

# Conversion and complications of elective laparoscopic cholecystectomy in a West African population

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## Background

Laparoscopic cholecystectomy (LC) is increasingly adopted in Nigeria, but the procedure is limited due to the low incidence of gallstone diseases. This study aims to determine the incidence of conversion and complications following elective LC.

## Patients and methods

Consecutive patients undergoing elective LC at the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria, were the participants. Patients' preoperative characteristics including ultrasonographic findings, instances of conversions, and intraoperative and postoperative complications were documented. The influence of gallbladder wall thickness on the outcome was analyzed.

## Results

There were 150 patients, including 124 (82.7%) women and 26 (17.3%) men aged 18–82 years (mean=45.4, SD=13.38). Indications for LC were chronic calculous cholecystitis in 101 (67.3%), 45 (30%) acute calculous cholecystitis, whereas four (2.7%) had acalculous cholecystitis. Gallbladder wall thickness was normal ( $\leq 3$  mm) in 98 (65.3%), thick (4–9 mm) in 35 (23.6%), and very thick ( $\geq 10$  mm) in 17 (11.3%) patients, whereas 11 patients had pericholecystic fluid collection. Gallbladder mucocele was encountered in nine (6%), empyema in six (4%), and gangrenous gallbladder in two (1.3%) cases. Ten (6.7%) procedures were converted to laparotomy including two patients with hemoglobinopathies. Postoperatively, bile leaks occurred in two patients, bleeding requiring reexploration in one, and bile duct dilatation after 4 months in one patient. Acute cholecystitis, hemoglobinopathy, and thickened gallbladder wall significantly influenced conversions and occurrence of complications in this series.

## Conclusion

We observed a low rate of conversion and complication following LC. Acute cholecystitis and thickened gallbladder wall significantly influence the conversion of LC to open procedure in our setting.

## Keywords:

cholecystectomy, conversion, laparoscopy

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## Introduction

Laparoscopy cholecystectomy (LC) is the treatment of choice for gallstone diseases and is the flagship procedure for minimally invasive surgeries having been proven to clearly demonstrate most of the recognized advantages [1,2]. Initially, LC was commonly adopted for the treatment of chronic cholecystitis due to the challenges of inflammation in acute cholecystitis but over time, early or delayed LC became the procedure of choice for acute cholecystitis with several guidelines and recommendations guiding its adoption and safe deployment [3,4]. In both acute and chronic conditions, LC can be attended by intraoperative challenges that may necessitate conversion to open laparotomy or postoperative complications [5].

Different rates of conversion and complications of LC have been reported in the literature. A review of 4105

LC in a large-volume center reported a conversion rate of 24% for patients with acute cholecystitis compared with 3.4% for uncomplicated gallstone diseases [6]. In other studies with mixed patient populations of acute and chronic cholecystitis, conversion rates ranged from 6.5 to 25% [7–9] with a higher rate consistently reported when signs of acute inflammation are overtly present at operation.

Gallstones are of low prevalence in Nigeria [10,11] and LC was introduced in many public hospitals only in the past decade. The numerous advantages previously documented in the literature have been equally

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reported in many centers across the country [12–14]. This has led to increased adoption of LC with widening indications and adoption of the technique for cases of acute cholecystitis and its complications, which were previously reserved for open operation in our setting. Our center receives referral from many parts of Nigeria and has consistently performed LC since 2009 [15]. Therefore, this study was carried out to highlight the causes of conversion and types of complications of the procedure in our setting.

## Patients and methods

This was a retrospective chart review of consecutive patients undergoing elective LC at the Ife Hospital Unit of the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria, from January 2010 through December 2016. Indications for LC include symptomatic gallstones, acute cholecystitis and recently treated biliary pancreatitis. Diagnosis of acute cholecystitis was established by clinical parameters of upper quadrant abdominal pain and tenderness, positive Murphy's sign, elevated temperature, and ultrasound findings suggestive of acute inflammation. Patients with common bile duct stones were excluded.

Preoperative ultrasound was carried out in all cases. Gallbladder wall thickness was classified as normal if less than or equal to 3 mm, thick if 4–9 mm, and very thick when more than or equal to 10 mm. The presence of pericholecystic fluid was equally sought and documented.

All procedures were performed by the first author and the four-port technique was adopted in all cases. During dissection of the Calot's triangle, the Critical View of Safety (CVS) was ensured before clipping and division of structures and inability to attain the view was an indication for conversion.

Postoperative events including postoperative complications were documented. Data generated were entered into a personal computer using the SPSS, version 21 for Windows (SPSS Inc., Chicago, Illinois, USA). Patients who had conversion to open laparotomy and those with intraoperative or postoperative complications were grouped together and compared with those who had laparoscopy without complications or conversions. We performed univariate analyses using the  $\chi^2$ -test and a *P* value of less than 0.05 was considered statistically significant.

This review was approved by the Ethics and Research Committee of our hospital.

## Results

A total of 150 patients had LC within the period. There were 124 (82.7%) women and 26 (17.3%) men aged 18–82 years (mean=45.4, SD=13.38). BMIs ranged from 22.3 to 48.2 kg/m<sup>2</sup> with the majority (81 of 150; 54%) having a BMI of greater than 30 kg/m<sup>2</sup>. Twelve (8%) of the patients in our series have hemoglobinopathies including hemoglobin SS (HbSS) and SC (HbSC). The duration of right upper abdominal pain ranged from 2 weeks to 72 months with a median of 6 months.

Indications for LC were chronic calculous cholecystitis in 101 (67.3%), 45 (30%) acute calculous cholecystitis, whereas four (2.7%) had acute acalculous cholecystitis. On preoperative ultrasound, gallbladder wall thickness was normal ( $\leq 3$  mm) in 98 (65.3%), thick (4–9 mm) in 35 (23.6%), and very thick ( $\geq 10$  mm) in 17 (11.3%) patients, whereas 11 patients had pericholecystic fluid collection. At operation, gallbladder mucocele was encountered in nine (6%), empyema in six (4%), and gangrenous gallbladder in two (1.3%) cases.

Ten (6.7%) procedures were performed for acute cholecystitis in five patients and chronic cholecystitis in another five was converted to open laparotomy. Specifically, conversion occurred in five of 49 patients with acute cholecystitis (10.2%) compared with five (4.95%) of 101 patients with chronic cholecystitis. Reasons for conversion include markedly contracted gallbladder (three patients), inability to attain critical view of safety (three patients), undue bleeding from the gallbladder bed (one patient), suspected bile duct injury (one patient), and equipment failure (two patients). Postoperatively, four complications were recorded including one in a patient with acute cholecystitis and three in patients with chronic calculous cholecystitis. Bile leaks occurred in three patients, two were transient, and resolved spontaneously with drainage, whereas one patient had laparotomy and repair of common bile duct injury over a T-tube. One patient had bleeding into the drain few hours after surgery and had open exploration for fulguration of the gallbladder bed. Bivariate analysis of factors influencing occurrence of intraoperative conversion and postoperative complications revealed that age and BMI were not significant, whereas female sex ( $P < 0.001$ ), acute cholecystitis ( $P = 0.03$ ), and hemoglobinopathy ( $P < 0.001$ ) were significant (Table 1). Preoperative ultrasound finding of the pericholecystic fluid and contracted gallbladder were not significant

but a thickened gallbladder wall significantly influenced conversions and occurrence of complications in this series ( $P < 0.001$ ) as shown in Table 2.

## Discussion

Gallstones are of low prevalence in many West African countries; thus, many patients with upper abdominal pain get repeated evaluation and treatment for the more common peptic ulcer disease conditions, whereas a number of older general practitioners still believe gallstones are best left alone. The combination of patient and physician delays result in many patients having several episodes of acute cholecystitis before being referred for surgery. The median duration of recurrent right upper abdominal pain in this cohort is 6 months and many patients presented with thickened or contracted gallbladders and multiple dense adhesions as depicted in Fig. 1. Hadad *et al.* [16]

**Table 1 Preoperative patient characteristics**

	Uneventful laparoscopic cholecystectomy	Conversions/ complications	P value
Age (years)			
<45	72	9	0.058
45–65	52	5	
>65	12	0	
Sex			
Male	25	1	<0.001
Female	111	13	
BMI (kg/m <sup>2</sup> )			
<25	25	2	0.062
25–30	38	4	
>30	73	8	
Chronic cholecystitis	93	8	0.03
Acute cholecystitis	43	6	
Hemoglobin electrophoresis			
HbSS/	10	2	<0.001
HbSC			
HbAA	126	12	

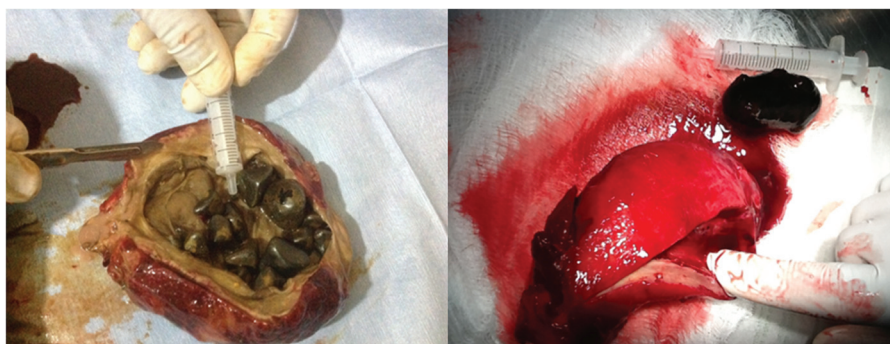
have previously reported the increased conversion rate in LC for acute cholecystitis when patients delay presentations, whereas Cwik *et al.* [6] noted that delayed presentation beyond 3 days increases the chance of conversion by five-fold. Another study observed that difficulties during LC including conversion were higher among patients who had three and more episodes of cholecystitis before presentation to surgeons [17]. We are of the opinion that long-term delays influence the outcome of patients treated for chronic cholecystitis.

We observed a conversion rate of 6.7% in this study. This cohort includes those with high risk of conversion as well as those with uncomplicated gallstones. A conversion rate of 10.2% recorded in acute cholecystitis was significantly higher than 4.95% recorded in chronic cholecystitis similar to previous reports from many centers across the world [7,16]. Our reasons for conversion, including the inability to attain Critical View of Safety (CVS), markedly contracted gallbladder and undue bleeding are common to many previous studies [18]. Studies of patients with acute cholecystitis highlight adhesions and difficulty identifying anatomic structures as the commoner indications for conversion [6,16], compared with inability to attain CVS and contracted gallbladder which are more

**Table 2 Preoperative ultrasound findings**

	Uneventful laparoscopic cholecystectomy	Conversions/ complications	P value
Pericholecystic fluid collection	7	4	0.654
Contracted gallbladder	6	7	0.875
Preoperative gallbladder wall on ultrasound			
Normal (<3 mm)	96	2	<0.001
Thick (4–9 mm)	31	4	
Very thick (≥10 mm)	9	8	

**Figure 1**



Markedly thickened gallbladder wall necessitating conversion to open procedure.

commonly reported among patients treated for chronic cholecystitis [19].

Preoperative ultrasound findings have been shown to influence the outcome of elective LC significantly. Nidoni *et al.* [17] showed that the presence of pericholecystic fluid and a thickened gallbladder wall doubles the risk for conversion to open laparotomy. Another study with a large patient population identified a higher rate of pericholecystic fluid collection and gallbladder wall thickening on preoperative ultrasound among patients requiring conversion than those who had LC completed [6]. Other ultrasound findings reported to be significant predictors of conversion includes impacted stones in the gallbladder neck [20] and contracted gallbladder [21]. In our series, only the presence of a thick gallbladder wall on preoperative ultrasound significantly influenced the conversion and occurrence of complications in our patients. This may be due to the limited number of patients we have studied. Previous studies have identified the other risk factors for conversion to include obesity, male sex, age older than 60 years, previous abdominal surgeries and acute cholecystitis [17,22–24]. A recent retrospective review of HbSS patients undergoing LC in Jamaica reported 28% conversion rate among them [25]. In our study, hemoglobinopathy was associated with a 20% conversion rate compared with the 6.7% overall conversion we observed. Patients with hemoglobinopathies often present late in our setting due to the low threshold of prescription of potent analgesics for them at some secondary level of care. Thus, two HbSS patients presented with gangrenous gallbladders and two others had markedly contracted gallbladders and this along with the difficult visualization associated with the gross hepatomegaly in them produced significant technical difficulties leading to the conversions in them. Also a few studies have identified male sex as a significant factor influencing conversion [17,23]. This is different from the findings of our study where female sex was more associated with conversion and complications. The two studies however included a higher proportion of male patients (36 and 49%) than our study (17% male sex).

Our study is limited by the small number of patients requiring cholecystectomy in our setting, with our series being the largest of any public hospital in our densely populated country. Some large tertiary hospitals have reported only two to five cholecystectomies a year. As many more centers are adopting LC, we are hopeful that more cases will be performed and we may look forward to a prospective multicenter study in the near future.

## Conclusion

We have observed a low rate of conversion and complication of LC in our setting even with the low prevalence of gallstone diseases. A diagnosis of acute cholecystitis, female sex and hemoglobinopathy along with preoperative ultrasound finding of thickened gallbladder wall significantly influenced the outcome of elective LC in our setting.

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## Conflicts of interest

There are no conflicts of interest.

## References

- Cushieri A, Dubios F, Mouiel J. The European experience with laparoscopic cholecystectomy. *Am J Surg* 1991; 161:385–388.
- Keus F, de Jong JA, Gooszen HG, van Laarhoven CJ. Laparoscopic versus open cholecystectomy for patients with symptomatic cholelithiasis. *Cochrane Database Syst Rev* 2006; 4:CD006231.
- Assaff Y, Matter I, Sabo E, Mogilner J, Nash E, Abrahamson J, Eldar S. Laparoscopic cholecystectomy for acute cholecystitis and the consequences of gallbladder perforation, bile spillage, and loss of stones. *Eur J Surg* 1998; 164:425–431.
- Siddiqui T, MacDonald A, Chong PS, Jenkins JT. Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: a meta-analysis of randomized clinical trials. *Am J Surg* 2008; 195:40–47.
- Duca S, Bala O, Al-Hajjar N, Iancu C, Puia IC, Munteanu D, Graur F. Laparoscopic cholecystectomy: incidents and complications. A retrospective analysis of 9542 consecutive laparoscopic operations. *HPB* 2003; 5:152–158.
- Cwik G, Skoczylas T, Wyrosiak-Najs J, Wallner G. The value of percutaneous ultrasound in predicting conversion from laparoscopic to open cholecystectomy due to acute cholecystitis. *Surg Endosc* 2013; 27:2561–2568.
- Licciardello A, Arena M, Nicosia A, di Stefano B, Cali G, Arena G, Minutolo V. Preoperative risk factors for conversion from laparoscopic to open cholecystectomy. *Eur Rev Med Pharmacol Sci* 2014; 18 (Suppl 2):60–66.
- Teckchandani N, Garg PK, Hadke NS, Jain SK, Kant R, Mandal AK, Bhalla P. Predictive factors for successful early laparoscopic cholecystectomy in acute cholecystitis: a prospective study. *Int J Surg* 2010; 8:623–627.
- Chahin F, Elias N, Paramesh A, Saba A, Godziachvili V, Silva YJ. The efficacy of laparoscopy in acute cholecystitis. *JLS* 1999; 3:121–125.
- Ibitoye BO, Adisa AO, Makinde ON, Ijarotimi AO. Prevalence and complications of gallstone disease among pregnant women in a Nigerian hospital. *Int J Gynecol Obstet* 2014; 125:41–43.
- Asuquo ME, Umoh MS, Nwagbara V, Inyang A, Agbor C. Cholecystectomy: indications at University of Calabar Teaching Hospital, Calabar, Nigeria. *Ann Afr Med* 2008; 7:35–37.
- Adisa AO, Lawal OO, Arowolo OA, Alatise OI. Local adaptations aid establishment of laparoscopic surgery in a semi-urban Nigerian Hospital. *Surg Endosc* 2012; 27:390–393.
- Ekwunife CN, Njike CI. Intent at day case laparoscopic cholecystectomy in Owerri, Nigeria: initial experiences. *Niger J Surg* 2013; 19:16–19.
- Ayandipo O, Afuwape OO, Olonisakin R. Laparoscopic cholecystectomy in Ibadan, south west Nigeria. *J West Afr Coll Surg* 2013; 3:15–26.
- Adisa AO, Lawal OO, Arowolo OA, Akinola DO. Laparoscopic cholecystectomy in Ile-Ife, Nigeria. *Afr J Med Med Sci* 2011; 40:221–224.
- Hadad SM, Vaidya JS, Baker L, Koh HC, Heron TP, Thompson AM. Delay from symptom onset increases the conversion rate in laparoscopic cholecystectomy for acute cholecystitis. *World J Surg* 2007; 31:1298–1301.
- Nidoni R, Udachan TV, Sasnur P, Baloorkar R, Sindgikar V, Narasangi B. Predicting difficult laparoscopic cholecystectomy based on clinicoradiological assessment. *J Clin Diagn Res* 2015; 9:PC09–P C12.

- 18 O'Leary DP, Myers E, Waldron D, Coffey JC. Beware the contracted gallbladder – ultrasonic predictors of conversion. *Surgeon* 2013; 11:187–190.
- 19 Van der Steeg HJ, Alexander S, Houterman S, Slooter GD, Roumen RM. Risk factors for conversion during laparoscopic cholecystectomy-experience from a general teaching hospital. *Scand J Surg* 2011; 100:169–173.
- 20 Lal P, Agarwal PN, Malik VK, Chakravarti AL. A difficult laparoscopic cholecystectomy that requires conversion to open procedure can be predicted by preoperative ultrasonography. *JLS* 2002; 6:59–63.
- 21 Soltes M, Radonak J. A risk score to predict the difficulty of elective laparoscopic cholecystectomy. *Wideochir Inne Tech Maloinwazyjne* 2014; 9:608–612.
- 22 Yol S, Kartal A, Vantansev C, Aksay F, Toy H. Sex as a factor in conversion from laparoscopic cholecystectomy to open surgery. *JLS* 2006; 10:359–363.
- 23 Rosen M, Brody F, Ponsky J. Predictive factors for conversion of laparoscopic cholecystectomy. *Am J Surg* 2002; 184:254–258.
- 24 Chandio A, Timmons S, Majeed A, Twomey A, Aftab F. Factors influencing the successful completion of laparoscopic cholecystectomy. *JLS* 2009; 13:581–586.
- 25 Leake PA, Reid M, Plummer J. A case series of cholecystectomy in Jamaican sickle cell disease patients – the need for a new strategy. *Ann Med Surg* 2017; 15:37–42.