Subtotal cholecystectomy in difficult laparoscopic cholecystectomies: is it safe?

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Purpose
Laparoscopic cholecystectomy is now accepted as the 'gold standard' procedure for cholecystectomy. However, this procedure can be dangerous in cases of unclear anatomy at the Callot's triangle. A significant proportion of patients with unclear anatomy are still converted to 'open' to complete the procedure. The other option is subtotal cholecystectomy rather than open conversion. Our purpose was to study the safety of laparoscopic subtotal cholecystectomy in cases where the clear identification of the anatomical land marks in Callot's triangle is difficult.

Materials and methods
Patients who underwent laparoscopic subtotal cholecystectomy between January 2011 and December 2011 were evaluated prospectively. These patients underwent subtotal cholecystectomy without isolation of the duct or artery, as this was judged to be hazardous, and the Hartmann pouch was transacted, stones were evacuated and the gall bladder remnant was closed by endoscopic sutures and a subhepatic drain left *in situ*.

Results
Laparoscopic subtotal cholecystectomy was performed in 30 elective procedures among 30 patients, male patients 18 (60%) and female patients 12 (40%). Their mean age was 52.6 years ± 12.65 SD. The mean operative time was 92 min ± 20 SD, and the mean hospital stay was 72.43 h ± 22 SD. We encountered one conversion into open and two patients who developed intra-abdominal collection. No mortalities were recorded.

Conclusion
Subtotal cholecystectomy is a safe procedure in cases where there is no clear identification of the structures in Callot's triangle. However, it is not a substitute for conversion into open, if deemed required.

Keywords:
bile leakage, difficult cholecystectomy, subtotal cholecystectomy

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Introduction

Laparoscopic cholecystectomy is introduced as a treatment option for symptomatic gall bladder disease in 1987 and it is now the gold standard treatment for symptomatic gall bladder disease [1].

About 60 000 cholecystectomies are performed every year in the UK, and it is performed in both elective and emergency situations. The rate of conversion from laparoscopic to open ranges between 5 and 10% [2].

The step of paramount importance in cholecystectomy is the clear identification of the cystic duct and artery, which in some situations can be difficult especially in presence of dense adhesions or severely inflamed gall bladder, increasing the risk for common bile duct (CBD) injury. Despite that, the incidence of common bile duct injury in laparoscopic cholecystectomy is 0.25–0.5% [3].

The traditional response to encountering a difficult laparoscopic cholecystectomy procedure is to perform conversion to an open procedure but the open conversion has its drawbacks; it definitely prolongs hospital stay and the patient will lose all the privileges of laparoscopic surgery [4,5].

Hence, the aim of our study was to assess the safety of laparoscopic subtotal cholecystectomy in difficult cholecystectomies.

Materials and methods

Our study was a prospective study that recruited 30 patients who underwent laparoscopic subtotal cholecystectomy in Ain Shams University Hospitals between January 2011 and December 2011. All our patients signed an informed consent and IRB approval was obtained and all the data were kept on a password protected computer.

Inclusion criteria

Patients with symptomatic gall bladder disease who underwent laparoscopic cholecystectomy and in whom identification of the Callot's triangle is difficult.

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Exclusion criteria

Patients with acute cholecystitis.

Preoperatively, all patients underwent the following:

(1) Ultrasound scan.
(2) Liver function tests.
(3) Total bilirubin and direct bilirubin estimation.

Technique

(1) All our patients were operated upon under general anaesthesia.
(2) Prophylactic dose of second-generation cephalosporin was given with induction.
(3) All patients were placed in the supine position with the surgeon on the left hand side of the patient opposite to the monitor and the cameraman on his left hand side.
(4) Pneumoperitoneum was created by open method through an infraumbilical incision. In addition, a 10-mm port was inserted and a 30°, 10 mm camera was used.
(5) The other three ports were inserted under complete visualization after infiltration of the peritoneum with local anaesthetic: 10-mm port in the epigastrium, 5-mm port in the right hypochondrium and a 5-mm port in the right iliac fossa.
(6) The fundus of the gall bladder was pushed cranially with a grasper through the right iliac fossa port and a counter traction was achieved by pulling the Hartmann's pouch caudally using a grasper through the right hypochondrium port.
(7) Dissection of the Callot's triangle was commenced using a diathermy mounted on a hook/maryland grasper. When we felt that further dissection is hazardous because of anatomical uncertainty, we started antegrade dissection.
(8) The fundus was pulled caudally using the grasper in the right hypochondrium port and a counter traction achieved by pushing the tip of the liver cranially using the grasper in the right iliac fossa port. In addition, dissection between the liver and the gall bladder was commenced.
(9) We continued dissection until it is not safe to proceed furthermore because of unclear anatomical landmarks in Callot's triangle; at this point the gall bladder was grasped from its middle part squeezing all the stones to the fundus using a noncrushing endoscopic clamp.
(10) The gall bladder was opened using a diathermy mounted on hook, and direct diathermy was applied to the edges to minimize bleeding. The gall bladder was retrieved from the epigastric port.
(11) Suction and irrigation of the opened gall bladder and removal of any stones were performed.
(12) Continuous suturing of the gall bladder was performed, using vicryl 2/0 stitches; only single layer was applied.
(13) Careful haemostasis of the liver bed and suction of the subhepatic space and subdiaphragmatic spaces were performed.
(14) Wide bore-free drainage tube was placed in the subhepatic region and brought out through the right iliac fossa port site.
(15) Inspection of the ports was performed from inside before removal to check for haemostasis, and all ports were removed under vision.
(16) Fascial defects were closed using 2/0 vicryl mounted on a J needle.
(17) Skin was closed using 3/0 monocryl.

Postoperative care

(1) Early mobilization was encouraged.
(2) Patients are allowed to eat and drink once tolerated.
(3) Single dose of antibiotics.
(4) Drains were removed if draining was less than 50 ml in 24 h.

The following parameters were recorded: intraoperative complications including bile duct injury and bowel injury and postoperative complications such as bile leakage, ligated ducts, the operative time and hospital stay.

Results

Our study recruited 30 patients, male patients 18 (60%) and female patients 12 (40%). Their mean age was 52.6 years ± 12.65 SD. The mean operative time was 92 min ± 20 SD, and the mean hospital stay was 72.43 h ± 22 SD.

Intraoperative and postoperative complications

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Duodenal injury	0
Bile duct injury	0
Intra-abdominal collection and bile leakage	2
Missed stone	0
Wound infection	0
Conversion to open	1

Discussion

Our study recruited 30 patients with difficult cholecystectomy and 18 (60%) patients were men. When searched through the literature, we found that different authors such as Vivek *et al.* [6] in 2014 and Nachnani and Supe [7] in 2005 studied the preoperative

predictors for a difficult cholecystectomy and male sex is believed to be one of the preoperative predictors that increases the likelihood of difficult cholecystectomy.

Careful identification of the structures in the Callot's triangle is the main step to perform cholecystectomy, either open or laparoscopic. In addition, despite careful dissection and identification of those structures, there is always an incidence of injury to the bile ducts. At the early beginning's of laparoscopic cholecystectomy it was believed that the incidence of bile duct injury is higher that during open cholecystectomy but this has been challenged by many authors and the incidence of bile duct injury during laparoscopic cholecystectomy is just 0.5% now [8,11–13].

In our study, we did not encounter any bile duct injuries, although there were difficult cholecystectomies, and this could be attributed to the fact that we performed a subtotal cholecystectomy. Hence, our dissection usually stopped away from Callot's triangle and this is in agreement with the results published by other authors who studied the subtotal cholecystectomy as an alternative approach in difficult cholecystectomy [14].

However, the incidence of bile duct injuries in total cholecystectomies performed for difficult cholecystectomies is higher; it is up to 3.4% [14,15].

We encountered two cases with bile leakage and intra-abdominal collection, which were managed conservatively, and Davis *et al.* [16] in 2012 showed the same results.

This is relatively higher than the incidence of bile leakage after standard laparoscopic cholecystectomy, which is less than 1% [17]. The value of an intra-abdominal drain in prevention of postoperative collection in standard cholecystectomies was studied thoroughly and most of the authors believe that there is no value of an intra-abdominal drain in preventing intraperitoneal collection [18–20]. However, we did not find enough literature to support this in cases of difficult cholecystectomies; hence, we considered that opening the gall bladder for stone extraction will contaminate the field, and hence we placed drains in all our cases. This did not prevent collection but our sample was not big enough to challenge the value of an intra-abdominal drain in such cases. We converted only one patient into open cholecystectomy; however, we are not adopting this technique as an absolute substitute for conversion to open. It is not appropriate to compare our rate of conversion to the rate of conversion during standard laparoscopic cholecystectomy because we did not include patients who underwent standard cholecystectomy in our study. In addition, we cannot use our data to comment on reduction of rate of conversion, but many authors cross-examined this point in their work and concluded that using this technique in difficult cholecystectomies will reduce the need to conversion [21–24].

We did not encounter any mortalities and no intestinal injury was encountered, in comparison with the incidence of bowel injury in standard cholecystectomy, which is less than 1% [17]. Operative time and hospital stay were longer than the usual operative time for laparoscopic cholecystectomy but this was expected [25,26].

Conclusion

Subtotal cholecystectomy is a safe procedure in cases where there is no clear identification of the structures in Callot's triangle. However, it is not a substitute for conversion into open, if deemed required.

Acknowledgements

Conflicts of interest

None declared.

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