Original Article

Preliminary Experience with Mini-Laparotomy Cholecystectomy in Jos

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Abstract

Background: Different techniques have been described for removing a diseased gall bladder; however, cholecystectomy via the laparoscopic approach is currently regarded as the gold standard. Laparoscopic surgery services are not widely available in low- and middle-income countries and mini-laparotomy cholecystectomy may be a suitable alternative in such circumstances. This technique achieves cholecystectomy with a smaller incision and affords the advantages of the laparoscopic approach. **Objective:** We report our experience over a 2-year period of 24 consecutive patients from two hospitals who underwent mini-laparotomy cholecystectomy to highlight our outcomes with the procedure. **Materials and Methods:** Data were obtained from the surgical theatre procedure register and medical records department of the hospital. **Results:** During the study period, a total of 24 mini-laparotomy cholecystectomies were performed. Fourteen (58.3%) patients had a clinical diagnosis of calculous cholecystitis whereas 10 (41.7%) patients had symptomatic gallstones. There were four males (16.7%) and 20 females (83.3%) giving a male-to-female ratio of 1:5. The ages ranged from 18 to 68 years with a mean of 46.8 years (standard deviation (SD) = 12.7 years) and the mean operating time was 56.3 min (SD = 7.5 min) and ranged from 45 to 72 min. There was no conversion to the traditional large incision cholecystectomy. There were no intra-operative or post-operative complications and there was no mortality in the study. All the patients were discharged 48 h post-op. **Conclusion:** Mini-laparotomy cholecystectomy offers the benefits of a minimally invasive procedure such as good cosmesis and short hospital stay. It has a relatively short operative time and a low incidence of complications and can be practised in a low-resource environment, where laparoscopic services are not available.

Keywords: *Cholecystectomy, laparoscopic, mini-laparotomy*

Introduction

There are different techniques described for removing a diseased gall bladder; however, cholecystectomy via the laparoscopic approach is currently regarded as the gold standard.[1,2] There are numerous drawbacks to setting up this service in low-resource environments and laparoscopy is not widely available in low- and middle-income countries.[2,3] Apart from the initial capital investment, there are recurrent costs for consumables and maintenance of equipment. In developing countries, where laparoscopic services are not available or there are breaks in the supply chain of consumables, mini-laparotomy cholecystectomy may be a suitable alternative.

Mini-laparotomy cholecystectomy is considered a minimally invasive technique since it affords the advantages of the laparoscopic approach but in addition, it is less costly and has a shorter operative period.[4-6] Studies comparing both techniques showed no statistically significant difference in long-term outcomes, quality of life, patient's cosmetic satisfaction and complications.[7-9] However, laparoscopic cholecystectomy became increasingly popular due to the appeal of technological innovation rather than demonstrated superiority over mini-laparotomy cholecystectomy.[10]

During the COVID-19 pandemic, guidelines from regulatory bodies suggested caution with aerosolizing procedures like laparoscopy due to the potential risk to healthcare personnel, which generated renewed interest in alternative procedures like mini-laparotomy cholecystectomy.[11] This together with the disruption in the supply chain of consumables for laparoscopy in Nigeria due to the lockdown and coupled with the desire of patients to have the benefits of a minimally invasive procedure, created a need re-visit the procedure.

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We report a retrospective study of 24 consecutive patients who underwent mini-laparotomy cholecystectomy over a period of 2 years to highlight our outcome with the procedure.

Materials and Methods

This is a retrospective study of patients who had mini-laparotomy cholecystectomy at two hospitals between June 2020 and June 2022. Ethical approval was obtained from the institutional review board of the hospital. Data were obtained from the surgical theatre procedure register and medical records department of the hospitals. All patients who had mini-laparotomy cholecystectomy within the study period in the two hospitals were included in this study. Routine pre-operative workup was done for all patients. Consent was taken from all patients, including to convert to the traditional large incision cholecystectomy if the need arises. All cases were done on an elective basis.

Operative technique

This procedure was performed under general anaesthesia with endotracheal intubation and muscle relaxation. Perioperative antibiotics were given to all patients consisting of three doses of 1 g of Ceftriaxone and 500 mg of Metronidazole. A nasogastric tube was used in all cases and removed at the end of surgery.

A 6 cm oblique skin incision is made about two fingers breadth below and parallel to the right costal margin, starting 4 cm lateral to the midline. The incision is deepened to the anterior rectus, which is divided in the direction of the incision. The rectus muscle is divided with diathermy and the posterior rectus sheath, transversalis fascia, and peritoneum are divided in the direction of the incision and access gained into the peritoneal cavity. Two narrow deep retractors are placed to facilitate exposure of the Calot's triangle. One retractor is used to retract the duodenum and the viscera away from the gall bladder and the other is used to retract the liver cephalad. Dissection is then carried out similar to the conventional open cholecystectomy by the "fundus first" technique. The cystic duct and artery are ligated separately and the gall bladder is removed. No special retractors or headlights were used during the surgery and no drain was placed. The abdomen was closed back in layers. Intravenous opioids were routinely administered for the first 24 h post-surgery, thereafter patients were placed on intramuscular Diclofenac and Paracetamol until discharge. Patients were subsequently seen after 1 week to remove stitches, and then had another post-operative review at 1 month.

Statistical analysis

Data of all patients were captured and analysed using SPSS version 23. Demographic and clinical information of patients included age, sex, diagnosis, duration of surgery, conversion rate, intra-operative, and post-operative complications and length of hospital stay. Descriptive statistics were applied.

Results

During the study period, a total of 24 mini-laparotomy cholecystectomies were performed. Fourteen (58.3%) patients had a clinical diagnosis of calculous cholecystitis, whereas 10 (41.7%) patients had symptomatic gallstones. There were four males (16.7%) and 20 females (83.3%) giving a male-to-female ratio of 1:5. The ages ranged from 18 to 68 years with a mean of 46.8 years (SD = 12.7 years) and the mean operating time was 56.3 min (SD = 7.5 min) and ranged from 45 to 72 min. There was no conversion to traditional open cholecystectomy. There were no intra-operative or post-operative complications and there was no mortality in the study. All the patients were discharged after a post-operative stay of 48 h.

Discussion

Mini-laparotomy cholecystectomy has been shown to provide a suitable alternative to laparoscopic cholecystectomy for benign gall bladder disease.[12,13] It can be performed in centres, where laparoscopic facilities are not available, making it ideal for low-resource settings. Furthermore, it needs no special training or equipment. It is performed using simple modifications to the traditional open cholecystectomy and, therefore, can be easily taught to surgeons. Mini-laparotomy cholecystectomy was first described by Dubois and Berthelot in 1982.[1] They showed cholecystectomy could be achieved with a smaller incision rather than the conventional larger subcostal incision. This approach was shown to have the benefit of a shorter convalescence and randomised controlled trials have established the superiority of this mini-incision over the traditional open cholecystectomy in terms of reduced post-op pain, quicker recovery, shorter hospital stays and better patient satisfaction.[14,15]

Various types and sizes of mini-incisions have been used for mini-laparotomy cholecystectomy.[16] We used a subcostal incision on all our patients, which was also used by some surgeons.[10,17] One study described the use of a longitudinal midline incision,[18] whereas in another a longitudinal incision over the gall bladder was used and they suggested that it may reduce the risk of damaging subcutaneous sensory nerves, which run in a longitudinal direction.[13]

In our study, there was no need for specialised retractors or other instruments and the results are therefore reproducible and well suited for low-resource settings. Different types of special retractors have, however, been used in different reports and may be important when additional procedures such as common bile duct exploration are required. One study reported the use of a special surgical tool kit, with a system of circular and small hook-retractors incorporating an illuminator and long surgical instruments.[13] In another

study, a special multi-purpose retractor system called a Jako retractor was used.[19]

We employed the "fundus first" method on all our patients. In some reports, the approach adopted was dependent on operative findings, namely the Calot's triangle anatomy and adhesions.[1] Other reports indicated that it was easier to complete mini-laparotomy cholecystectomy using the fundus first approach and some surgeons have routinely adopted it.[20,21] This routine use of the Fundus first approach by some may be due to the better manoeuvrability of the gall bladder obtained by this technique within the limited surgical space. We also used a rectus muscle-dividing incision on all our patients and achieved good pain control with our analgesic regimen. Studies on the post-operative pain when "rectus sparing" and "rectus dividing" techniques were compared have given conflicting results. One study reported a reduction in pain when a muscle-sparing technique is used as compared to a muscle-dividing technique.[22] In another study, there was minimal difference in pain between the rectus sparing and rectus dividing techniques.[10]

The mean operating time in our study was 56.3 min (SD = 7.5 min) and is comparable to other studies.[4,13] The relatively shorter operating time of mini-cholecystectomy when compared to laparoscopic cholecystectomy has been noted by several authors[23,24] and may allow more efficient use of theatre time especially in low income setting with limited theatre space.[1]

There was no bile duct injury in our study, which is consistent with several reports showing no or low incidence of bile duct injuries with mini-cholecystectomy.[25,26] Bile duct injuries usually occur due to inadequate demonstration of the Calot's triangle at cholecystectomy and they are the most feared complication of cholecystectomy. The unacceptably high incidence of bile duct injuries in the early years of laparoscopic cholecystectomy was a major drawback to its use.[27] Studies have shown a lower incidence of bile duct injuries with mini-laparotomy cholecystectomy than with laparoscopic cholecystectomy.[6,28]

No wound complications occurred in our study, though some studies on this procedure reported occurrence of wound sepsis,[2,10] which is likely due to undue traction on the wound edges which leads to tissue damage and subsequent infection.

Conversion to traditional large incision is usually resorted to due to inability to safely dissect Calot's triangle, which may be as a result of dense adhesions, bleeding and unclear anatomy and tend to occur more when surgery is done for acute cholecystitis. Low conversion rates have generally been noted with mini-laparotomy cholecystectomy and are consistent with our study in which there was no need to convert.[2,6]

All the patients in our study had a 48-h duration of hospital stay, which is comparable to one study.[1] Some studies have reported shorter hospital stays than ours with mini-laparotomy cholecystectomy[2,10] and there are others that showed it could even be done on an ambulatory basis.[7,29,30] This procedure is performed through an incision that is, less than 8 cm. The incision length is noted to be directly proportional to patient's recovery during the post-operative period, and the shorter length of hospital stay with mini-laparotomy cholecystectomy when compared with the traditional large incision, is one of the attractions of the technique. Despite studies showing that mini-laparotomy cholecystectomy can be done as a day case, laparoscopic cholecystectomy is associated with a shorter length of hospital stay, shorter convalescence, shorter sick leave, and fewer number of days to return to normal activities as attested to by some studies.[5,12,16,31] The shorter duration of hospital stay with mini-laparotomy cholecystectomy may translate to reduced cost of the procedure when compared to the traditional open procedure.[13]

Although this procedure comes with a lot of advantages as earlier mentioned, it should be noted however that the patients would need to be evaluated clinically and properly investigated to confirm the diagnosis of gall bladder disease and exclude other differential diagnoses, since the opportunity for a diagnostic laparoscopy and exploratory laparotomy is lost during this method of cholecystectomy.

Our study shows good outcomes with mini-laparotomy cholecystectomy and this attests to the feasibility and safety of mini-laparotomy cholecystectomy and we recommend it as a suitable alternative, where laparoscopic services are not available.

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Conflicts of interest

There are no conflicts of interest.

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