

## **Research Article**

# **Open minimally invasive cholecystectomy in Khartoum North Teaching Hospital, Sudan**

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**Abstract:** The laparoscopic approach is the procedure of choice for cholecystectomy, but the cost of such an operation is very high and has a higher risk of biliary injury when compared with conventional open cholecystectomy. Open cholecystectomy through a small incision (Mini-cholecystectomy) is an alternative to other mean of cholecystectomies. The objective was to evaluate a single unit result of cholecystectomy through 3-5 cm incision for treatment of gallstones diseases in terms of length of surgery, complications, hospital stay and operator. We conducted a prospective cross-sectional study from 1 January 2006 through 31 December 2009. All operations upon the gallbladder in our surgical unit in Khartoum North Teaching Hospital with elective admission and responsibility for surgical training were done as intended small-incision open cholecystectomy. Ethical clearance was obtained prior to conduct this study. Data were managed statistically using SPSS computer package for window version 21. It included 103 patients (87 females and 16 males) with female to male ratio of 5.4:1. Their mean age was  $\pm$  years. All patients were treated by mini-incision 3-5 cm approach (42.7% by consultant and 57.3% by registrar). The incidence of operative complications was 3.9% (bleeding, and bile leak). Complication was affected by gender, but not affected by age of the patients and the operator as p was 0.04, 0.8, and 0.06 respectively. No mortality was recorded. Mean postoperative analgesia was  $3.4 \pm 1.7$  doses. Mean postoperative hospital stay was  $1.3 \pm 0.9$  days (range, 1-6 days). Cholecystectomy through mini-cholecystectomy is a safe procedure. It may be recommended as a procedure of choice where laparoscopic facilities are not available. However, we need more sample sizes in the future to conclude its' accurate benefit.

**Keywords:** Gall bladder stone disease; Mini- cholecystectomy (MC)

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## **INTRODUCTION**

Biliary diseases constitute a major portion of digestive tract disorders worldwide [1], with cholelithiasis being one of the major international health problem and over 1000,000 cholecystectomies are performed each year [2].

Historically cholecystectomy has been done through a T-shaped 7–10 cm incision that cuts the majority of rectus muscle [3]. The credit of performing first ever cholecystectomy goes to Carl-Langenbueh, who performed it on 15th July 1882 at the Lazaruskrankenhas in Berlin on a -12 years old man [4].

Since then seven further incisions for cholecystectomy have been described, of these most commonly used are the right paramedian and Kocher sub-costal incision [3]. Thereafter many attempted small incisions with quite encouraging results were described. Recently, more and more surgeons have shown inclination towards minimally invasive procedure [5].

Nowadays, laparoscopic cholecystectomy (LC) is the preferred method and it is becoming standard for cholecystectomy. Unfortunately, this method is not suitable for developing countries because of its high operative cost and need for complicated, expensive instruments, and experienced surgeons, and it has a higher risk of biliary injury than in open cholecystectomy [6].

Mini-cholecystectomy is a minimally invasive surgical procedure for gallbladder diseases performed through 4–6 cm subcostal incision, was first described more than three decades ago by Dubios and Berthelot [7]. It reduces the hospital stay and patients has a small scar on the abdomen but require surgical experience and good assistance [8]. Studies documented that the health-care costs are lower after mini-cholecystectomy than after other modalities of cholecystectomy [9-13].

Against this background it was appropriate to assess open small-incision cholecystectomy as a treatment for all patients with gallstone disease treated in our surgical

unit in Khartoum North Teaching Hospital, a unit with responsibility for surgical training.

## MATERIAL AND METHODS

The prospective cross-sectional study was conducted in a single unit of General Surgery, Khartoum North Teaching Hospital from January 2006 to January 2009. The data of all the patients with gallstone disease that confirmed with ultrasound and treated by minimally invasive mini-cholecystectomy was analyzed for age, sex, postoperative hospital stay, operator and postoperative complications after acceptance of informed consent. Those having treated by laparoscopic method or conventional approach were excluded from the study. All the baseline investigations, cardiac, and anaesthetics clearance were taken a day before surgery.

Procedure done with a personal standardized technique for MC was established in our unit since 5 years. Under general anaesthesia and patients being in supine position. The incision was started approximately 4 cm to the right of the midline and ran obliquely parallel to and 3 cm below the right costal margin. The initial length of the incision was either 3 or 4 cm, depending on the size of the patient; it was extended if necessary but did not exceed 6 cm. The wound deepened thoroughly and rectus muscle was cut with diathermy, after which the gallbladder is usually visualized and adhesions or other anomalies are ruled out. Gall bladder was grasped with the sponge holding forceps and freed of any adhesions. Two small abdominal packs were put into the abdominal cavity in order to push the stomach, duodenum, colon and omentum away from the gall bladder. Two small Deaver's retractors were placed on the abdominal packs and mentioned structures retracted. Liver, if required was retracted headway with small retractor. The Calot's triangle is then dissected and cystic duct and cystic artery are identified and divided between ligatures. The gallbladder is next freed from its fossa in the liver using blunt finger dissection or electrocautery whenever needed. In a patient with a markedly distended gallbladder, decompression of the gallbladder was first step after entering the peritoneal cavity. Retrograde or fundus first cholecystectomy was performed if the orientation of the Calot's triangle was not clear. We put a drain in the Morrison's pouch in selected patients as if the patients had appreciable amount of bile leakage or bleeding. The operative area is finally checked for bleeding and the wound closed in layers. Skin was closed with either interrupted nylon or subcuticular vicryl sutures.

The collected data are managed statistically using SPSS computer package for windows version 21.

Numerical data were presented as mean, while the categorical data were expressed as percentage and compared using statistical analysis included Fisher's exact test,  $\chi^2$  test and Student t test as appropriate. Differences were considered to be significant when the probability value was  $< 0.05$ .

## RESULTS

The study included 103 patients 87 females (84.5%) and 16 males (15.5%) with female to male ratio of 5.4:1. Their mean age was 31.5 years. Most patients (41.7%) from the age group of 20- 40 years, figure 1. All patients were treated by mini-incision approach. In 44 (42.7%) they operated by consultant and in the reminder 59 (57.3%) by registrar in training.

**Table 1: Demographic and Operative Data of the Patients (N=103)**

	Frequency (Incidence)	Rate of Complications
Female	87(84.5%)	2.3%
Male	16 (15.5%)	12.5%
Mean Postoperative Hospital Stay	1.3±0.9 days	.....
Operator		
Consultant	44(2.7%)	9.1%
Registrar	59 (57.3%)	.....
Complications	4(3.9%)	.....
Bleeding	3 (2.9%)	.....
Bile leak	1(1%)	.....
Drain	11 (10.7%)	.....
Blood transfusion	6(5.8%)	.....

The incidence of operative complications was 3.9% (4 patients) bleeding in 3 (2.9%) that is controlled by pack and ligation, and bile leak in 1 (1%). Six patients (5.8%) required blood transfusion. Drain was inserted in only 11 (10.7%) cases. There were no cases of common bile duct or intestinal injury. No wound site infection and postoperative pyrexia were encountered in the current study. No mortality was recorded during the period of hospitalisation in this study.

Rate of complication was 12.5% in males and 2.3% in females. Mean postoperative analgesia was  $3.4 \pm 1.7$  doses. Mean postoperative hospital stay was  $1.3 \pm 0.9$  days (range, 1-6 days).

Complication was affected by gender as the obtained difference was statistically significant ( $p=0.04$ ), but not affected by age of the patients ( $p=0.8$ ) and the operator ( $p=0.06$ ).

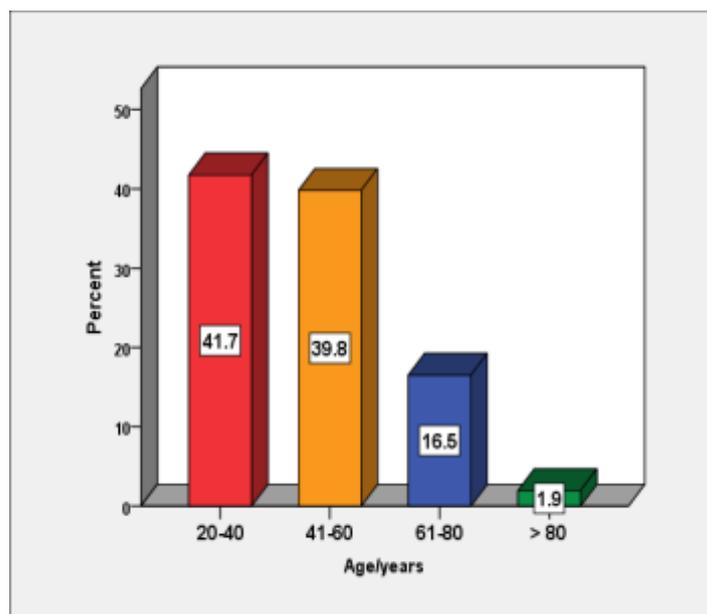


Figure 1: The age groups of study patients (n=103)

## DISCUSSION

Mini-cholecystectomy denotes suitable duration in surgery, smaller complications rate, lesser analgesic requirement, quicker recovery, excellent cosmetic results and relative cost-effectiveness [14].

The length of incision was maximum 5 cm in our study but it varies in different studies, a few studies used 5 cm mini-cholecystectomy incision [15, 16].

The long hospital stay following open cholecystectomy is a major factor preventing rapid turnover of patients, thus increasing the waiting list in these already overloaded hospitals [17].

The complication rate in our study was 3.9% which is quiet low compare to a high rate of 13.6% to 28% reported in literature [18, 19].

A shorter hospital stay of 2 days and few complications seen in this present study and there were no bile duct injury or mortality in our study as reported by Nadia S. *et al.* [1] and Ahmed *et al.* [20] in their studies. The mean postoperative analgesics required in this study was 3.4 doses relatively similar to that required in study by Warren B *et al.* [21] 2.9 doses.

Most surgeons routinely place drain at sub-hepatic space after open cholecystectomy which is not scientifically proved. Mostly drains are advocated in empyema and gangrene gall bladder, CBD exploration, incomplete haemostasis, anticipated biliary leak, abscess formation, and difficult cholecystectomy [18]. The major reason for drained cholecystectomy is the fear of bile leakage leading to sub hepatic collection/abscess, peritonitis, intra abdominal haemorrhage and Watmann Walter's Syndrome [22]. In our local set up we usually using no drain technique and

we used drain in only 10.7% of patients due to haemorrhage or difficult operation.

## CONCLUSION

Although laparoscopic gall bladder surgery is an accepted gold standard treatment worldwide, in the developing countries like ours where economic constraints are major concern, open mini-cholecystectomy is a good alternative in practice in teaching hospitals with reasonable and acceptable results.

Our initial experience suggests that the results of cholecystectomy can be considerably improved by relatively simple adaptations of standard surgical techniques of mini-cholecystectomy.

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