

Open Transperitoneal, Laparoscopic Transperitoneal or Retroperitoneoscopic Adrenalectomy? Comparative Study

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Introduction

In the last decade, the surgical management in adrenal tumour has made substantial progress. The objective of this study was to assess the effectiveness and safety of the open (OTA) and laparoscopic transperitoneal (LTA), and retroperitoneoscopic adrenalectomies (RPA).

Materials and Methods

All patients with adrenal tumour who underwent adrenalectomies from January 1, 2011, to December 31st, 2023 at Hospital Putrajaya were analysed for this single-institution. Clinical data were retrieved from the institution’s Putrajaya Adrenal Surgery (PADRES) registry.

Results

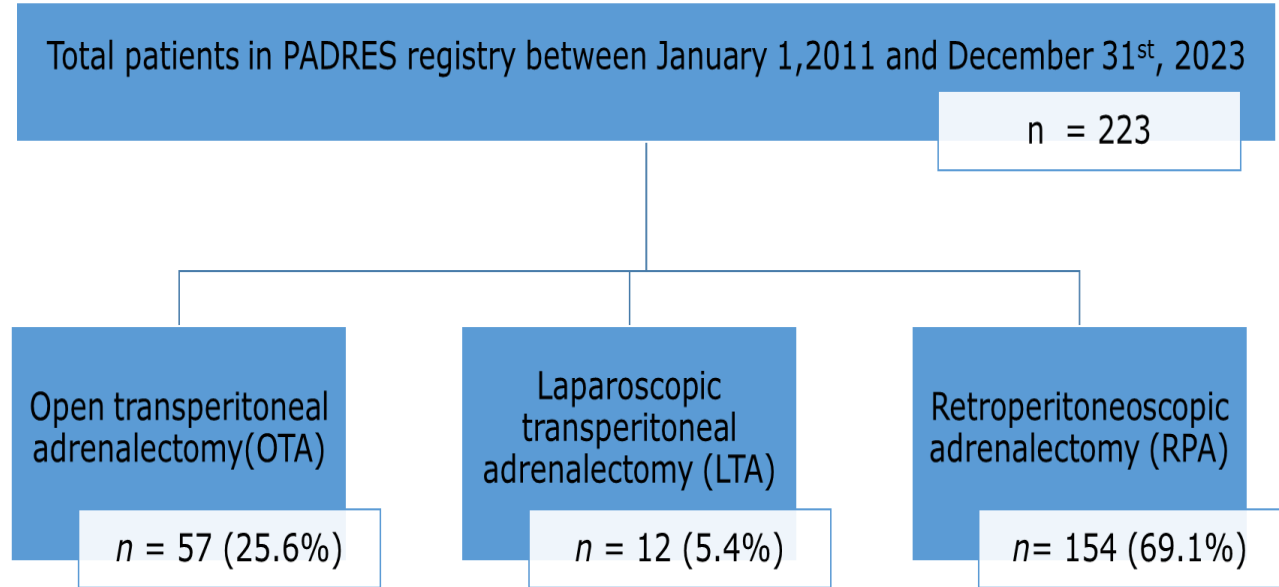


Figure 1 Distribution of Surgical Approaches

Table 1 Clinical Characteristics

Category	Total n (%)	Frequency (%) n = 223			p value
		OPA	LTA	RPA	
Age (years) (Mean, SD)	51.9 (15.0)	51.63 (15.4)	62.7 (12.9)	61.1 (14.7)	0.344
Sex					0.171
Male	132 (59.2)	35 (26.5)	4 (3.0)	93 (70.5)	
Female	91 (40.8)	22 (24.2)	8 (8.8)	61 (67.0)	
Ethnicity					0.062
Malay	134 (60.1)	37 (27.4)	3 (2.2)	94 (70.1)	
Chinese	63 (28.3)	11 (17.5)	8 (12.7)	44 (69.8)	
Indian	20 (8.9)	7 (35.0)	1 (5.0)	12 (60.0)	
Other	6 (2.7)	2 (33.3)	0	4 (66.7)	
Comorbidity					0.945
Yes	65 (29.1)	17 (26.2)	3 (4.6)	45 (69.2)	
No	158 (70.9)	40 (25.6)	9 (5.7)	109 (69.0)	
BMI (kg/m ²)	27.1 (5.9)	26.0 (6.4)	25.9 (4.6)	27.6 (5.7)	0.298
Laterality					0.478
Right	114 (51.1)	30 (26.3)	8 (7.0)	76 (66.7)	
Left	100 (44.8)	23 (23.0)	4 (4.0)	73 (73.0)	
Bilateral	9 (4.1)	4 (44.4)	0	5 (55.6)	
Tumour size (cm) (Mean, SD)	5.2 (4.9)	10.0 (5.8)	9.2 (5.4)	3.0 (2.3)	<0.001

Table 2 Pathological Characteristics

Category	Total n (%)	Frequency (%) n = 223		
		OPA	LTA	RPA
Histology				
Non-functioning				
Benign	38 (17.0)	19 (50.0)	4 (10.5)	15 (39.5)
ACC	9 (4.0)	7 (77.8)	0	2 (22.2)
Other	5 (2.2)	2 (40.0)	1 (20.0)	2 (40.0)
Functioning				
Aldosterone producing adenoma	93 (41.7)	2 (2.2)	2 (2.2)	89 (95.7)
Pheochromocytoma	54 (24.2)	23 (42.6)	4 (7.4)	27 (50.0)
Cortisol producing adenoma	21 (9.4)	1 (4.8)	1 (4.8)	19 (90.5)
Functioning ACC	3 (1.3)	3 (100.0)	0	0

Table 3 Surgical Characteristics

Category	Frequency (%) n = 223			p value
	OPA	LTA	RPA	
Hospital stays (days) (Mean, SD)	9.4 (4.3)	7.7 (3.7)	5.9 (3.4)	<0.001
Estimated blood loss (ml) (Median, IQR)	1055 (100,2000)	Minimal	Minimal	<0.001
Duration of surgery (minutes) (Mean, SD)	222.6 (131.1)	161.7 (85.7)	164.6 (93.1)	<0.001
Conversion to open	-	2 (16.7)	29 (18.8)	-
Complication	7 (12.3)	3 (25.0)	5 (3.2)	0.002

Table 4 Univariate and Multivariate Analysis of RPA Conversion to Open

Category	Conversion to Open n (%)	Crude Odds Ratio	95% CI	Adjusted Odds Ratio*	95% CI
Tumour size					
≤ 5 cm	8 (38.1)				
> 5 cm	13 (61.9)	11.8	4.3, 33.1	14.4	4.5, 46.2

*Multiple logistic regression - adjusted for age, sex, ethnicity, comorbidity, BMI, laterality, and tumour size

Discussion

This study further demonstrated laparoscopic approaches, either LTA or RPA, as a preferable approach for adrenal tumour with its better perioperative outcomes. The conversion rates to open of LTA and RPA were higher than published reports. The high conversion rates might be due to steep learning curve. The size of adrenal tumour was associated with higher conversion rate of RPA to open, but not LTA to open. This study surprisingly reported higher complication rate in LTA. This is likely due to small number of patients underwent LTA (small denominator). However, our patients were from a single center based institution, which has a designated comprehensive endocrine surgery services and serves the urban population. To our knowledge, this first study adrenal surgery from the developing countries.

Conclusion

For small tumors, RPA offers advantages over the transabdominal method (OTA and LTA). However, for large tumours present, LTA is preferred over RPA. The limited space and anatomical orientation pose challenges in the retroperitoneal approach. Besides that, we can easily convert to from RPA or LTA to OTA if complication arises.

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