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ORIGINAL ARTICLE

Routine mini-laparoscopic cholecystectomy: Outcome in 200 patients

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KEYWORDS
Cholecystectomy;
Laparoscopy;
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Summary
Introduction: In order to improve the outcome of classical laparoscopic cholecystectomy (CLC), surgeons have attempted to minimize tissue trauma. The aim of this study is to describe the technique of mini-laparoscopic cholecystectomy (MLC) and to report the outcome of this approach when used as a routine procedure.
Methods: Since January 2012, all consecutive patients undergoing MLC were included in this study. Operative and perioperative data were prospectively collected. Additionally, cost analysis was performed.
Results: From 2012 to 2015, 200 MLC were performed (F/M: 132/68, mean age 45 ± 16 years). Mean operative duration was 97 ± 32 min for the first 50 patients and 75 ± 25 min for the subsequent 150 patients ($P < 0.0001$). Modifications in the number or size of trocars were necessary in nine of the first 50 procedures and in seven of the subsequent 150 procedures ($P = 0.003$). Perioperative morbidity included gallbladder perforation ($n = 28$) or moderate (< 50 mL) bleeding ($n = 6$). Postoperative morbidity was 4%. The mean global cost for a MLC procedure was 1757 ± 1855 euros. This cost decreased from 2946 ± 3115 euros in the first 50 patients to 1390 ± 1278 euros in the subsequent 150 patients ($P = 0.001$).
Conclusion: Mini-laparoscopy can be used for routine elective cholecystectomy. This approach is associated with low morbidity and good cosmetic results.

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Introduction

Cholelithiasis is found in 10% to 15% of the adult population and represents a major public health problem [1]. Laparoscopic cholecystectomy is the most frequently performed operation in elective gastrointestinal surgery [2,3]. In order to improve the outcome of classical four-port laparoscopic cholecystectomy (CLC), surgeons have attempted to decrease the parietal insult by reducing the number of incisions and/or their size.

Different mini-invasive techniques have been reported: three-port [4] or two-port [5] cholecystectomy, single-port cholecystectomy [6] or natural orifice endoscopic surgery (NOTES). Cholecystectomy via mini-laparoscopy (MLC) has the advantage of not modifying the surgical bases of CLC. This technique can be standardized and the learning curve is short. Moreover, mini-laparoscopic instruments are inexpensive and can be used for other types of laparoscopic surgery.

Since 2009, single-port laparoscopic cholecystectomy (SPLC) and MLC have been concomitantly developed at Antoine-Béclère hospital. We very rapidly concluded that the SPLC technique was difficult to standardize and potentially dangerous [6—8]. Conversely, the MLC technique progressively came to be our standard technique for the majority of patients undergoing elective cholecystectomy.

The goal of this study is to describe the MLC technique and to report the results of this approach that has been proposed as the routine technique in our service.

Methods

All patients undergoing MLC since January 2012 were included in this study. This date corresponded to the moment when the mini-laparoscopic approach was routinely proposed to patients with symptomatic cholelithiasis (biliary colic, stone migration or cooled off acute cholecystitis) or gallbladder polyp (> 1 cm) who were scheduled for elective cholecystectomy. Patients with acute cholecystitis, common bile duct stones, antecedent pancreatitis with necrosis (Balthazar C or greater), morbid obesity (body mass index [BMI] $\geq$ 40 kg/m^2) or cirrhosis were not proposed for MLC.

Surgical technique

A 10-mm umbilical trocar and three 3-mm manipulation trocars are used. Mini-laparoscopic instruments with traditional lengths (30 cm) are available, but we prefer to use 20 cm long instruments that are less flexible (Medtronic, Boulogne-Billancourt, France). The three 3-mm trocars are inserted higher and more to the right compared to the classical CLC set up (Fig. 1). The principal operator stands between the patients' legs, and works near the gallbladder. The epigastric trocar is placed to the right of the round ligament in order to allow the gallbladder fundus to be pushed toward the right upper quadrant without tension on the round ligament. Calot's triangle is dissected with a cautery hook. The cystic duct and artery are controlled with 10 mm absorbable clips (Laproclip®, Covidien, Dublin, Ireland), inserted through the 10 mm trocar and positioned under visual control via a 3-mm optical device. Thus, two optical devices (10 mm and 3 mm) are used in the beginning and need to be connected to two different cameras in order not to lose time when the clips are placed. The gallbladder is dissected off the liver bed in retrograde fashion with the hook. If necessary, a 3-mm bipolar coagulator and suction instruments can be used. A cholangiogram can be performed via a Chevassu type catheter. This may require a supplementary 3 mm trocar. At the end of the operation, 20 mL of ropivacaïne are instilled and/or injected: ropivacaine 0.2% (2 mg/mL) intraperitoneally under the diaphragmatic cupola and 0.5% (5 mg/mL), 5 mL injected around the trocar site orifice. No drain is inserted. The 3 mm skin incisions can be closed with clips, biological glue or a simple adhesive. A short video illustrating the MLC technique is available (Video 1).

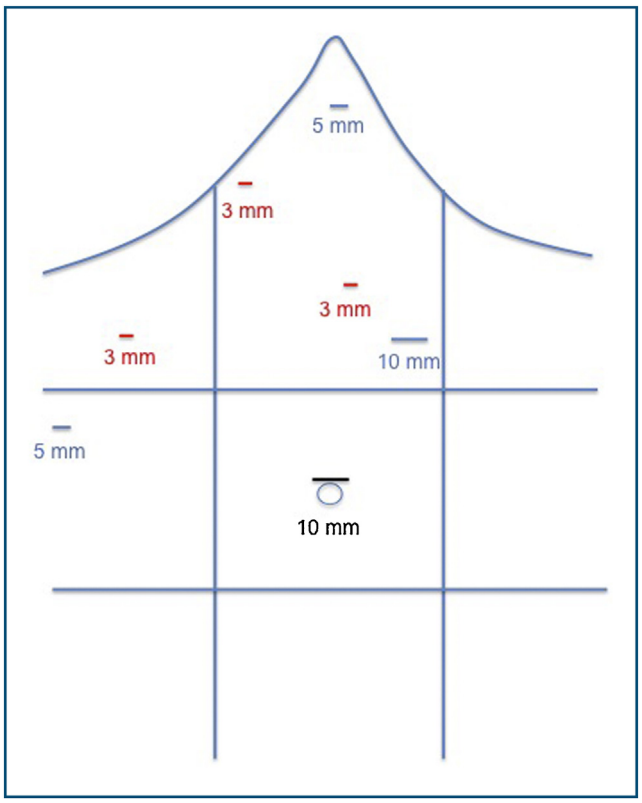

Figure 1. Placement of trocars for mini-laparoscopic (blue) and classical four-port laparoscopic (red) cholecystectomy. Ten-millimeter umbilical incision (black) for the optical device.

Postoperative follow-up

Postoperative pain is managed with group I or II oral analgesics, which are continued for one week after the operation. The patient is seen by the surgeon at 10—15 days, three months and one year after the operation.

Statistical analysis

Operative and perioperative data for patients were collected prospectively. The surgical parameters evaluated included operative duration, conversion rate, number of additional trocars used, and intraoperative morbidity (including gallbladder perforation or bleeding, defined as bleeding from the hepatic pedicle or gallbladder bed requiring use of aspiration/lavage). Postoperative data evaluated included early postoperative morbidity (i.e., within 90 days after the operation), duration of hospital stay, postoperative pain at discharge and/or at the first postoperative visit (assessed by a visual analogue scale [VAS] ranging from 0—10), time to resumption of professional and physical activities at the same level as before operation. Quality of