

ORIGINAL ARTICLE

Laparoscopic resection of hepatocellular carcinoma: a French survey in 351 patients

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Abstract

Objectives: Current clinical studies report the results of laparoscopic resection of hepatocellular carcinoma (HCC) obtained in small cohorts of patients. Because France was involved in the very early development of laparoscopic surgery, the present study was conducted in order to report the results of a large, multicentre experience.

Methods: A total of 351 patients underwent laparoscopic liver resection for HCC during the period from 1998 to 2010 in nine French tertiary centres. Patient characteristics, postoperative mortality and morbidity, and longterm survival were retrospectively reviewed.

Results: Overall, 85% of the study patients had underlying liver disease. Types of resection included wedge resection (41%), left lateral sectionectomy (27%), segmentectomy (24%), and major hepatectomy (11%). Median operative time was 180 min. Conversion to laparotomy occurred in 13% of surgeries and intraoperative blood transfusion was necessary in 5% of patients. The overall morbidity rate was 22%. The 30-day postoperative mortality rate was 2%. Negative resection (R0) margins were achieved in 92% of patients. Rates of overall and progression-free survival at 1, 3 and 5 years were 90.3%, 70.1% and 65.9%, and 85.2%, 55.9% and 40.4%, respectively.

Conclusions: This multicentre, large-cohort study confirms that laparoscopic liver resection for HCC is a safe and efficient approach to treatment and can be proposed as a first-line treatment in patients with resectable HCC.

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Introduction

Hepatocellular carcinoma (HCC), a cancer of frequent and world-wide occurrence, is most often associated with liver disease, mainly chronic hepatitis and cirrhosis.¹ In recent years, liver trans-

plantation has appeared to be successful in the treatment of both cancer and underlying liver disease.² The limited number of liver grafts available does not permit transplantation in all patients with early HCC. In patients with normal liver function, partial hepatic resection is still indicated as the primary treatment and leads to survival rates within the same range as those of patients who undergo liver transplantation on an intention-to-treat basis.³ Moreover, partial resection allows complete information about

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the pathology and prognostic characteristics of the resected tumour to be obtained, and thus facilitates the selection of the best candidates for further liver transplantation.⁴ However, conventional partial resection still carries a high risk for complications.

Laparoscopy has rapidly come to be recognized as a surgical technique that can decrease morbidity and shorten the hospital length of stay, as well as allowing other benefits. The results of randomized studies have led both surgeons and patients to regard laparoscopy as appropriate in the surgical treatment of various digestive diseases, including colon cancer.^{5,6} However, liver surgeons have been reluctant to use laparoscopy for several reasons, including the technical difficulties involved in liver exploration and mobilization, as well as in vascular control and parenchyma transection.⁷ These technical challenges, which are even more hazardous in patients with cirrhosis, may lead to an increased risk for haemorrhage and compromise the improvements in oncological results that liver surgeons have achieved in open liver surgery in recent years. For these reasons, the diffusion of laparoscopic liver surgery remains limited and thus most articles report the results of fairly small cohorts of patients in non-controlled studies. In the absence of randomized controlled studies, robust clinical data are needed to define the role of laparoscopy in the resection of HCC. Thus, this study was designed to review the results of such laparoscopic liver resections in HCC at a nationwide level in France, a Western country in which laparoscopy gained early popularity among surgeons.

Materials and methods

Study population

Prospective data for patients who underwent laparoscopic resection of HCC during the period from 1998 to 2010 were retrospectively retrieved from the databases of nine French tertiary centres. These centres were experienced in both open and laparoscopic liver surgery. Preoperative general evaluation relied on the patient's American Society of Anesthesiologists (ASA) score, age, severity of underlying liver disease assessed by the Model for End-stage Liver Disease (MELD) score, Child–Pugh class and presence of significant portal hypertension with oesophageal varices (grade II or greater). The decision to undertake surgical resection was based on expert opinion delivered at a multidisciplinary meeting. Selection criteria for laparoscopic resection were determined by the surgeon or local surgical team on the basis of tumour size and location [assessed by computed tomography (CT) and/or magnetic resonance imaging (MRI)], according to which suitability for laparoscopic resection was evaluated, and on a preoperative general evaluation of the patient. Patients presenting with decompensated cirrhosis (Child–Pugh classes B and C) or an ASA score of >3 were deemed to be unsuitable for surgical resection, including by laparoscopy.

Surgical technique

The surgical techniques for laparoscopic liver resection have been described previously.^{7–9} All liver resections were intended to be

totally laparoscopic and were performed according to the procedures described and the surgeon's usual practice. The patient was placed in a supine position with the legs apart, except in posterior liver (segments VI and VII) resections, in which left lateral decubitus positioning with an elevated right arm was chosen. Pneumoperitoneum was created by carbon dioxide insufflation at a pressure of 12–14 mmHg, and a 0-degree or 30-degree laparoscope was used. Parenchymal transection was performed with an ultrasonic dissector, or harmonic scalpel, in accordance with the surgeon's usual practice. Small vessels were controlled with bipolar coagulation or a harmonic scalpel. Larger vessels were clipped or electively stapled. The use of portal triad clamping was not systematic and depended upon the surgeon's habits and the amount of bleeding. The specimen was extracted through a suprapubic incision whenever possible in a dedicated laparoscopy bag. All resected specimens were sent to the pathology department for analysis. All surgeons were experienced in hepatic and laparoscopic surgery. Types of resection were defined according to the Brisbane 2000 classification.¹⁰ Minor resections involved two or fewer segments; major resections removed at least three segments. Resections of less than one segment (according to Couinaud's classification) were non-anatomical or wedge resections.

Postoperative management and follow-up

Postoperatively, patients were admitted to the intensive care unit only after major hepatic resection. After minor resections, patients were admitted to the surgical ward. Postoperative monitoring included liver biochemical tests on postoperative days 1, 3 and 5. Ultrasound and/or CT scans were indicated only in the event of complications. The occurrence of medical or surgery-related complications was closely monitored, as in open liver surgery. Morbidity was stratified by severity according to the Clavien–Dindo system of classification. Surgical complications included biliary leak, intra-abdominal collection, and parietal complications. Mid- and longterm follow-up included clinical, biological and radiological assessment at 1 month after surgery and subsequently every 6 months in all centres.

Evaluation criteria

Intraoperative evaluation criteria were operation duration, transfusion rate, need for and duration of a Pringle manoeuvre or portal triad clamping, and incidence of conversion to laparotomy. Postoperative parameters studied included: pathological margins; postoperative medical and surgical complications; 30- and 90-day mortality, and duration of hospital stay. Longterm survival and recurrence rates were estimated at 1, 3 and 5 years.

Data on clinicopathological factors, such as age, sex, ASA grade, preoperative hepatic function, underlying liver disease and its cause, number and size of tumours, fulfilling of the Milan Criteria, vascular invasion, presence of satellite nodules, and pathological margins, were collected.

An additional analysis referred to survival outcomes in a subgroup of patients with a good prognosis defined by Child–Pugh

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