Original Article

Laparoscopic Adrenalectomy - A Report of 11 Cases

Najoua Aballa, Mohamed Oulad Saiad

Department of Pediatric Surgery, Mother and Child Unit, School of Medicine, University Hospital Mohamed VI, Cadi Ayyad University, Marrakesh, Morocco

Abstract

Aims: Mini-invasive adrenalectomy has been described by Gagner in 1991 and has become the approach of choice. In the pediatric population, laparoscopic adrenalectomy is more challenging because of the small body and pathology of adrenal masses which makes their removal difficult. **Methods:** We retrospectively reviewed medical records of 11 patients who had laparoscopic removel of adrenal masses, between January 2017 and June 2023. Demographic, clinical, and surgical data were described and compared to the literature. **Result:** Eleven patients were treated for adrenal masses laparoscopically. The mean age of our patients was 6.8 years. Computer tomodensitometry showed a solid mass with an average size between 2,5 to 6 cm. All patients were treated by transperitoneal approach, five patients had benign lesions and six malignant lesions. A Conversion was done in one patient; no complication had been noticed at o follow-up of 25 months. **Conclusion:** LA has shown its safety and efficacy in the management of benign adrenal tumor and selective malignant lesions.

Keywords: Adrenalectomy, conversion, laparoscopy, malignancy

Introduction

Laparoscopy is an attractive alternative to open surgery. Laparoscopic adrenalectomy become the gold standard of the management of benign adrenal masses in adults since its initial description in 1991 by Gagner.[1] In paediatrics, laparoscopy has become the approach of choice for multiple pathologies and confirmed many benefits. Nevertheless, laparoscopic adrenalectomy in paediatrics is more challenging because of the frequency of malignant lesions. Although the experience is widespread and growing, there are only a few studies of limited cases published,[1,2] so we aimed to review the experience of our institute.

Patients and Methods

We retrospectively reviewed 11 patients who underwent surgery by laparoscopic surgery for adrenal tumour diagnosed by imaging from January 2017 to June 2023; medical records, imaging, surgery, follow-up, final diagnosis after pathology result and long-term outcomes were analysed and discussed by a multidisciplinary tumour board.

Patients were selected for the laparoscopic approach when the mass is <6 cm with neither midline expansion nor major vessel invasion and local infiltration.

Received: 09-01-2024 **Revised:** 26-02-2024 **Accepted:** 15-04-2024 **Available Online:** 15-07-2026

Access this article online

Quick Response Code:

Website: https://www.afrjpaedsurg.com

DOI: https://doi.org/10.67481/ajps.v22i4.1268

Results

Between January 2017 and June 2023, 11 laparoscopic adrenalectomies were performed involving 6 boys and 5 girls. The mean age of our patients was 6.8 years ranging from 9 months to 13 years old. One patient underwent open surgery for a left pheochromocytoma 2 years ago.

None of the other children had previous abdominal surgery. None of our patients had an antenatal diagnosis. Six patients had a non-functioning solid mass, four patients had abdominal pain, one patient had virilising symptoms and two had headache and hypertension. Ultrasound and abdominal computed tomography scans were performed for all patients. The size, side of the lesion, local invasion, encasement of vasculatures and the presence of any secondary lesion were established. The mean size of the lesions was 45mm (ranging from 35 to 60 mm)on the radiologic images. Iodine meta-iodobenzyl guanidine scintigraphy evaluation was performed on five patients and showed extreme hyperfixation. None of our patients had biochemical evaluations (vanillylmandelic

Address for correspondence: Prof. Mohamed Oulad Saiad, Department of Pediatric Surgery, Mother and Child Unit, School of Medicine, University Hospital Mohamed VI, Cadi Ayyad University, Marrakesh, Morocco.
E-mail: mouladsaiad@gmail.com

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: editor@afrjpaedsurg.com

How to cite this article: Aballa N, Saiad MO. Laparoscopic adrenalectomy – A report of 11 cases. Afr J Paediatr Surg 2025;22(4):178-180.

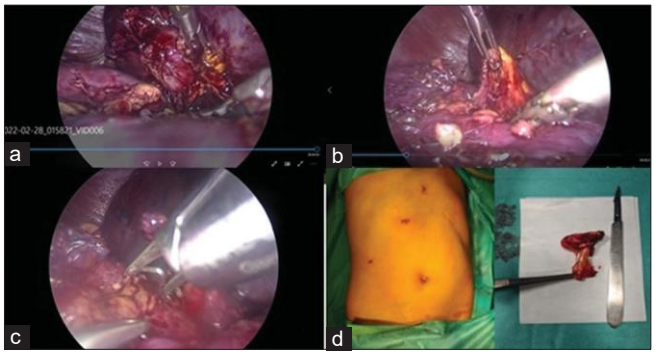


Figure 1: Pre-operative images of a 13 years' male with a history of a left pheochromocytoma operated 2 years earlier; he developed a right localisation. (a) Tumour identification, (b) Tumour dissection, (c) Ligation of right adrenal pedicle using clips, (d) Adrenal mass after extraction in an endobag

acid, homovanillic acid and adrenaline) as it is not available in our laboratory.

Three patients out of five had infiltration by malignant cells in myelogram and pulmonary metastasis.

The patient with a previous history of left pheochromocytoma excision had a recurrence of hypertension and received treatment before surgery, and six patients had five pre-operative chemotherapy sessions. All patients underwent transperitoneal laparoscopy, with two cases of conversion due to difficulties in the visualisation of the tumour in one case and bleeding in the second case. The surgical approach was performed using 4 ports for the right side and 3 for the left. A retro colonic dissection [Figure 1a and b], ligation of the pedicle using clips [Figure 1c] and extraction of the tumour were made on an endoscopic bag system through the umbilicus [Figure 1d], no drain was required. The perioperative course was uneventful, none of our patients required blood transfusion, and there were no deaths or post-operative complications on the immediate follow-up. The mean operating time was 135 min (ranging from 115 to 200 min). The average post-operative hospital stay was 2 days and a half (ranging from 2 to 4 days), and oral intake was on the first post-operative day. Final pathological examination revealed pheochromocytoma in two cases, ganglioneuroma in two cases, adenoma in one case and neuroblastoma in six cases (intermediate risk in four cases and high risk in two cases). Three patients had post-operative chemotherapy as guidelines. The mean post-operative follow-up was 25 months (ranging from 4 months to 4 years). Cosmetic results were good with very small incisions, no patient required enlargement of the incision. Patients with malignant masses are at 27 months of follow-up with no local recurrence, port-site recurrence or distant metastasis.

Discussion

The experience of Laparoscopic adrenalectomy (LA) in paediatrics is growing. We have found small retrospective case series by reviewing the literature, because of the rarity of adrenal masses that can be managed laparoscopically, there is no randomised controlled study of LA in paediatrics. In contrast, laparoscopy is the gold standard of adrenalectomy in adults.[1]

Experience is growing in the use of laparoscopy in children. The advantages of mini-invasive surgery include less morbidity and complications related to open surgery. Laparoscopy reduces damage to soft tissue and blood loss. It allows wide exposure to the abdominal view. It also decreases the necessity of pain treatment, allows an early post-operative oral intake, and rapidity of intestinal function.[1-3]

Surgery of the adrenal gland is suitable for laparoscopy because of its small size and its retroperitoneal location. However, the spectrum of adrenal pathology in paediatrics limits the indication of laparoscopy. The most common adrenal tumour in paediatrics is neuroblastoma, a tumour that is derived from crest neurological cells, it can be differentiated with a well-limited benign lesion without metastasis, but it is often undifferentiated with a large infiltrative tumour, with local and general invasion, vessels and nodal encasement what makes its excision very difficult and limits the use of the mini-invasive approach. Dokumcu *et al*.[3] reported nine cases of neuroblastoma treated by laparoscopy with good outcomes in long-term follow-up.

LA is the treatment of choice for a benign adrenal lesion. Pheochromocytoma requires pre-operative preparation to control hypertension by an alpha-receptor blockade.

The transabdominal lateral approach is more commonly used in the paediatric population; it has been used on all our patients. Three to four ports are used generally. Dokumku and al confirmed that transperitoneal lateral laparoscopy has become the standard procedure in the management of adrenal tumours in paediatrics, which can be used in both left and right localisation.[3] Retroperitonescopy was used in 30% with a significantly higher risk of conversion rate than laparoscopy; unlike the transperitoneal approach, the retroperitoneal approach does not give a wide operative field of vena cava which is important on the malignant lesion. Lymph node dissection is possible by either the trans or retroperitoneal approach.[4]

Intraoperative complications are bleeding, colonic perforation, renal infarct and diaphragmatic rupture.[3] The requirement for transfusion is <2%. The conversion rate is 7.5% during LA in children due to tumour adhesions, renal vein or inferior vena cava thrombosis.[3] In our study, none of our patients required blood transfusion; we noted conversion in two cases related to adhesions to important structures.

There is no apparent contraindication to LA in children. In the early era of LA, older children were likely to have a laparoscopy, therefore, ganglioneuroma, cyst and oncocytomas were the most frequent lesions proposed for laparoscopy.[5] Currently, in a study of nine children treated by laparoscopy, patients with neuroblastoma had a mean age of 38 months; the youngest child in our study was 1 year old.[6] Tumour size

is not a contraindication to laparoscopy, specimens can be extracted in an endoscopic bag, fragmentation of benign lesion, enlargement of umbilicus port or by a Pfannenstiel incision. Relative contraindications include kidney or splenic trauma or surgery and uncontrolled coagulopathy.[7]

Conclusion

Laparoscopy is a safe, feasible and effective approach to the management of adrenal benign lesions, besides the size and spectrum of pathology. On malignant tumours, infiltrative lesions with encasement of vessels or lymph nodes are not suitable for laparoscopy because of the risk of spillage and incomplete resection compromising the prognosis.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Walsh DS, Ponsky TA, Bruns NE, editors. The SAGES Manual of Pediatric Minimally Invasive Surgery. Cham: Springer International Publishing; 2017. Available from: https://www.link.springer.com/10.1007/978-3-319-43642-5. [Last accessed on 2024 Feb 13].
2. Cianci P, Fersini A, Tartaglia N, Capuzzolo S, Giambavicchio LL, Ambrosi A, *et al*. Current approaches in the minimally invasive surgical treatment of adrenal tumors. In: Clinical Management of Adrenal Tumors. IntechOpen; 2017. Available from: https://www.intechopen.com/chapters/55454. [Last accessed on 2024 Feb 13].
3. Dokumcu Z, Divarci E, Ertan Y, Celik A. Laparoscopic adrenalectomy in children: A 25-case series and review of the literature. J Pediatr Surg 2018;53:1800-5.
4. Catellani B, Acciuffi S, Biondini D, Ceccarelli PL, Cacciari A, Gelmini R. Transperitoneal laparoscopic adrenalectomy in children. JSLS 2014;18:e2014.00388. doi: 10.4293/JSLS.2014.00388.
5. Lopes RI, Dénes FT, Bissoli J, Mendonca BB, Srougi M. Laparoscopic adrenalectomy in children. J Pediatr Urol 2012;8:379-85.
6. Bhat HS, Tiyadath BN. Management of adrenal masses. Indian J Surg Oncol 2017;8:67-73.
7. Skarsgard ED, Albanese CT. The safety and efficacy of laparoscopic adrenalectomy in children. Arch Surg 2005;140:905-8.