

# Laparoscopic General Surgeries in a Developing Country: A 5-Year Private Hospital Experience in Abuja, Federal Capital Territory, Nigeria

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## ABSTRACT

**Background:** Laparoscopic surgical services are well established in most hospitals in developed countries but not in developing countries like Nigeria. Moreover, the scope of healthcare financing like the health insurance scheme in Nigeria has not expanded to accommodate laparoscopy. Basic surgeries like appendicectomy, cholecystectomy and advanced surgery like hemicolectomy form common surgical procedures now performed via laparoscopy in Nigeria. **Objective:** To share our experiences with laparoscopic general surgical operations performed in a private hospital in Abuja, Nigeria. **Methods:** Retrospective study of 119 patients who had laparoscopic general surgeries over 5 years period at a private hospital in Abuja, Nigeria, from January 2017 to December 2021. The variables analysed were patients' demographic data, diagnosis, type and duration of operations and outcome. **Results:** One hundred and nineteen patients had laparoscopic surgery over the period. Of these, majority were females 71 [59.7%] and males 48 [40.3%] giving M:F of 1:1.5. The age range of patients was 12 to 81 years and the mean age was 43.4 years  $\pm$  14.0. A higher proportion of the patients [58%, n=69], were aged 40 years and above. The commonest procedures done were laparoscopic cholecystectomies [49.6%, n=59], followed by appendicectomies [21.0%, n=25]. Seven [5.9%] patients had laparoscopic adhesiolysis and drainage of liver cysts each, laparoscopic fundoplication 5 [4.2%] and left hemicolectomy 3 [2.5%]. The commonest postoperative complication was surgical port site infection 4 [3.4%]. **Conclusion:** The scope of laparoscopic general surgeries provided in a private hospital in Abuja, Nigeria is broad and safe. The outcomes are comparable to those from other centres in the region.

**Keywords:** General surgery, laparoscopy, Private Hospital, Abuja

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## Introduction

Laparoscopic services involving many surgical specialities are well established in most hospitals in developed countries but unfortunately, this is not the case in low and middle-income countries [LMIC] or in developing countries like Nigeria.<sup>1,2</sup> A functional and effective laparoscopic service requires significant investments in infrastructure and human capacity which remain unaffordable to the majority of the population in LMIC. Thus, poor healthcare funding, infrastructural deficit, dearth of modern equipment, "hierarchical nature of local surgical culture" as well as lack of well-trained personnel, mitigate the access to quality healthcare (including laparoscopic surgery) services in developing countries.<sup>1,4</sup> Moreover, the scopes of healthcare financing socio-economic schemes like the National Health Insurance Scheme [NHIS] in Nigeria in general and the Federal Capital Territory Health Insurance Scheme [FHIS] Abuja in particular, have

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QuickResponse Code	
	website: <a href="http://www.bornomedicaljournal.com">www.bornomedicaljournal.com</a>
	DOI: 10.31173/bomj.bomj_2213_19



not been expanded to accommodate laparoscopic services that will enable the enrollees on such schemes to have more access to healthcare. Therefore, patients pay for laparoscopic surgical services out of their pockets or on a “cash-and-carry” basis, which is a situation where payment is provided as at when due for every service and consumable item received. This funding or healthcare financing model poses a barrier to effective and prompt laparoscopic service delivery. Some government tertiary and secondary health institutions and a few private hospitals in Nigeria have established laparoscopic surgical services but due to paucity of healthcare insurance, inappropriate funding, poor equipment maintenance and irregular power supply, such services are not being sustained.<sup>4</sup> Basic general surgical procedures like appendicectomy, cholecystectomy, hernia repair and advanced laparoscopic general surgeries like Nissen’s fundoplication, Heller’s cardiomyotomy, enteral feeding access, adhesiolysis, gastrectomy, colectomy, lymph node dissection, partial hepatectomy, common bile duct exploration, splenectomy, adrenalectomy and hepatic cyst drainage form common surgical procedures now performed by laparoscopy.<sup>5</sup>

The capacity to perform some of these common general surgical operations by laparoscopy is now available in some tertiary hospitals in Nigeria but the literature on the scope and outcomes of such interventions in the private health facilities involved in the provision of advanced laparoscopic general surgery in Abuja is scanty.

We present our preliminary experience with laparoscopic general surgery procedures performed at Trust Charitos Hospital [TCH], a private healthcare facility in Abuja, Federal Capital Territory [FCT], Nigeria, over 5 years.

## Methods

This was a retrospective study where the case notes, electronic medical records and operation registers of 119 patients who had diagnostic and therapeutic laparoscopic procedures during the period of 5 years from January 2017 to December 2021 by the general surgery unit of Trust Charitos Hospital, Abuja were reviewed. The diagnosis of the surgical conditions requiring laparoscopy was based on clinical, relevant laboratory and radiological investigation findings.

Double consent was obtained from all patients with an adequate explanation for the possibility of conversion of laparoscopic procedure to open surgery. Most of the surgeries were done by the same team comprising of two consultant surgeons [assisted by medical officers], an anaesthetist and trained nursing personnel, using the Stryker HD 1108TM laparoscopic tower with a light source, 3-chip HD camera, suction irrigation machine, diathermy machine and insufflators. Insufflation was with carbon dioxide, set at 15-20 mmHg pressure and a flow rate of 1.5-2L/min. Access was via the standard 4-port incisions approach. The use of an open sub-umbilical cut down with direct visualisation of the peritoneum which served as the camera port was also employed. Attention was paid to critical view for safety. All the laparoscopic procedures in this series were done in an operating theatre with the full complement of the operative team and set up, in case there might be a need to proceed with therapeutic surgery or convert to open laparotomy instead of the initial ‘office-only’ diagnostic procedure.

Data extraction was done by two perioperative nurses using the proforma designed by the authors for this purpose. The variables analysed were the patients’ demographic data, diagnosis, intra-operative findings, duration of surgery, outcome, postoperative complications, time of discharge and follow-up. All biopsy specimens were sent for histological examinations. Data were analysed using the SPSS version 22.0 software. The level of statistical significance was determined by a p-value of <0.05. The student t-test and chi-square test were applied to compare means and proportions while qualitative variables were reported in percentages. Ethical clearance was obtained from the Trust Charitos Hospital Ethics and Research review committee.

## Results

One hundred and nineteen patients had laparoscopic surgery procedures over 5-years duration. Of these, the majority were females, 71 [59.7%] and males were 48 [40.3%], giving a male-to-female ratio of 1:1.5. The age range of patients was 12 to 81 years and the mean age was 43.4 years  $\pm$  14.0\_SD. A higher proportion of the patients, 69 [58%], were aged 40 years and above as shown in Table 1. The mean age of the males was 39.2 years  $\pm$  15.4 standard deviation while the mean age of females was 46.3 years  $\pm$  12.2\_SD, and the



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difference in means was statistically significant, [t = -2.209, p=0.006]. A higher proportion of the females 27 [38.0%] was within the predominant age group of 50 years and above that of males 12 [25.0%], and the difference in proportions was statistically significant, [ $\chi^2=13.954$ , p=0.003] as shown in Table 2. The commonest indications for laparoscopic surgery procedure performed in this study were calculous cholecystitis 53 [44.5%], followed by acute appendicitis 24 [20.2%], liver cyst and adhesive intestinal obstruction 7 [5.9%] respectively while bleeding colonic diverticular disease, carcinoma of the stomach, tuberculosis of the abdomen were the least common and accounted for 1(0.8%) each (Table 3). There were 681 general surgical procedures performed within 5 years period under review and out of this, 562 [82.5%] were open general surgeries while 119 [17.5%] were laparoscopic general surgeries. Of the 119 laparoscopic general surgeries, 106 [89.4%] were therapeutic [operative] interventions while 13 [10.8%] were diagnostic procedures. Most of the laparoscopic surgeries done [72.3%, n=86] were elective surgeries while the emergency laparoscopic surgeries accounted for 33 [27.7%] in this study (Table 4).

The emergency procedures comprised laparoscopic appendicectomies, small bowel adhesiolysis for intestinal obstruction, and laparoscopic cholecystectomy for a 'hot' gall bladder.

Laparoscopic cholecystectomies 59 [49.6%] and laparoscopic appendicectomies 25 [21.0%], constitute

**Table 1: Distribution of Age and Sex of the Patients**

Variables	Frequency [n=119]	Percentage [%]
<b>Gender</b>		
Male	48	40.3
Female	71	59.7
<b>Age Groups [Years]</b>		
< 30	16	13.4
30 - 39	34	28.6
40 - 49	30	25.2
≥ 50	39	32.8
<b>Mean Age = 43.4 years ± 14.0 SD</b>		
<b>Age Range = 12-81years</b>		

84 [70.6%] of all cases performed. Thirty-five [29.4%] patients had advanced laparoscopic general surgery procedures like adhesiolysis 7 [5.8%], liver cyst drainage and fundoplication 5 [4.2%] respectively, left hemicolectomy and anastomosis 3 [2.5%], Heller's cardiomyotomy and gastrectomy 2 [1.7%] each as shown in Table 4.

One patient had a combined laparoscopic cholecystectomy for pre-existing calculous cholecystitis and salpingectomy for ruptured ectopic tubal gestation by a combined team of general surgeons and gynaecologists [Table 4].

Only three [2.5%] laparoscopic cholecystectomies were converted to open surgery while the operation was completed in the remaining 116 [97.5%] cases. The morbidities recorded include injury to the duodenum 1 [0.8%], bleeding 3 [2.5%] and surgical port site infection 4 [3.4%], prolonged ileus beyond 48 hours 2 [1.7%]. The average duration of surgery was 1 hour 15 minutes. The average hospital stay was one day for basic surgeries and seven days for advanced surgeries. There were two day cases of laparoscopic cholecystectomy and one day case of laparoscopic appendicectomy. There was no mortality recorded in this series. The histology of the specimens are primary liver cell carcinoma 3 [4.2%], cholangiocarcinoma 2 [1.7%], adenocarcinoma of the colon 2 [1.7%], lymphoma 2 [1.7%] and carcinoma of the stomach 1 [0.8%]. All patients had follow-ups in the outpatient clinic for six months.



**Table 2: Relationship between age and sex of the patients**

Variables	Sex n=119		$\chi^2$	p-value
	Male [N=48] n [%]	Female [N=71] n [%]		
<b>Age groups (years)</b>				
< 30	13 [27.1]	3 [4.2]		
30 – 39	14 [29.2]	20 [28.2]	13.954	0.003
40 – 49	9 [18.8]	21 [29.6]		
≥ 50	12 [25.0]	27 [38.0]		
<b>Mean Age ± SD</b>	39.2 years ± 15.4	46.3 years ± 12.2	<b>t-value</b> -2.816	<b>p-value</b> 0.006

**Table 3: Indications for laparoscopic general surgery**

Variables /Diagnosis	Frequency [n=119]	Percentage [%]
Calculous cholecystitis	53	44.5
Acute appendicitis	24	20.2
Liver Cyst	7	5.9
Adhesive intestinal obstruction	7	5.9
Acalculous cholecystitis	5	4.2
Hiatus Hernia	5	4.2
Primary liver cell carcinoma	3	2.5
Achalasia of Oesophagus	2	1.7
Cholangiocarcinoma	2	1.7
Cancer of descending colon	2	1.7
Abdominal lymphoma	2	1.7
Cholelithiasis and Sickle Cell Disease	2	1.7
Bleeding colonic diverticular disease	1	0.8
Ruptured Appendicitis	1	0.8
Tuberculosis of the Abdomen	1	0.8
Ca Stomach	1	0.8
Cholelithiasis and ruptured tubal pregnancy	1	0.8



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**Table 4: Indications and Types of laparoscopic surgery procedure performed**

Variable	Frequency [n=119]	Percentage [%]
<b>Timing of surgery</b>		
Elective	86	72.3
Emergency	33	27.7
<b>Nature of Laparoscopic procedure done</b>		
Therapeutic [operative]	106	89.4
Diagnostic	13	10.6
<b>Duration of Hospital Stay</b>		
Basic surgery	<1-2 days	
Advanced Surgery	7-10 days	
<b>Day cases</b>		
Laparoscopic Cholecystectomy	2	
Laparoscopic appendicectomy	1	
<b>Duration of surgery</b>		
45 minutes-120 minutes		
<b>Type of Surgery performed</b>		
Laparoscopic cholecystectomy	59	49.6
Laparoscopic appendicectomy	25	21.0
Laparoscopic drainage of liver cysts	7	5.8
Diagnostic laparoscopy + small bowel adhesiolysis	7	5.8
Laparoscopic fundoplication	5	4.2
Diagnostic laparoscopy + Liver biopsy	3	2.5
Diagnostic laparoscopy + Lymph Node biopsy	3	2.5
Laparoscopic left hemicolectomy + anastomosis	3	2.5
Laparoscopic Heller's cardiomyotomy	2	1.7
Laparoscopic biopsy of gall bladder tumour	1	0.8
Laparoscopic partial sleeve-gastrectomy	1	0.8
Laparoscopic re-do sleeve gastrectomy	1	0.8
Laparoscopic cholecystectomy + salpingectomy	1	0.8
<b>Laparoscopic cholecystectomy converted to open cholecystectomy</b>	<b>3</b>	<b>2.5</b>

### Discussion

At the beginning of this century, laparoscopy was once regarded as an esoteric Hi-tech procedure of little relevance to present day Nigeria but in the last decade, it has been established successfully in some private and government-owned health institutions in Nigeria.<sup>1,6,7,8,9.</sup>

The age distribution of all the 119 patients in this study shows that majority of them 69 [58%] are above 40 years old which varies from the reports by other researchers where majority of their patients are less than 40 years old.<sup>1,10</sup> However, gender distribution and the M:F ratio of 1:1.5 obtained in this study is comparable to findings from earlier research supporting more uptake for females than males probably because of cosmetic reasons.<sup>1, 7,10,11</sup>

All the therapeutic laparoscopic operations in this study were confirmed by an initial diagnostic laparoscopy thus supporting the precision and accuracy of diagnosis also recommended by other researchers.<sup>12,13</sup> Of the total laparoscopic cholecystectomies done 59 [49.6%]; calculous cholecystitis accounted for the majority 53 [44.5%] while acalculous cholecystitis accounted for the remaining. During the period under review, only seven [10%] open cholecystectomies were performed compared to sixty [90%] recorded in this study. This uptake in laparoscopic cholecystectomy may be due to the benefits of reduced postoperative pain, early recovery and ambulation, early discharge from the



hospital translating to huge economic benefits and better cosmetic scar as recorded by other researchers<sup>4</sup>. These findings support the global trend that laparoscopic cholecystectomy is the gold standard treatment for various gall bladder diseases.<sup>14-20</sup> Presently, the same trend cannot be said of other laparoscopic surgeries in our centre.

It has been reported that diagnostic and therapeutic laparoscopy is of immense and inestimable value in patients who have abdominal masses and also those who present with blunt abdominal trauma.<sup>21-24</sup> We did not encounter any patient with abdominal trauma in this series. However, diagnostic laparoscopy alone accounted for 10.6% of all laparoscopic procedures in this study and it was primarily for incisional biopsies of abdominal masses like abdominal lymphoma and primary liver cell carcinoma.

The average operating time in this series was 45 minutes for laparoscopic appendicectomy and cholecystectomy while that for laparoscopic partial sleeve-gastrectomy and hemicolectomy was 120 minutes. The laparoscopic procedure was completed in 116 out of the 119 patients giving a completion rate of 97.5% and a conversion rate of 2.5%. The three laparoscopic cholecystectomies converted to open surgery were due to severe intraoperative bleeding from an injury to the cystic artery, a bleeding aberrant artery and a malfunctioned clip applicator respectively. At open surgery, the injured arteries were identified and ligated with a vicryl suture.

Though all patients 'pay out of pocket' for the laparoscopic services provided without any form of insurance cover, the average cost of laparoscopic cholecystectomy and appendicectomy is \$1500 [one thousand five hundred US dollars] equivalent and despite soaring inflation and foreign exchange rates, this is still comparable to the \$1250 cost published by Misauno<sup>11</sup> in the year 2011 while the cost of advanced laparoscopic sleeve gastrectomy and hemicolectomy is \$4000 [four thousand US dollars] equivalent. This cost is influenced by Nigeria's current trend of inflation for goods and services.

It is reported by Balogun *et al*<sup>1</sup> and other researchers that inadvertent intraoperative injuries manifesting as complications in the postoperative period may occur during.<sup>25</sup> We encountered one patient who had a severe bile leak due to a missed injury to the second part of the duodenum which was recognised 48 hours after laparoscopic cholecystectomy. This

necessitated exploratory laparotomy, during which we drained 2 litres of bile. The duodenal injury was repaired with vicryl sutures after its kocherisation and a Redivac<sup>TM</sup> drain was left in place but removed 72 hours after the operation. The patient was discharged home on the 10<sup>th</sup> postoperative day and follow-up for 6 months was uneventful. The overall range of hospital stay was one to two days for cholecystectomy and appendicectomy, and 7 to 10 days for advanced surgeries like hemicolectomy, partial sleeve-gastrectomy and in the instance of the procedure-related complication of injury to the second part of the duodenum. Other procedure-related morbidities recorded in the series include port site infection [3.4%, n=4], bleeding requiring blood transfusion [2.5%, n=3] and prolonged ileus [1.7%, n=2]. Surgical port site infection from laparoscopic appendicectomy [3.4%, n=4] is the most common morbidity in this series and this is comparable to reports by other authors.<sup>26-28</sup> One haemodynamically stable patient had laparoscopic cholecystectomy and salpingectomy for pre-existing calculous cholecystitis and ruptured ectopic tubal gestation, by a combined team of surgeons and gynaecologists.

The spread of basic laparoscopic surgical cases comprising laparoscopic cholecystectomies and laparoscopic appendicectomies is similar to those documented by other researchers in Nigeria<sup>26,28,29</sup>. However, more advanced laparoscopic surgeries like Nissen's fundoplication, liver cyst drainage, Heller's cardiomyotomy, partial sleeve-gastrectomies, hemicolectomies and anastomosis are recorded in this series compared to the results reported by Balogun *et al* and other researchers from the same geographical region.<sup>1,26,31</sup> This may be due to easy access and the high socio-economic narratives of Abuja, Nigeria's capital, where the facility is located instead of patients travelling to other regions of Nigeria to have the operation. The patients whose histological reports of the specimens showed cancer were referred to a tertiary centre for adjuvant chemotherapy. The laparoscopic hemicolectomy also contributes to the broader scope of advanced surgeries performed in this series.

Technical problems like power outages, dead light-source bulbs, inability to replace consumables, malfunctioning and non-functioning equipment [except one incidence of clip failure], experienced by earlier researchers like Ismaila *et al*<sup>30</sup> and others<sup>29,31</sup>



were not encountered in this series probably due to the absence of bottlenecks and official bureaucracies in private hospitals when compared with what usually obtains in most government institutions. The careful selection of patients, the capacity of the team, the small volume of patients and less bureaucracy, may be responsible for the various encouraging outcomes in this series.

### Limitation

The relatively small sample size of the study, the shorter duration of the services and the retrospective nature of the study pose a limitation for outcomes when compared with that obtained from other centres in the sub-region.

### Conclusion

The scopes of basic and advanced laparoscopic general surgical services provided by a private health facility are broad and safe. The outcomes of the laparoscopic general surgeries are comparable to those obtained from other regional centres. We encourage more private hospitals in Abuja, Federal Capital Territory, Nigeria to acquire the capacity for laparoscopic general surgery to enhance its accessibility and availability.

### Acknowledgement

The authors wish to acknowledge Sarah Dandana and Nathaniel Wodi of Trust Charitos Hospital, Abuja for providing the registers and also collating the data used for this study.

### Financial Support and Sponsorship

Nil

### Conflict of Interest

The authors declare no conflict of interest

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**Cite this Article as:** Aghahowa ME, Salu IK, Esomonu SN, Umar MU, Bello O, Gali BM. Laparoscopic General Surgeries in a Developing Country: A 5-Year Private Hospital Experience in Abuja, Federal Capital Territory, Nigeria. *Bo Med J* 2022;19(2):94-101 **Source of Support:** Nil, **Conflict of Interest:** None declared

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