is the best one for a surgical decision.

MATERIALS & METHODS

Between March 2009 and April 2017, 98 adrenal glands from 91 patients underwent transperitoneal laparoscopy adrenalectomy (LA): 44% were AIs. All patients underwent functional study prior to surgery. Data gathered included demographics, preoperative imaging, tumor and pathological characteristics.

A retrospective observational study was performed, using IBM SPSS Statistics 23, with a $p<0.05$.

RESULTS

Demographic Data	<4 cm	≥ 4cm	*p*
% of Patients	**52.5%**	47.5%	
Gender (♂/♀)	36% / 64%	43.2% / 56.8%	NS
Age (years)	55.7 ± 13.5	56 ± 17.6	NS
Comorbidities			
Type II Diabetes Mellitus	18%	21.6%	NS
Dislipidemia	14%	13.5%	NS
Cancer	6%	8.1%	NS
Psychiatric	16%	2.7%	NS
Cardiovascular	12%	16.2%	NS

Table 1: Demographic data divided by their respective size. NS: non-significant

Adrenal masses data	<4 cm	≥ 4cm	*p*
Side (L/R)	68% / 32%	54.1% / 45.9%	NS
Mean preoperative imagiologic tumors diameter (mm)	**23 ± 8.8**	**65.5 ± 26.7**	**p<0.001**
Hormone Producers			**p<0.001**
NF	**30%**	**54.1%**	
Aldosterone	**36%**	0%	
Catecholamines	20%	**35.1%**	
Cortisol	14%	8.1%	
Sexual androgens	0%	2.7%	
Mean preoperative imagiologic non-functioning masses (mm)	**23.2±10.1**	**59.9±19.5**	**p<0.001**

Table 2: Adrenal masses data divided by their respective size. NF: non-functioning. NS: non-significant

Pathology data	<4 cm	≥ 4cm	*p*
Adenomas	**66%**	18.9%	**p= 0.002**
Malignant pheo	4%	8.1%	
Intermediate pheo	0%	5.4%	
Benign pheo	16%	**24.3%**	
Myelolipomas	2%	8.1%	
Ganglioneuroma	2%	0%	
Cavernous Hemangioma	0%	2.7%	
Cortical Hyperplasia	2%	0%	
Cysts	0%	5.4%	
Carcinoma	4%	16.2%	
Metastatic lesion	4%	2.7%	
Normal	0%	8.1%	

Table 3: Comparision of pathology studies divided by their respective size. Pheo: pheochromocytomas

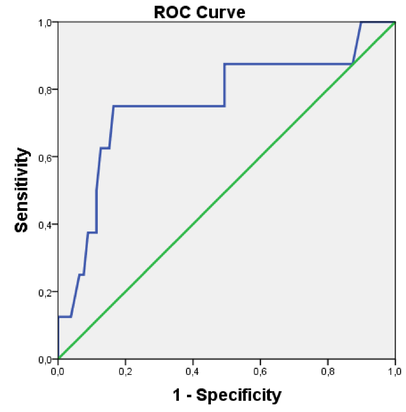
If it is only considered non-functionig adrenal masses.....

Adenomas (29.2 ± 12.5 mm) were **smaller** than **carcinomas (73.6 ± 11.6 mm)**, **p <0.001**.

Pathology data	<4 cm	≥ 4cm	*p*
Adenomas	**53.3%**	**25%**	NS
Benign pheo	6.7%	5%	
Myelolipomas	6.7%	15%	
Ganglioneuroma	6.7%	0%	
Cavernous Hemangioma	0%	5%	
Cysts	0%	10%	
Carcinoma	**13.3%**	**20%**	
Metastatic lesion	13.3%	5%	
Normal	0%	15%	

Table 4: Comparision of pathology studies of non-functionig adrenal masses divided by their respective size. pheo : pheochromocytomas

Only 2 (4%) adrenal masses with a diameter <4cm were carcinomas. The 4-cm cut-off size for surgical resected AIs admitted in this study as the standard for the detection of carcinoma in non-functioning incidental adrenal masses revealed a sensitivity of 75% and a specificity of 33%.



Graph 1: ROC Curve of adrenal mass size for detection of carcinoma.

Logistic Regression

Logit =-4.6 + 1.5 (Non-functioning adrenal mass) +0.036 x (mean preoperative imagiologic diameter) - 1.2 x (Gender female)

	B (SE)	Wald Test	95% Confidence Interval		
			Inferior Value	Odds ratio	Superior Value
Constant	-4.6 (1.4)	10.5			
Non-functioning adrenal mass	1.5[+] (1.1)	2.1	0.59	4.67	36.67
Mean preoperative imagiologic diameter (mm)	**0.04* (0.01)**	**7.9**	**1.01**	**1.04**	**1.06**
Gender female	-1.3[Δ] (0.9)	1.7	0.04	0.28	1.94

R^2=0.8 (*Hosmer & Lemshow*), 0.2 (*Cox & Snell*), 0.4 (*Nagelkerke*). $x^2(3)$ =15.8, p<0.001; [+]p:0.1; *p:0.005; [Δ] p :0.2

Observed		Predictive		
		Tumor in Pathology		% Correct
		No	Yes	
Tumor in Pathology	No	77	2	**97.5%**
	Yes	7	1	**12.5%**
	Total %			**89.7%**

CONCLUSIONS

The size matters: if the diameter of a nonfunctioning AI is ≥4cm, surgical resection should be the first decision to take. Nonfunctional lesions should be considered as suspicious. However, the sensitivity was 75% and specicity was 33% for cancer detection using this cut-off. Other characteristics should be evaluated in order to improve the surgical indication and to avoid the excision of benign lesions.

EAU18 COPENHAGEN 16-20 March 2018

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