

Mini-laparotomy cholecystectomy: A reasonable answer to a difficult situation

Hatem Al Wagih, MD; Essam Gabr, MD; Ahmed Shaabaan, MD

Division of General, Head & Neck and Endocrine Surgery, Alexandria Main University Hospital, Egypt.

Abstract

Introduction: Laparoscopic cholecystectomy is the gold standard treatment modality for symptomatic calculus cholecystitis. Patients who are unfit for laparoscopy such as elderly patients with severe cardiopulmonary disease, mini-laparotomy cholecystectomy may be a good alternative to laparoscopic cholecystectomy.

Objectives: To compare between mini-laparotomy cholecystectomy (MLC) and laparoscopic cholecystectomy (LC) as regards operative time, risk of complications, postoperative hospital stay, return to normal activities and aesthetic results.

Patients and methods: A study of 50 patients with gall stones who underwent LC (group A, n = 25 patients) or MLC (group B, n = 25 patients). Age, sex, Body Mass Index (BMI), pain scores (visual analog scale), analgesic consumption, operative time, complications, length of hospital stay, return to normal daily activities and patient satisfaction were recorded.

Results: In this study, both groups were found to be matching, with no statistically significant difference, in their preoperative assessment. In group A; the overall operative time ranged between (30 and 55 minutes) with a mean of 39.50 ± 2.0347 minutes. In group B; the operative time ranged between (30 and 50 minutes) with a mean of 40.857 ± 1.56 minutes. There was no statistically significant difference between the operative time in both groups ($p=0.601$). No statistically significant difference was found between the mean postoperative pain score and postoperative analgesic consumption in both groups ($p= 0.952, 0.843$ respectively). Postoperative hospital stay, return to normal daily activities, postoperative complications and patient satisfaction were comparable in both groups.

Conclusions: In non obese patients mini-laparotomy cholecystectomy can be a good alternative to laparoscopic cholecystectomy in developing countries where laparoscopy is not available and in patients who are not fit for laparoscopy such as patients with severe cardiopulmonary disease.

Key words: Mini-laparotomy cholecystectomy, laparoscopic cholecystectomy, non obese patients, severe cardiopulmonary disease.

Introduction:

Since the introduction of laparoscopic cholecystectomy (LC) as a minimally invasive procedure alternative to the conventional open cholecystectomy, the procedure has quickly become the treatment of choice for gallbladder disease. More than any other laparoscopic procedure, LC has epitomized the advantages of minimal access surgery. It has been shown to be consistently superior in terms of postoperative recovery and has resulted in earlier discharge from hospital and return to full activity. The main reason for these

improvements has been the replacement of a long surgical incision with several small port site incisions. The expected reduction in postoperative pain, as a consequence, has also been proven by prospective trials¹⁻⁴. Mini-laparotomy cholecystectomy can be a good alternative to laparoscopic cholecystectomy in developing countries where laparoscopy is not available and in patients who are unfit for laparoscopy such as patients with severe cardiopulmonary disease with results comparable to that of laparoscopy⁵⁻⁷.

Patients and methods:

The present study included 50 patients with symptomatic cholelithiasis proved by ultrasonography admitted to the department of surgery at the Main University Hospital and the Medical Research Institute, University of Alexandria. Patients were randomized into either of 2 groups by the closed envelope technique.

Group A (25 patients): the laparoscopic cholecystectomy group (LC).

Group B (25 patients): the mini-laparotomy cholecystectomy group (MLC).

Exclusion criteria:

- History of jaundice and or history of biliary pancreatitis.
- Elevated liver enzymes and or elevated serum bilirubin.
- Elevated alkaline phosphatase.
- Ultrasonographic evidence of common bile duct stones or dilated common bile duct >8mm.
- BMI >30.

Laparoscopic cholecystectomy was done using the American approach.⁸

Technique of mini-laparotomy cholecystectomy⁹: to describe in short.

- a- Pre-operative ultrasonographic marking of the site of the gall bladder and its position was marked on the skin.
- b- The patient was placed in the supine position with a bridge under the lower ribs.
- c- Nasogastric tube was inserted for deflation of the stomach and removed at the end of operation.
- d- Transverse epigastric skin incision was made over the lateral portion of the rectus abdominis muscle.
- e- The incision was kept between 4 and 5cm.
- f- The operating room lights were turned off and the primary surgeon utilized a head light to illuminate the small opening in the abdomen.

- g- The instrumentation required included three small narrow Deaver retractors, medium sized haemoclips and a clip applier with long tip.
- h- Next, a longitudinal incision was made in the anterior rectus sheath and the rectus abdominis muscle was split in the process.
- i- Another longitudinal incision was made in the posterior rectus sheath and peritoneum.
- j- The patient was rotated to the left side with the right side up.
- k- After the above maneuver and retraction of the liver bed in the supero-lateral direction with a narrow Deaver retractor the Calot's triangle became visible.
- l- The cystic duct and artery were clamped with stainless steel clips or ligated.
- m- The gall bladder was dissected of the liver bed.
- n- The skin was closed with subcuticular sutures.
- o- No drain was inserted.

Results:

Patient's demographics:

Both groups were found to be matching, with no statistically significant difference, in their preoperative assessment.

Operative data:

Conversion: In the laparoscopic cholecystectomy group, the procedure was converted to an open one in one patient (4%); the cause of conversion was the presence of cholecysto-duodenal fistula in addition to excessive adhesions. Consequently; this patient was excluded from the study. In the mini-laparotomy cholecystectomy group, the wound was widened in one patient (4%) due to the occurrence of uncontrollable bleeding which couldn't be managed from the small incision. Widening of the wound up to 12 cm was done and the bleeding which was from an injured cystic artery was successfully controlled. A sub-hepatic tube drain was inserted in this patient; consequently this patient was excluded from the study.

Table (1): Comparison of operative time in both groups in minutes.

| | Group A (24 Patients) | | | Group B (24 patients) | | | p |
|---------------------------------|--------------------------|-------|--------|--------------------------|--------|------|-------|
| | Range | Mean | SD | Range | Mean | SD | |
| Operation time (minutes) | 30-55 | 39.50 | 2.0347 | 30-50 | 40.857 | 1.56 | 0.601 |

There was no statistically significant difference between the operative time in both groups (p=0.601).

Table (2): Operative data in both studied groups.

| | Group A | Group B | P |
|--|---------|---------|-------|
| 1- Abnormal anatomy: | | | |
| -Caterpillar hump right hepatic artery | 1 | 0 | 0.598 |
| - Short cystic duct | 1 | 0 | |
| -Low lying anterior cystic artery | 1 | 1 | |
| 2-Inflammatory adhesions between the gall bladder, duodenum and omentum | 5 | 3 | 0.682 |
| 3-Intra-operative bleeding: | | | |
| -From the liver bed | 2 | 0 | 0.598 |
| -From the cystic artery | 1 | 1 | |
| 4-Gall bladder perforation with bile leak | 4 | 3 | 0.666 |
| 5-Stone spillage | 2 | 1 | 0.541 |

Postoperative data:

No statistically significant difference was found between the mean postoperative pain score in both groups (p= 0.952). The number of analgesic ampoules (diclophenac sodium 75mg) required during the 1st postoperative 24 hours in both groups was recorded. As regards postoperative analgesic consumption,

no statistically significant difference was found between both groups (p=0.843). Resumption of oral feeding and hospital stay were not statistically significant between both groups (p= 0.658, 0.509). There was no statistically significant difference between the overall postoperative complication rates in both studied groups (p=0.552).

Table (3): Postoperative complications of group A and group B.

| Postoperative complications | Group A (24 patients) | Group B (24 patients) | P |
|-----------------------------|--------------------------|--------------------------|-------|
| Chest infection | 4 | 2 | 0.552 |
| Wound infection | 2 | 3 | |
| External biliary fistula | 0 | 1 | |
| Postoperative bleeding | 0 | 0 | |
| Postoperative jaundice | 0 | 0 | |
| Deep vein thrombosis | 0 | 0 | |
| Incisional hernia | - | 1 | |

In group A; return to normal activities postoperatively ranged between six and ten days with a mean of 7.57 ± 1.28 days, while in group B; patients returned to normal activities after six to twenty one days with a mean of 8.36 ± 3.82 days (the patient who developed external biliary fistula returned to his normal daily activities after 3 weeks). There was no statistically significant difference between both groups as regards return to normal daily activities ($p = 0.472$).

In the laparoscopic cholecystectomy group, all patients were satisfied with their postoperative fine scar, while in the mini-laparotomy cholecystectomy group, all except two patients were satisfied with their postoperative fine scar. There was no statistically significant difference between both groups as regards patient's satisfaction ($p = 0.482$).

Discussion:

Laparoscopic cholecystectomy is the gold standard treatment modality for symptomatic calculous cholecystitis, patients who are unfit for laparoscopy such as elderly patients with severe cardiopulmonary disease, mini-laparotomy cholecystectomy may be a good alternative to laparoscopic cholecystectomy with nearly the same outcome as regards operative time, hospital stay, return to normal daily activities and post-operative complications.⁵⁻⁷ As regards the financial cost mini-laparotomy cholecystectomy may be a good choice in developing countries where cost containment is critical.¹

Our results as regards operative time was in accordance with what was reported by Sylvanus et al.¹⁰ Vagenas et al, J Harju et al, found in their studies that the mean operative time of laparoscopic cholecystectomy was significantly longer than that of mini-laparotomy cholecystectomy.^{11,12} Syrakos et al in their study reported a longer operating time for laparoscopic cholecystectomy versus mini-laparotomy cholecystectomy (median values were 61 minutes versus 46 minutes respectively).¹³ Setting up and testing of laparoscopic equipments usually add minutes to the performance time. The shorter operative time of laparoscopic cholecystectomy in this study may be attributed to increased familiarity and experience with the laparoscopic technique, absence of acute attacks and absence of unclear anatomy.

Sylvanus et al and J Harju et al in their studies reported that there was no statistically significant difference between mini-laparotomy cholecystectomy and laparoscopic cholecystectomy as regards postoperative pain.^{10,12} Vagenas et al in their study reported that laparoscopic cholecystectomy significantly reduced postoperative pain compared to mini-laparotomy cholecystectomy.¹¹ In our study the use of muscle splitting technique significantly reduced postoperative pain following mini-laparotomy cholecystectomy. Postoperative hospital stay after laparoscopic cholecystectomy and mini-laparotomy cholecystectomy is another controversial issue. Squirell et al and Sylvanus et al, in prospective randomized comparisons of laparoscopic versus

mini-laparotomy cholecystectomy procedures, found no significant difference as regards postoperative hospital stay between both groups.^{1,10} On the other hand, Rose et al and Barkun et al claim that laparoscopic cholecystectomy is associated with a shorter convalescence period than mini-laparotomy cholecystectomy.^{14,15} In a prospective randomized study, Kunz et al reported that there was no statistically significant difference between laparoscopic and mini-laparotomy cholecystectomy as regards operative time, postoperative hospital stay, and peri-operative complications. Syrakos et al in their study did not find any significant difference between laparoscopic and mini-laparotomy cholecystectomy groups as regards postoperative hospital stay.¹³ In our study there was no statistically significant difference between both groups as regards postoperative hospital stay. The short postoperative hospital stay following both procedures in our study is attributed to the use of fast track surgery. In this study, there was no statistically significant difference between the laparoscopic cholecystectomy group and the mini-laparotomy cholecystectomy group as regards patient's satisfaction with the procedure. Vagenas et al in their study found that as regards aesthetic result, punctures from fine caliber laparoscopic instruments were superior to small surgical incisions. However, data shows no significant long term difference between both groups as regards the aesthetic results.¹¹

One obvious advantage of laparoscopic cholecystectomy over mini-laparotomy cholecystectomy is that laparoscopy is exploratory and can detect any other pathology in the abdominal cavity. In the mini-laparotomy cholecystectomy, abdominal exploration couldn't be performed from the small incision.

Conclusion and recommendations:

- Results of mini-laparotomy cholecystectomy are comparable to that of laparoscopic cholecystectomy as regards operative time, postoperative pain score, postoperative analgesic requirement, postoperative complications, hospital stay, return to normal daily activities and patient's satisfaction with the procedure.

- Mini-laparotomy cholecystectomy can be a good alternative to laparoscopic cholecystectomy in developing countries where laparoscopy is not available and in patients who are not fit for laparoscopy such as patients with severe cardiopulmonary disease.
- Mini-laparotomy cholecystectomy is a safe, cost-effective procedure associated with smooth postoperative period and early convalescence.
- One obvious disadvantage of laparoscopic cholecystectomy is that if it's widely adopted a generation of younger surgeons will emerge who are not experienced in open biliary surgery which will be needed in about 2-2.8% of patients. Surgeons who perform mini-laparotomy cholecystectomy will retain their open operating skills and thus will be less likely to have operative mishaps.
- For mini-laparotomy cholecystectomy emphasis on good illumination (the use of head light) and experienced surgeon with open biliary surgery is important, the use of funds 1st technique is more safe but it's a matter of surgeon preference.

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