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A paradigm shift in operative approach to cholecystectomy in Makurdi, Nigeria

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Abstract
Background: *Several tertiary centers in Nigeria adopted routine laparoscopic practice only within the last decade, lagging behind the rest of the world. In BSUTH Makurdi, operative laparoscopy was introduced in the performance of cholecystectomy barely two years ago. We sought to determine the preference of patients electively scheduled for cholecystectomy, between the traditional open approach and the recently-introduced minimal access technique, and outcomes following the procedures.*
Materials and Methods: *We collected preoperative, intraoperative and postoperative data from the patients, to compare both techniques and analysed them using SPSS version 26.*
Results: *Most of the patients were females in their 5th decade of life and most preferred minimal access surgery. Laparoscopy took longer to perform compared to open cholecystectomy but was associated with a quicker return of bowel function, earlier discharge from hospital, earlier resumption of normal activity and better cosmetic outcome. There were few complications but no mortality in the study cohorts.*
Conclusion: *We conclude that patients requiring cholecystectomy in our settings prefer minimal access to the traditional open approach and that despite the challenges of our low-resource setting, routine laparoscopic cholecystectomy in the management of gall bladder disorders is safe and feasible.*
Keywords: *laparoscopic cholecystectomy, low-resource setting, minimal access surgery*

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I. Introduction

Interest in minimal access operative techniques has existed for over a century.(1,2) However, the practice of modern laparoscopy began relatively recently in surgical history when Semm performed the first laparoscopic appendicectomy.(1) Since then, the application of laparoscopic techniques in the management of surgical diseases has continued to expand. Laparoscopic cholecystectomy was first performed in 1985 by Erich Muhe(3) and currently, virtually all abdominal procedures can be performed using laparoscopic or laparoscopic-assisted techniques. Laparoscopic cholecystectomy is now considered worldwide as the gold standard for the management of gallstones and other gallbladder pathology.(1,4) It is safe and offers many advantages including less operative trauma, less adhesion formation, earlier patient recovery, less need for postoperative analgesia, excellent cosmetic outcome, and earlier discharge from hospital.

In Nigeria, laparoscopic techniques have been established in the major tertiary centers across the various geo-political zones as indicated by various published studies.(5–9) However, in Benue state of Nigeria, the adoption of laparoscopy by the few available surgeons has been poor. This may be due to the usual hesitance that surgeons are known to change their established treatment methods(1) and relatively poor healthcare funding, as is the norm in most parts of Nigeria.(2) However, a minimal access surgical program was recently established in the surgery department of Benue State University Teaching Hospital (BSUTH) Makurdi, in 2019. This hospital is one of only two tertiary hospitals in Benue state which serve as a referral center for the entire state, as well as neighboring states of Nassarawa, Enugu, Taraba, Cross-River, and Kogi. The center also serves as a postgraduate training institution for both the Nigerian National Postgraduate Medical College of Nigeria (NPMCN) and the West African College of Surgeons (WACS).

In the short time since its commencement, laparoscopic cholecystectomy appears to have become the procedure of choice for patients being managed for gallbladder disorders in our facility. This is unsurprising, considering the benefits of laparoscopic cholecystectomy over the open technique, and as one author puts it,

"the rapid acceptance of laparoscopic techniques by the general population is unparalleled in the history of surgery".(1) The postgraduate training of surgical residents, has also been impacted, with surgical residents having access to hands-on training in laparoscopy and surgical endoscopy. This study aims to determine the preference of patients electively scheduled for cholecystectomy, between the traditional open approach and the recently-introduced minimal access technique, and outcomes following the procedures in BSUTH within the 2 years since the introduction of minimal access surgical techniques in the institution.

II. Methodology

This was a prospective study carried out on all patients scheduled for cholecystectomy (open and laparoscopic) in the General Surgical (GS) clinics of Surgery Department, Benue State University Teaching Hospital, (BSUTH) Makurdi, within 2 years, from August 2019 to July 2021. We obtained consent from the patients for the study, alongside consent for the respective procedure. Laparoscopic cholecystectomy was performed with a standard four-port technique(10) using Ark Meditech (India) laparoscopic tower and a 30 degrees Karl Storz laparoscope. Initial access to achieve pneumoperitoneum was by the open technique(11) and transillumination to identify and prevent injury to the anterior abdominal wall vasculature during placement of the secondary ports was routinely done. At the end of surgery, the gall bladder specimen was retrieved with endobag in all patients. Open cholecystectomy was performed with a standard retrograde approach(12) when this was opted for.

Data were collected, including socio-demographics, intraoperative and post-operative parameters. These included the indications for surgery, patients' preference of operative method after counseling, anesthetic record, the operative procedure performed, duration of surgery, the occurrence of intraoperative complications, postoperative recovery, length of hospital stay, occurrence of postoperative complications, and results of histopathological analysis of surgical specimens amongst others.

Postoperative visits were scheduled for 1, 2, and 4 weeks after surgery in all patients. Further interaction with the patient and evaluation of the operative access sites was done during these visits. Data were entered and analyzed using SPSS version 26. Permission to conduct the study was obtained from the institution's health and research ethics committee.

III. Results

There were 35 procedures done within the study period and all procedures were carried out by local faculty. Three of these (8.6%) were via the open technique while 32 (91.4%) were via the laparoscopic approach. There were 30 females and 5 males with a female to male ratio of 6:1. The age range was 28 to 80 with a mean of 45.9 ±15.9 years. The indications for surgery were chronic calculous cholecystitis (37%), biliary colic (34%), acute cholecystitis (23%), and gall bladder tumor (6%). Seventeen patients (49%) were of Tiv extraction, 10 (29%) were Idoma, and the remaining 8 (22%) were of other ethnic affiliation. The patients were stratified using the American Society of Anaesthesiology (ASA) physical status score(13) and 17(49%), 13(37%) and 5(14%) patients were ASA I, II, and III respectively.

Most of the patients (34 of 35) preferred laparoscopy to open surgery; however, 2 of those who initially indicated a preference for laparoscopy finally opted for open surgery due to financial reasons. The mean duration of surgery for the open cholecystectomy group was 50 ± 13.2 minutes compared to 142.5 ± 21.5 minutes for the laparoscopic group. There was no conversion from laparoscopic to open cholecystectomy. Intraoperative adverse events (complications) were categorized based on the Classification of Intraoperative Complications (CLASSIC) system.(14) There was no intraoperative complication in the open group. However, 6 of 32 patients (18.8%) in the laparoscopic group had some intraoperative complication. 5 (15.6%) of these had grade I complication not requiring additional treatment. These included gall bladder perforation, thermal injury to the liver and primary haemorrhage. One patient (3.1%) had a grade II complication, in this case, a non life-threatening bleeding which required intraoperative blood transfusion. None of these necessitated an open conversion. There were no grades III or IV complication intraoperatively. Postoperative complications were categorized into minor or major based on Clavien-Dindo classification.(15) In the open group, there was no post-operative complication, but in the laparoscopic group, there were postoperative complications in 4 (12.5%) patients. Two of these were grade I (minor port-site infections), 1 was grade IIIa (a case of biliary ascites which resolved following ultrasound-guided percutaneous drainage under local anaesthesia) and the last was grade IIIb (a case of port-site metastasis which was managed with wide excision). All patients who had laparoscopic cholecystectomy showed evidence of bowel function within 24 hours of surgery and most (31 of 32 patients) were discharged by postoperative day 2. In contrast, it took an average of 2 days for satisfactory return of bowel function in the open surgery group and the mean length of hospital stay was 5.7 ± 1.2 days. On follow-up, the cosmetic outcome was subjectively determined both by the patients and members of the operating team to be better in the laparoscopy group both at 1 week and 4 weeks post-operatively. There was no mortality at 30-days following surgery.

IV. Discussion

The number of laparoscopic cholecystectomies done within the study period is small relative to western studies but is comparable to that of other local studies, reflecting a lower volume in our clime compared to more developed societies.(16) Factors responsible for this, include more prevalence of gallstones in western societies, greater availability, and accessibility of laparoscopic service. There are few laparoscopic surgeons in our environment and where available, the cost may be prohibitive for most patients to afford their services.(8) Interruption of surgical services during the study period occasioned by the COVID-19 pandemic may have also contributed to the low volume in this study.(17)

All the patients were offered both open and laparaoscopic cholecystectomy during preoperative counselling. Most patients opted for the laparoscopic procedure over the open approach. In contrast, all cholecystectomies done within the preceeding seven years in this institution were via the open approach. This suggests that laparoscopy is more appealing and/or acceptable to patients than open surgery.(18) When adequately informed, the typical patient prefers minimal access approach likely due to its advantages. Additionally, most of the patients were females and it is known that females have a bias for laparoscopy due to cosmetic concerns.(8) Few patients who desired laparoscopy ended up with open surgery due to financial reasons, but this should not lead to the conclusion that laparoscopy is more expensive. The initial cost of surgery may be more, but when the entire costs of treatment (direct and indirect) are considered, laparoscopic cholecystectomy has been shown to be cheaper than the open approach.(19,20) The cost of surgery, though highly subsidized in most public hospitals in Nigeria, is still beyond the reach of most people in this country largely due to a low per-capital income of the population(21) and grossly inadequate health insurance coverage.(22) Surgical patients are typically required to make of out-of-pocket payment for their treatment in our clime and this can potentially skew their decisions to a less-desired choice.

There was a female preponderance and the mean age of study participants was 45.9 years which is similar to findings by other authors in our setting.(4,8) Gallbladder disorders are generally known to have a female preponderance and have been observed to be common in the later stages of reproductive life,(23) similar to findings in this study. This may be related to pregnancy and female hormones.

Symptomatic gall stones and their complications make up the commonest indications for cholecystectomy in this study. These are likely the predominant pathology of the gall bladder in our settings. Misauno,(8) Ekwunife et al,(6) Adisa et al,(24) and Balogun et al(5) all reported similar findings. Laparoscopic cholecystectomy is known to take longer than the open procedure due to the greater number of procedural steps and the increased technical difficulty associated with each step, so the finding in this study is in keeping with others.(5,6) The operating time in laparoscopic procedures is highly variable, in keeping with differences in surgeon experience and learning curve.(8) However, when considered alongside other studies in our "low-volume environment", the mean duration of surgery is comparable to other authors(4,8) and is expected to reduce further with increasing institutional experience.(25)

Zero conversion was noted in this study, similar to reports by Olajide and colleagues who reported on a similar number of cases.(4) We concur with several authors who opine that conversion in laparoscopy is a reflection of sound surgical judgement and this need not be blurred by egoistic concerns when the prevailing situation necessitates open conversion.(26,27) In view of this, the zero conversion noted in this study is likely due to the small number involved, with most of the cases being uncomplicated. Most of the intraoperative complications noted in this study were minor events including cautery burns to the liver (4 cases) and gall bladder perforation (2 cases).

Significant bleeding that necessitated blood transfusion was seen in one patient and this was due to aberrant vascular anatomy in a patient with chronic hepatitis. This type of bleeding is always a potential hazard during laparoscopic procedures even in well-developed centers, with bleeding rates up to 8.6% reported in such centers.(28) Based on trends from more experienced centers, we expect that the occurrence of intraoperative complications will decline with increasing experience.(28)

As we anticipate an increase our case volume, we also anticipate more complex intraoperative events(27) and the need to develop a plan to mitigate these events when they do occur. Concerning the postoperative complications, endobag failure and subsequent contamination of the epigastric port site was likely responsible for the infective complications while the biliary leak was related to intraoperative haemorrhage similar to findings by Opitz and colleagues.(28) Surprisingly, the patient with biliary leak had a relatively normal recovery and was discharged after a few days but re-presented 10 days after discharge with progressive abdominal distension without features of peritonitis. On further evaluation, she was found to have developed biliary ascites which resolved following ultrasound-guided percutaneous drainage.

Earlier return of bowel function, earlier commencement of oral feeding postoperatively and earlier resumption of usual activities were noted in all patients that had laparoscopy compared to the open group. The length of hospital stay was also reduced compared to the open cholecystectomy group. These are all typical advantages of minimal access surgery as established by other studies.(18) Perhaps the most obvious advantage

of laparoscopy as perceived by patients is the scar outcome. It is our view that inspite of the initial cost of setting up a laparoscopic practice, maintenance of equipment, procurement of consumables and training of personnel, laparoscopy offers many advantages which are difficult to ignore. There was no mortality in this study, similar to other studies,(4,8,25) suggesting that routine laparoscopic cholecystectomy is safe in our environment.

V. Conclusion

Patients requiring cholecystectomy in our settings prefer the minimal access to the traditional open approach. Despite the challenges of our low-resource setting, we have demonstrated the feasibility of routine laparoscopic cholecystectomy in management of gall bladder disorders, as is being done in other parts of the world. Laparoscopic surgery is associated with a steep learning curve and takes longer to perform than open surgery. However, it offers an excellent operative view, quick return of bowel function, early discharge from hospital, early return to normal activities, and an excellent cosmetic outcome. The procedure is also, relatively safe. Based on the above, and in keeping with global trends, we predict an upward trajectory and expanding role for laparoscopy in our institution, going forwards.

Recommendation

We recommend further investment and expansion of available minimal access infrastructure and training across may centres in our subregion, to sustain the momentum of this current paradigm and explore newer grounds. This way we can fully leverage the benefits of minimal access technology for the good of our patients.

References

[1]. Spaner SJ, Warnock GL. A brief history of endoscopy, laparoscopy, and laparoscopic surgery. J Laparoendosc Adv Surg Tech - Part A. 1997;7(6):369–73.

[2]. Ekwunife CN, Chianakwana GU, Anyanwu SN, Emegoakor C. Pioneering laparoscopic surgery in South-eastern Nigeria: A two-center general surgery experience. Niger J Basic Clin Sci. 2012;9(2):75–8.

[3]. Reynolds W, Jr. The First Laparoscopic Cholecystectomy. J Soc Laparoendosc Surg. 2001;5:89–94.

[4]. Olajide T, Osinowo A, Balogun O, Afolayan M, Bode C, Atoyebi O. Experience with laparoscopic cholecystectomy in a tertiary hospital in Lagos, Nigeria. J Clin Sci. 2020;17(1):1–4.

[5]. Balogun OS, Osinowo AO, Olajide TO, Lawal AO, Adesanya AA, Atoyebi OA, et al. Development and practice of laparoscopic surgery in a Nigerian tertiary hospital. Niger J Clin Pr. 2020;23:1368–74.

[6]. Ekwunife CN, Nwobe O. First 100 laparoscopic surgeries in a predominantly rural Nigerian population: A template for future growth. World J Surg. 2014;38(11):2813–7.

[7]. Ray-Offor E, Okoro P, Gbobo I, Allison A. Pilot study on laparoscopic surgery in Port-Harcourt, Nigeria. Niger J Surg. 2014;20(1):23–5.

[8]. Misauno M. Pilot experience with laparoscopic cholecystectomy in Jos, Nigeria - challenges and prospects. J West African Coll Surg. 2011;1(3):37–43.

[9]. Adisa AO, Lawal OO, Arowolo OA, Akinola DO. Laparoscopic cholecystectomy in Ile-Ife, Nigeria. Afr J Med Sci. 2011;40(3):221–4.

[10]. Kumar M, Agrawal CS, Gupta RK. Three-port versus standard four-port laparoscopic cholecystectomy: a randomized controlled clinical trial in a community-based teaching hospital in Eastern Nepal. J Soc Laparoendosc Surg. 2007;11:358.

[11]. Taye MK, Fazal SA, Pegu D, Saikia D. Open versus closed laparoscopy: yet an unresolved controversy. J Clin Diagnostic Res. 2016;10(2):4–7.

[12]. Visser BC, Parks RW, Garden OJ. Open cholecystectomy in the laparoendoscopic era. Am J Surg. 2008;195(1):108–14.

[13]. Daabiss M. American Society of Anaesthesiologists physical status classification. Indian J Anaesth. 2011;55(2):111–5.

[14]. Kinaci E, Sevinc MM, Bayrak S, Erdoğan E, Ozakay A, Sari S. Is the Classification of Intraoperative Complications (CLASSIC) related to postoperative course? Int J Surg. 2016;29:171–5.

[15]. Dindo D, Demartines N, Clavien P. Classification of surgical complications. A new proposal with evaluation in a cohort of 6336 patients and results of a survey. Ann Surg. 2004;240(2):205–13.

[16]. Adisa A, Lawal O, Adejuyigbe O. Trend over time for cholecystectomy following the introduction of laparoscopy in a Nigerian tertiary hospital. Niger J Surg. 2017;23:102–5.

[17]. Omolabake BI, Ugwu BT, Abiodun AA, Agbo CA, Akintayo AJ, Olori S, et al. Overview of the effect of COVID-19 pandemic on residency training in surgery and related specialties in North-Central Nigeria. J Adv Med Med Res. 2020;32(23):126–31.

[18]. Shamiyeh A, Wayand W. Laparoscopic cholecystectomy: Early and late complications and their treatment. Langenbeck's Arch Surg. 2004;389(3):164–71.

[19]. Zacks S, Sandler R, Rutledge R, Brown R. A population-based cohort study comparing laparoscopic cholecystectomy and open cholecystectomy. Am J Gastroenterol. 2002;97(2):334–40.

[20]. Fajardo R, Valenzuela JI, Olaya SC, Quintero G, Carrasquilla G, Pinzón CE, et al. Cost-effectiveness of laparoscopic versus open cholecystectomy. Biomedica. 2011;31(4):514–24.

[21]. Alimi OY, Fagbohun AC, Abubakar M. Is population an asset or a liability to Nigeria's economic growth? Evidence from FM-OLS and ARDL approach to cointegration. Futur Bus J. 2021;7(20):1–12.

[22]. Sustainability of state health insurance schemes in Nigeria: beyond the launch [Internet]. [cited 2021 Sep 25]. Available from: https://www.pwc.com/ng/en/assets/pdf/sustainability-state-health-insurance-nigeria.pdf

[23]. Stinton LM, Shaffer EA. Epidemiology of gallbladder disease: cholelithiasis and cancer. Gut Liver. 2012;6(2):172–87.

[24]. Adisa A, Lawal O, Alatise O, Adesunkanmi A. An audit of laparoscopic surgeries in Ile-Ife, Nigeria. West Afr J Med. 2011;30(4):273–6.

[25]. Misauno MA, Ojo EO, Uba AF. Laparoscopic paediatric surgery: A potential for paradigm shift in developing countries. African J Paediatr Surg. 2012;9(2):140–2.

[26]. Wakabayashi G, Iwashita Y, Hibi T, Takada T, Strasberg SM, Asbun HJ, et al. Tokyo Guidelines 2018: surgical management of

acute cholecystitis: safe steps in laparoscopic cholecystectomy for acute cholecystitis (with videos). J Hepatobiliary Pancreat Sci. 2018;25:73–86.
[27]. Z'graggen K, Wehrli H, Metzger A, Buehler M, Frei E, Klaiber C. Complications of laparoscopic cholecystectomy in Switzerland: A prospective 3-year study of 10,174 patients. Surg Endosc. 1998;12(11):1303–10.
[28]. Opitz I, Gantert W, Giger U, Kocher T, Krähenbühl L. Bleeding remains a major complication during laparoscopic surgery: analysis of the SALTS database. Langenbeck's Arch Surg. 2005;390(2):128–33.

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