ORIGINAL ARTICLE

Laparoscopic Subtotal Cholecystectomy: Our Experience

George C Obonna[1], Martin C Obonna[2], Rajneesh K Mishra[3]

Abstract

Background: The gold standard for gallbladder (GB) surgery worldwide is laparoscopic cholecystectomy. At the same time, complications that may arise from performing cholecystectomy can be horrifying. This is because in some cases, the complex anatomy can predispose the patient to the dangerous arteriovenous and biliary injuries. A subtotal cholecystectomy (STC) can, thus, obviate these complications.

Aim: To examine the clinical spectrum of STC and the postoperative turnout of this procedure.

Materials and methods: Our health management information system was used to collate our 10-year data (January 2010–January 2020) from the secondary and tertiary health facilities owned by Ondo State of Nigeria. Information on patients' biodata, indication for surgery, surgical approach, laboratory evaluation, and radiological assessment was entered into a spreadsheet and analyzed using Statistical Package for the Social Sciences (SPSS) version 20 (OBM Incorporation).

STC occurs when there is a remnant of the GB after GB surgery exclusive of the cystic duct.

Results: A total of 60 (15%) out of 400 patients underwent laparoscopic STC. Closely compacted, complexly crowded constituents and adhesions at the Calot's triangle were the main indications for STC. Ten patients (16.7%) had bile leakage after surgery. There were no biliovascular injuries, and 1-month mortality was zero.

There was no case of surgical site infection. Over a consistent follow-up of 1 year, clinical examination, liver function test, and ultrasonography revealed no abnormality in any of the patients.

Conclusion: STC is a rescue mission during difficult GB surgery. Early consideration for STC before conversion to open surgery is more acceptable. Intraoperative injuries are obviated, and the postoperative outcomes are satisfactory.

Keywords: Biliovascular injury, STC.

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Introduction

The popular procedure of cholecystectomy even performed by laparoscopy is not devoid of the dangerous complications of biliovascular injury. Despite innovation in the management of biliary disease and the current approach using indocyanine fluorescent imaging, the rates of intraoperative injury to structures at the Calot's triangle remain consistent. Figure 1 depicts the procedure of laparoscopic cholecystectomy.

Conditions that predispose to serious complications at total cholecystectomy include empyema gallbladder (GB), frozen Calot's triangle, sessile GB, short/wide cystic duct, and biliovascular anomalies. In these situations, a resort to open cholecystectomy may not improve the plane of dissection, and there still exists the complication of biliovascular injuries. Various authors have demonstrated biliovascular injuries despite conversion to open cholecystectomy.[1–3] Subtotal cholecystectomy (STC) thus provides the window for removing the GB without subsequent destruction of surrounding structures. It was in 1995 that madding provided the term of STC in three cases and further description of the safety of the procedure was done by Bornman and Terbanch, and Michalowski et al. They described the steps of laparoscopic STC.[4,5]

The definition of STC, which is the inability of a surgeon to safely divide the cystic duct which is not accepted, was provided by Lidsky et al.[6] and classification types of STC by Palanivelu et al.,[7] Shin et al.,[8] and Strasberg et al.[9] Figure 1 elucidates the steps in laparoscopic STC. In our study, we evaluated our 10 years of STC.

[1]Department of Surgery, University of Medical Sciences, Ondo, Nigeria

[2]Faculty of Basic Medical Sciences, ABSU, Uturu, Nigeria

[3]World Laparoscopy Hospital, Gurugram, Haryana, India

Corresponding Author: George C Obonna, Department of Surgery, University of Medical Sciences, Ondo, Nigeria, Phone: +2348038584310, e-mail: obonnadr@gmail.com

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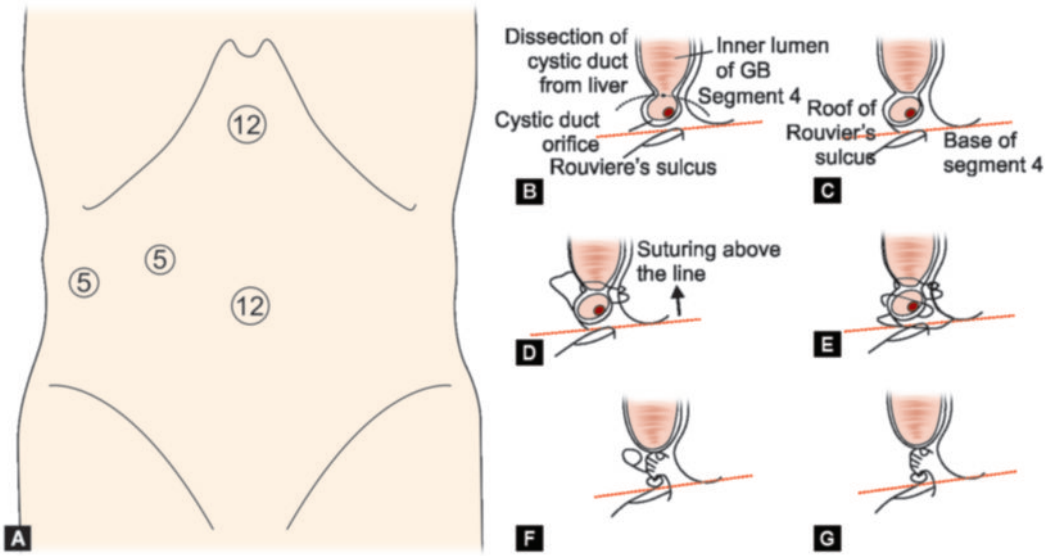
Materials and Methods

This is a retrospective, descriptive cross-sectional study. Our health management information system provided data from January 2010 to January 2020. Cases of cholecystectomy were evaluated. STC in our research was defined as leaving behind any portion of the GB other than the cystic duct. The follow-up data of the cases were noted, and all the patients had abdominal ultrasonography (USG) and liver function test (LFT). The primary aim of the study is to evaluate the turnout of STC, demographics, indications, and surgical method.

The patients evaluated are those who do not have concurrent common bile duct stone confirmed by appropriate imaging.

All patients who required an STC had their GB opened and remnant cleared of any stones during the surgery. The remnant



Figs 1A to G: Port placement for LSC and surgical procedures of LSC. (A) The scopist used the umbilical port and main surgeon stood left side of the patient; (B) Making incision on the GB and identification of cystic duct orifice from the inner lumen of GB leaving a part of GB wall on the liver bed. Dissection of cystic duct from the liver; (C) Isolation of cystic duct and identification of the line between the base of Segment 4 and the roof of Rouviere's sulcus; (D to G) Suture using an absorbable 3–0 V-Loc above the line

mucosa was ablated using the coagulation mode of electrosurgical unit.

The amount of GB left behind was minimum in which a safe transection away from hilar structures could be performed. We did not proceed to objective measurement of the remnant.

Results

Four hundred patients underwent cholecystectomy for gallstone disease in our hospital from January 2010 to January 2020. Of the 300 patients who had laparoscopic cholecystectomy, 200 patients (66.6%) had undergone total cholecystectomy while 60 patients (20.0%) had STC. The remaining 40 patients who had laparoscopic cholecystectomy were converted to open procedure in view of the anticipated difficulty, advanced age, and comorbidities precluding general anesthesia (Tables 1 and 2).

Adhesions and inability to delineate the Calot's triangle anatomy were the most common reasons for an STC, and atrophy hypertrophy complex causing hilar rotation and a branch of high hepatic artery running parallel to GB wall and entering the liver also constituted an indication for STC. In 43 patients, the remnant GB was tackled with interrupted sutures, while in 15 patients, a purse string was used.

The endoscopic cutting stapler was used in two patients (Fig. 2). Vicry1 (polyglactin 90) was used as the suture material.

Drains were placed in all but three patients. Ten patients (16.7%) had a bile leakage in the postoperative period. Nine were managed conservatively with a wait-and-watch policy.

One patient required laparotomy. There were no biliary/vascular injuries, and 1-month mortality was zero. There was no case of surgical site infection (SSI).

In the long term, all the patients were assessed over a period of 1 year by clinical examination, LFT, and USG. Except for one patient who had mild epigastric pain, no abnormality was detected in any of the patients.

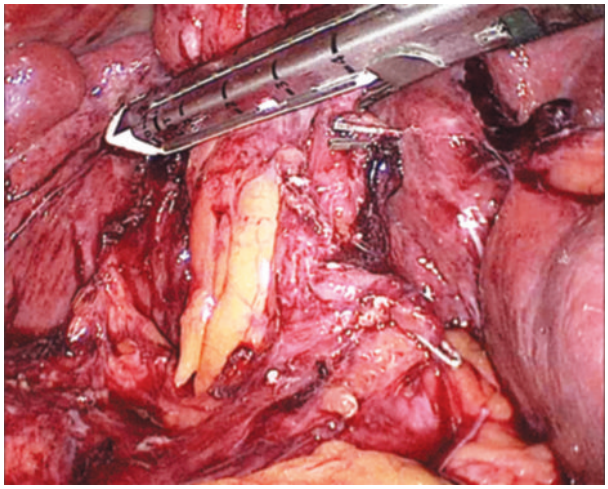


Fig. 2: Stapled STC performed in an unclear Carlot's anatomy.

Discussion

The possibility of biliovascular injury at the time of cholecystectomy cannot be overlooked. These injuries can thus increase the morbidity and mortality after biliary surgery. An STC has been shown to prevent such disaster.

Males constituted the most in this study correlating with available data worldwide, advanced age and male sex being the predictors of difficult cholecystectomy. The rate of STC (20%) was profoundly high compared to that reported (3.3%) by Chowbey et al.[10,11] This is in keeping with the extended catchment of our health facility.

The most common reason for STC, that is, dense adhesions due to chronic inflammation, is in keeping with the results of reviews by Elshaer et al. and Henneman et al. independently.[12,13]

Table 1: Demographic profile of STC patients

Age	*n = 60*
<40	8
40–49	10
50–59	12
60–69	20
>70	10
Gender	
Male	40
Female	20

Table 2: Operative findings and tackling remnant of GB

Indications for STC	*n = 60*
Dense adhesions/frozen Calot's triangle	34
High insertion/short or wide cystic duct	5
Intrahepatic GB	5
GB perforation/empyema	
Mirizzi	4
Collaterals on GB wall	3
Others	2
Methods of closure of remnant	
Interrupted suture	43
Purse-string suture	15
Stapler	2

Conversion to an open procedure may not prevent biliovascular injury.[14]

We had no case of biliary damage. Taking an early decision for an STC can obviate the danger of injury and very often prevent unnecessary conversion to open procedure.

Ten (16.7%) out of 60 patients developed a bile leakage and were managed effectively by watchful waiting except one who had laparotomy because he developed biliary peritonitis. We discovered a nidus of remnant GB for that patient, and peritoneal lavage and drainage was done.

None of our patients developed a wound infection. Meta-analysis by Elshaer et al. showed that laparoscopic STC had lower rates of intra-abdominal collections, SSI, or reoperation rate. From our experience, STC via the laparoscopic approach whenever we can in case of difficulty gives faster recovery, less chances of SSI, and acceptable long-term outcomes. Studies by Van Dijk et al.[15] are in keeping with our findings.

Removing the majority of the distensible portion of the GB prevents any further stagnation/saturation of bile. It can be argued that a remnant GB might have been missed on ultrasonography imaging. We, however, preferred not subjecting our patient to cross-sectional imaging in the absence of any symptoms or biochemical abnormalities. In the general population, 80% of the diseased GBs are asymptomatic, and it cannot be justified to subject them to any kind of investigation or treatment.[16]

Regarding the risk of neoplasia, the mere presence of gallstones is not a risk factor for malignancy. It may be argued that with the removal of the offending agent, further inflammation may subside. There remains a risk of recurrent stone; however, it would be preferable to manage a remnant GB than a biliary cripple.

We conclude that STC is a useful alternative during the difficult GB surgery. Due consideration for STC must be given initially before rushing to the conclusion of conversion to an open procedure. STC averts biliovascular injuries. The short-term and later outcomes of STC are encouraging.

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