

# Early experience with laparoscopic surgery in children in Ile-Ife, Nigeria

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## ABSTRACT

**Background:** Laparoscopy is not yet routinely employed in many Paediatric Surgical Units in Nigeria despite the advantages it offers. This study describes the preliminary experience with laparoscopic procedures in a single centre. **Patients and Methods:** A retrospective analysis of all children who had laparoscopic surgery between January 2009 and December 2013 at the Paediatric Surgical Unit of Obafemi Awolowo University Teaching Hospitals Complex Ile-Ife was carried out. Their sociodemographic, preoperative and intraoperative data along with postoperative records were subjected to descriptive analysis. **Results:** Eleven (44%) diagnostic and 14 (56%) therapeutic procedures were performed on 25 children whose age ranged from 5 months to 15 years (Median: 84 months, Mean: 103 ± 64.1 months), including eight (32%) females and 17 (68%) males. Indications included acute appendicitis in 12 (48%), intra-abdominal masses in six (24%), three (12%) disorders of sexual differentiation, two (8%) ventriculoperitoneal shunt malfunctions and impalpable undescended testes in two (8%) children. The procedures lasted 15-90 minutes (Mean = 54 (±21.6) minutes). Conversion rate was 17% for two patients who had ruptured retrocaecal appendices. No intra operative complications were recorded while three (12%) patients had superficial port site infections post-operatively. All diagnostic (11) and two therapeutic procedures were done as day case surgery. The mean duration of hospital stay was 3.1 (±3.3) days for those who had appendectomies. **Conclusion:** Laparoscopic surgery in children is safe and feasible in our hospital. We advocate increased use of laparoscopy in paediatric surgical practice in Nigeria and similar developing settings.

**Key words:** Children, early experience, laparoscopy

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## INTRODUCTION

Paediatric surgeons seem to be slower in adopting laparoscopic technique than their general surgeons' counterparts. This was partly due to the initial lack of child or adolescent-size instrumentation, surgical learning curves, and limited case volumes for complex procedures.<sup>[1,2]</sup> Having overcome some of these initial challenges, many more surgeons have embraced the technique and laparoscopic surgery in children is now increasingly practiced in many centres across the world. The technique has evolved into the use of single port access.<sup>[3-7]</sup>

Numerous advantages of laparoscopy in children have been documented. This includes reduced intra operative haemorrhage, decreased post-operative pain and other wound related complications, along with better cosmetic outcome and shorter duration of hospital stay.<sup>[8,9]</sup> In spite of these, the technique is not yet routinely employed in many centres in the West African sub-region including Nigeria. Some have cited economic, logistic, technical challenges and dearth of cases amenable to laparoscopy as obstacles to performing laparoscopic surgery in developing countries.<sup>[4,5,9,10]</sup> This retrospective analysis aims to present our early experience in laparoscopic surgery in children in Ile-Ife, Nigeria.

## PATIENTS AND METHODS

This is a retrospective analysis of all children who had laparoscopic surgery between January 2009 and December 2013 at the Paediatric Surgical Unit of Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria. The hospital receives referral from the largely agrarian parts of Osun and adjoining states of southwest Nigeria. The unit has been offering a range of general paediatric surgical care in the hospital for about three decades.

We adopted the locally adapted set-up developed as previously described by the adult general surgeons

in our hospital.<sup>[10]</sup> Re-useable 5mm ports and hand instruments were employed in all cases, and surgical energy was with unipolar and bipolar electrocautery when required. All procedures were carried out under general anaesthesia with carbon dioxide insufflation.

The information extracted from patients' medical records includes: Age, gender, diagnosis, procedures performed, and conversion to an open procedure, duration of the procedure, as well as the occurrence of intra- and post-operative complications. We recorded information on procedures that were either diagnostic or therapeutic, those performed on outpatients (day case operations) basis and those requiring hospital admissions. Data generated were entered into a personal computer using the SPSS version 18 for windows (SPSS Inc, Illinois, Chicago) and subjected to descriptive analysis.

## RESULTS

There were 11 (44%) diagnostic and 14 (56%) therapeutic procedure performed on twenty-five children. Their ages ranged from 5 months to 15 years (median: 84 months, mean:  $103 \pm 64.1$  months). There were eight (32%) females and 17 (68%) males. The most common indication for laparoscopy was acute appendicitis in 12 (48%), followed by intra-abdominal masses in six (24%), three (12%) disorders of sexual differentiation, two (8.0%) ventriculoperitoneal shunt malfunctions and two (8.0%) impalpable undescended testes. The procedures performed were 12 (48%) appendectomies, two (8%) shunt revision, six (24%) laparoscopic biopsies of intra-abdominal masses and five (20%) other diagnostic procedures. Two of the appendectomies required conversion to open procedures on account of ruptured retrocaecal appendicitis with extensive intra-peritoneal abscess. Thus, conversion rate of 17% was recorded.

Overall duration of operation ranged between 15 and 90 minutes with a mean of  $54 (\pm 21.6)$  minutes. For those that had appendectomies, the duration of operation was between 50 and 90 minutes with a mean of  $68 (\pm 11.3)$  minutes as depicted in Table 1. Estimated intra operative blood loss was  $<10$  ml in 23 (92%) procedures while the remainder who had conversion to open laparotomies

had a mean blood loss of 50 ml. No intra operative complications were recorded; and three (12%) patients had superficial port site infections post-operatively.

Findings in three patients with disorders of sexual differentiation suggested two cases of androgenital syndrome and a male patient with intra-abdominal testicles. The two patients with suspected androgenital syndrome had elevated serum 17-OH progesterone and were noted to have a single low confluence urogenital sinus at subsequent surgery wherein they had vulvo-vaginoplasty with hydrocortisone replacement therapy. The only child with intra-abdominal testicles had bilateral orchidopexy and Duckett urethroplasty for penoscrotal hypospadias. Mean duration of hospital stay was  $3.1 (\pm 3.3)$  days for those who had laparoscopic appendectomy, while other 13 (52.0%) were operated on out-patient basis (day cases operation). The histologic reports of the six biopsies taken were: One inflammatory mass, four non-Hodgkin's high-grade T-cell lymphoma and one liver cirrhosis.

## DISCUSSION

With gross limitation of funds and challenges with acquisition and maintenance of equipment, limitation in the number of disease conditions amenable to laparoscopic procedures: Paediatric surgeons in Nigeria and the sub-region are lagging behind their Western counterparts. The adult surgeons in our centre faced similar challenges, which were gradually surmounted partly by local adaptations and improvisations.<sup>[10]</sup> The initial success of the adult surgeons encouraged us to introduce laparoscopic surgery into our practice. The high cost of procuring equipment was one of our challenges as we had only the adult 5 mm hand instrument to work with, we opted to start with diagnostic laparoscopies which afforded us time to adapt to the local set-up and gain confidence with our improvisations. It was only after this initial period that we started performing therapeutic procedures and laparoscopic biopsies. We relied initially on adult surgeons' laparoscopic equipment as limited funds were available at the door step of hospital management. Part of the challenges we contended with was the relatively higher cost of procedures over and above

**Table 1: Laparoscopic procedures in children in Ile-Ife, Nigeria**

Procedure	Frequency (n = 25)	Mean duration (min)	Conversion (%)	Mean hospital stay (days)
Appendectomy	12	$68 \pm 11.3$ (50-90)	2 (16.7)	$3.1 \pm 3.3$ days
Ventriculoperitoneal shunt revision	2	$58 \pm 3.5$ (55-60)	0	Day case
Diagnostic laparoscopy	5	$37 \pm 30.8$ (15-90)	0	Day case
Biopsy of intra-abdominal masses	6	$38 \pm 11.3$ (23-52)	0	Day case

traditional open methods as alluded to by many authors in developed nations. We were able to surmount this partly by adopting the measures taken by the adult laparoscopic surgeons in our centre.<sup>[10-12]</sup> We believe that as many Nigerians key into the National Health Insurance Scheme, the cost of most procedures will not be a burden to our patients, and this will encourage more patients to embrace technologically driven procedures like laparoscopy in our country and other resource-poor nations in our sub-region.

Laparoscopic appendectomy is one of the most commonly performed minimal access abdominal operations in children.<sup>[4]</sup> The predominance of laparoscopic appendectomy (12 of 25,48.0%) in our study may be due to the low incidence of conditions like calculous cholecystitis in children in our setting and our low experience in other advanced minimal access procedures commonly performed in children in other climes. Apart from appendectomy, diagnostic laparoscopic procedures were the second most common procedures in our series. Most of these children could have been subjected either to laparotomy to obtain specimen for tissue diagnosis with the consequent admission and competition for bed space in a resource-poor environment like ours or to more expensive radiological investigations with attendant exposure to radiation to aid diagnosis. We have learnt in our setting that laparoscopy could actually serve as an adjunct to other investigative modalities with minimal trauma and can be safely performed as day case procedure to attain diagnosis of abdominal conditions in many instances.<sup>[5,13]</sup>

Investigation of children with intra-abdominal malignancies in our unit commonly involved imaging-guided percutaneous biopsies or open biopsy through a mini-laparotomy. The introduction of laparoscopic surgery has enabled us to perform laparoscopic biopsies for intra-abdominal masses with several benefits to the patients including less intra-operative haemorrhage, minimal post-operative pain and shorter hospital stay. While a number of children still benefitted from ultrasound guided percutaneous aspiration and or biopsies, six children were offered laparoscopic biopsies. This includes those with limited anatomic information on ultrasonography who could not afford computerised tomography scan and those with poor yield on percutaneous aspiration. The histopathology of the six biopsies was: One inflammatory mass, four non-Hodgkin's diffuse small and large high-grade T-cell lymphoma and one liver cirrhosis: The four patients with high-grade T-cell lymphoma had between two

to six cycles of combination therapy of parenteral cyclophosphamide, adriamycin, methotrexate and intra-theal methotrexate and cytosine arabinoside with poor outcome.

Our protocol for children with impalpable undescended testis was to investigate with abdomino-pelvic ultrasound followed by groin exploration (with or without retroperitoneal dissection) and orchidopexy. Occasionally, when the testis may not be found, mini-laparotomy was resorted to. Diagnostic laparoscopy has changed this trend with higher sensitivity and specificity over ultrasound.<sup>[14-17]</sup> Our experience with laparoscopy for the two cases of impalpable undescended testis demonstrated these benefits. Similarly, laparoscopy aided our evaluation of three children with the disorder of sexual differentiation. This was of great value as it allows direct visualization of the internal reproductive organs which play a role in gender assignment.<sup>[18,19]</sup> Laparoscopy revealed well-formed female internal reproductive organ in two patients while one had intra-abdominal testes.

About half of all our cases (all diagnostic procedures and the two shunt revisions) were managed as day cases. Those who had laparoscopic appendectomy stayed 1-2 days in the hospital after the procedure while those whose procedures were converted to open laparotomy stayed for 5-8 days. This is comparable to durations published in earlier studies.<sup>[4,11]</sup> The mean operative time of 68 minutes for laparoscopic appendectomy compare favourably with report from Nigeria, but is much longer than reports of studies from Europe and America.<sup>[4,20,21]</sup> Even though some of our improvisations may lengthen operation time, we believe that this will improve as we climb the learning curve.

The two cases that required conversion had retrocaecal appendix with extensive intra-peritoneal abscess. Since then we have improved with better patients' selection criteria. Nowadays, surgeons are able to perform laparoscopic appendectomy for complicated cases with zero conversion rates.<sup>[12,22,23]</sup> We, however, prefer to manage such cases by open laparotomy in our setting. There was no mortality in this initial cohort of cases in our unit. This has helped us to gain acceptance and to popularise the technique among our patients. We look forward to being able to increase the number of patients benefitting from laparoscopy in our unit by including more indications and performing more advanced procedures in the course of time.

## CONCLUSION

Laparoscopy has been safely introduced for the diagnosis and treatment of common surgical conditions in children in our setting. We advocate increased use of laparoscopy in paediatric surgical practice in Nigeria and similar developing settings.

## REFERENCES

1. Georgeson KE, Owings E. Advances in minimally invasive surgery in children. *Am J Surg* 2000; 180:362-4.
2. Zitsman JL. Current concepts in minimal access surgery for children. *Pediatrics* 2003; 111:1239-52.
3. Zitsman JL. Pediatric minimal-access surgery: Update 2006. *Pediatrics* 2006; 118:304-8.
4. Misauno MA, Ojo EO, Uba AF. Laparoscopic paediatric surgery: A potential for paradigm shift in developing countries. *Afr J Paediatr Surg* 2012; 9:140-2.
5. Adisa AO, Lawal OO, Alatise OI, Adesunkanmi AR. An audit of laparoscopic surgeries in Ile-Ife, Nigeria. *West Afr J Med* 2011; 30:273-6.
6. Karakus OZ, Hakgüder G, Ates O, Olguner M, Akgür FM. Cholecystectomy conducted with single-port incisionless-intracorporeal conventional equipment-endoscopic surgery. *J Laparoendosc Adv Surg Tech A* 2013; 23:728-32.
7. Blanco FC, Kane TD. Single-port laparoscopic surgery in children: Concept and controversies of the new technique. *Minim Invasive Surg* 2012; 2012:232-347.
8. Misauno AM, Ismaila OB. Pioneering general surgery in Nigeria. *Niger Med J* 2011; 52:104-6.
9. Raiga J, Kasia JM, Canis M, Glowaczower E, Doh A, Bruhat MA. Introduction of gynecologic endoscopic surgery in an African setting. *Int J Gynaecol Obstet* 1994; 46:261-4.
10. Adisa AO, Lawal OO, Arowolo OA, Alatise OI. Local adaptations aid establishment of laparoscopic surgery in a semiurban Nigerian hospital. *Surg Endosc* 2013; 27:390-3.
11. Lee HJ, Park YH, Kim JI, Choi PW, Park JH, Heo TG, *et al.* Comparison of clinical outcomes and hospital cost between open appendectomy and laparoscopic appendectomy. *J Korean Surg Soc* 2011; 81:321-5.
12. Cariati A, Brignole E, Tonelli E, Filippi M, Guasone F, De Negri A, *et al.* Laparoscopic or open appendectomy. Critical review of the literature and personal experience. *G Chir* 2001; 22:353-7.
13. Adisa OA, Alatise IO, Arowolo AO, Lawal OO. Laparoscopic appendectomy in a Nigerian Teaching Hospital. *J Soc Laparoendosc Surg* 2012; 16:576-80.
14. Shah A, Shah A. Impalpable testes – is imaging really helpful? *Indian Pediatr* 2006; 43:720-3.
15. Satar N, Bayazit Y, Doran S. Laparoscopy in the management of impalpable testicle. *Acta Chir Belg* 2005; 105:662-6.
16. Park JH, Park YH, Park K, Choi H. Diagnostic laparoscopy for the management of impalpable testes. *Korean J Urol* 2011; 52:355-8.
17. Tsujihata M, Miyake O, Yoshimura K, Kakimoto K, Matsumiya K, Takahara S, *et al.* Laparoscopic diagnosis and treatment of nonpalpable testis. *Int J Urol* 2001; 8:692-6.
18. Osifo OD, Amusan TI. Female children with ambiguous genitalia in awareness-poor subregion. *Afr J Reprod Health* 2009; 13:129-36.
19. Yu TJ, Shu K, Kung FT, Eng HL, Chen HY. Use of laparoscopy in intersex patients. *J Urol* 1995; 154:1193-6.
20. Yau KK, Siu WT, Tang CN, Yang GP, Li MK. Laparoscopic versus open appendectomy for complicated appendicitis. *J Am Coll Surg* 2007; 205:60-5.
21. Sauerland S, Jaschinski T, Neugebauer EA. Laparoscopic versus open surgery for suspected appendicitis. *Cochrane Database Syst Rev* 2010; 10:1-140 CD001546.
22. Wang X, Zhang W, Yang X, Shao J, Zhou X, Yuan J. Complicated appendicitis in children: Is laparoscopic appendectomy appropriate? A comparative study with the open appendectomy – Our experience. *J Pediatr Surg* 2009; 44:1924-7.
23. Nwokoma NJ, Swindells MG, Pahl K, Mathur AB, Minocha A, Kulkarni M, *et al.* Pediatric advanced appendicitis: Open versus laparoscopic approach. *Surg Laparosc Endosc Percutan Tech* 2009; 19:110-3.

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