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ORIGINAL ARTICLE

Ambulatory laparoscopic minor hepatic surgery: Retrospective observational study

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KEYWORDS
Laparoscopic hepatic surgery;
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Summary
Introduction: Over the last decade, laparoscopic hepatic surgery (LHS) has been increasingly performed throughout the world. Meanwhile, ambulatory surgery has been developed and implemented with the aims of improving patient satisfaction and reducing health care costs. The objective of this study was to report our preliminary experience with ambulatory minimally invasive LHS.
Methods: Between 1999 and 2014, 172 patients underwent LHS at our institution, including 151 liver resections and 21 fenestrations of hepatic cysts. The consecutive series of highly selected patients who underwent ambulatory LHS were included in this study.
Results: Twenty patients underwent ambulatory LHS. Indications were liver cysts in 10 cases, liver angioma in 3 cases, focal nodular hyperplasia in 3 cases, and colorectal hepatic metastasis in 4 cases. The median operative time was 92 minutes (range: 50—240 minutes). The median blood loss was 35 mL (range: 20—150 mL). There were no postoperative complications or re-hospitalizations. All patients were hospitalized after surgery in our ambulatory surgery unit, and were discharged 5—7 hours after surgery. The median postoperative pain score at the time of discharge was 3 (visual analogue scale: 0—10; range: 0—4). The median quality-of-life score at the first postoperative visit was 8 (range: 6—10) and the median cosmetic satisfaction score was 8 (range: 7—10).
Conclusion: This series shows that, in selected patients, ambulatory LHS is feasible and safe for minor hepatic procedures.

Introduction

Over the last decade, laparoscopic hepatic surgery (LHS) has been increasingly performed throughout the world [1]. Compared to open hepatic surgery, the minimally invasive approach allows a reduction in intraoperative blood loss, and postoperative pain and morbidity, with no change in the oncologic results. A significant decrease in the length

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of hospital stay [1] along with lower resultant costs [2] are also reported as an added socioeconomic benefit of LHS. In a recent systematic review of the literature, the length of stay after LHS ranged from 1.2 to 15.3 days [1].

An increasing number of gastrointestinal surgeries are now routinely performed in an ambulatory setting including cholecystectomy [3], hernia repair [4], gastroesophageal fundoplication [5], and appendectomy [6]. The minimally invasive approach could help expand ambulatory care to more complex procedures. Gash et al. [7] have reported successful ambulatory colectomy, facilitated by the use of the single laparoscopic trocar technique. However, although it is recognized that ambulatory surgery generates lower costs, its safety for surgery involving solid organs (pancreas, spleen, liver) is still unproven.

Our team has been striving to decrease the length of postoperative stay through the development of LHS [8]. On our service, the average hospital stay after laparoscopic right hepatectomy [9] and atypical hepatic resections [10] is 8 and 5 days respectively. For some selected interventions, which we consider to be as safe as cholecystectomy, we were able to evaluate the feasibility of ambulatory management.

We report our experience with ambulatory minimally invasive hepatic surgery in highly selected patients. To our knowledge, there has not yet been any study focused on the feasibility of this approach.

Patients and methods

Between 1999 and 2014, 172 patients underwent LHS at the Antoine-Béclère Hospital (Clamart), including 151 liver resections and 21 fenestrations of hepatic cysts. All consecutive patients who underwent ambulatory LHS were included in this retrospective observational study. Our selection criteria for ambulatory management (defined retrospectively) were: fenestration of liver cysts, atypical resection for a single small lesion (< 2 cm), lesion located in the anterior-lower segments (segments II, III, IVb, V and VI), or tumor on a pedicle; the patient must also live near the hospital (< 60 min) and have a responsible adult to assist after discharge. The indication for benign tumor resections was the symptomatic nature of the lesion. Patients who were excluded from ambulatory management included patients with a body mass index (BMI) > 35 kg/m^2, an American Society of Anesthesiologists (ASA) score $\geq$ 3, a prior history of upper abdominal surgery, known parenchymal liver disease (cirrhosis, fibrosis [METAVIR F1—F3] or steatosis $\geq$ 10%) or long-term anticoagulant or antiplatelet therapy.

Operative and perioperative management

Our ambulatory protocol was instituted 2003 and only one patient (in 1999) underwent LHS before implementation of the protocol. The decision to pursue an ambulatory approach was made during the surgical consultation. The patient was informed of all the details of ambulatory management, the risks associated with surgery and anesthesia, as well as the possibility of remaining in the hospital after surgery. A website summarizing the specifics of treatment was available to both physicians and patients. Finally, a folder containing several pages of information was also delivered to the patient. Our hospital has a dedicated ambulatory surgery unit staffed by a specifically-trained paramedical staff who are experienced in the practice of ambulatory surgery. A nurse contacts the patient by telephone the day before surgery to summarize all of the details of management and to ascertain compliance with preoperative requirements (antiseptic shower, fasting after midnight, adequate home conditions for post-surgical recovery).

Surgery was performed under general anesthesia without an indwelling arterial catheter, central venous line or epidural catheter. Intravenous fluid replacement was restricted in order to obtain a low central venous pressure (< 5 mmHg). The surgical technique, the collection of clinical data and histological examinations have been previously reported [8—11].

We performed a completely laparoscopic approach using 3—5 trocars, with an insufflation pressure of 10—12 mmHg, and a 0 or 30° telescope. Parenchymal transection was performed using either ultrasonic dissection (Ultracision®, Ethicon, Cincinnati, USA) or thermofusion (Ligasure®, Covidien, Dublin, Ireland). Hemostasis of minor bleeding was achieved with bipolar coagulation. When a single trocar technique was employed, this was performed through a 2 cm supraumbilical incision using a 4-port device (Quadriport®, Olympus, Tokyo, Japan). This technique used a flexible laparoscope (endoEYE®, Olympus, Tokyo, Japan) and a double curvature grasper in order to avoid conflicts between instruments. At the end of surgery, the cut surface of the liver was inspected for hemostasis with the intraperitoneal pressure dropped to 6 mmHg, and local anesthetic (20 mL of Ropivicaine 0.2% [2 mg/mL]) was instilled to bathe the diaphragmatic cupolas and 5 mL of 0.5% Ropivicaine was infiltrated into the trocar sites. No drains were placed.

Postoperative pain was managed with level I and II oral analgesics in a manner similar to that used for ambulatory laparoscopic cholecystectomy. Pre-emptive treatment to prevent nausea and vomiting (consisting of dexamethasone 4 mg at induction and droperidol 1.25 mg at the end of the intervention) has been routinely performed since 2007. After a light meal and following surgical and anesthesia assessments, the patient was allowed to leave the facility. At the time of discharge, the patient had to be able to eat without problems, ambulate, urinate, and have pain controlled according to the analgesic protocol. A prescription for analgesics was provided for use during the week following the intervention. At the time of discharge, the patient was handed a document describing adverse events that required emergency consultation, and contact information for the digestive surgeon who is available on 24-hour call. Four patients undergoing resection of colorectal metastases received prophylactic anticoagulation as recommended by the French Society of Anesthesia and Intensive Care. On the day following surgery, a dedicated nurse contacted the patient by telephone, and the patient was seen by the surgeon on the third day and again at four weeks after the intervention. For patients within the framework of these very specific indications (fenestration of hepatic cysts and atypical resections of small peripheral tumors in healthy liver), we did not systematically perform laboratory monitoring or imaging after LHS, regardless of whether the management setting was in-patient or ambulatory.

Statistical analysis

The following data on patients undergoing ambulatory were collected prospectively: operative time, conversion to laparotomy, intraoperative morbidity (including bleeding, defined as a 100 mL higher bleeding), postoperative morbidity, and length of hospital stay. Pain was evaluated at the time of discharge and at the first visit using a visual analog