DOI:10.1111/hpb.12257 HPB

ORIGINAL ARTICLE

Open and laparoscopic resection of hepatocellular adenoma: trends over 23 years at a specialist hepatobiliary unit

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Abstract

Background: Hepatocellular adenoma (HCA) is a rare benign liver epithelial tumour that can require surgery. This retrospective study reports a 23-year experience of open and laparoscopic resections for HCA.

Methods: Patients with a histological diagnosis of HCA were included in this analysis. Surgical resection was performed in all symptomatic patients and in those with lesions measuring > 5 cm.

Results: Between 1989 and 2012, 62 patients, 59 of whom were female, underwent surgery for HCA (26 by open surgery and 36 by laparoscopic surgery). Overall, 96.6% of female patients had a history of contraceptive use; 54.8% of patients presented with abdominal pain and 11.2% with haemorrhage; the remaining patients were asymptomatic. Patients who underwent laparoscopy had smaller lesions (mean ± standard deviation diameter: 68.3 ± 35.2 mm versus 91.9 ± 42.5 mm; $P = 0.022$). Operatively, laparoscopic and open liver resection did not differ except in the number of pedicle clamps, which was significantly lower in the laparoscopic group (27.8% versus 57.7% of patients; $P = 0.008$). Postoperative variables did not differ between the groups. Mortality was nil. Two surgical specimens were classified as HCA/borderline hepatocellular carcinoma. At the 3-year follow-up, all patients were alive with no recurrence of HCA.

Conclusions: Open and laparoscopic liver resections are both safe and feasible approaches for the surgical management of HCA. However, laparoscopic liver resections may be limited by lesion size and location and require advanced surgical skills.

Received 20 November 2013; accepted 27 January 2014

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Introduction

Although rare, hepatocellular adenoma (HCA) is the most common benign epithelial tumour of the liver.[1] First described by Edmondson in 1958,[2] the incidence of HCA has progressively increased since the 1970s to reach approximately three cases per million population per year, of which 90% occur in women.[3] This trend may be explained by the wide use of oral oestrogen-based contraceptives among young women, combined with the increasing quality and number of liver imaging techniques.[1] Recently, distinct subtypes of HCA, based on molecular alterations, have been identified.[4] These types are: (i) H-HCA, in which inactivating mutations of the gene are encoded by hepatocyte nuclear factor-1α (HNF-1α); (ii) β-HCA, which shows a β-catenin-activating mutation; (iii) I-HCA, which represents inflammatory HCA, and (iv) U-HCA, which represents unclassified HCA.[4] Either H-HCA or I-HCA is found in 80% of patients, whereas β-HCA is found in approximately 10–15%. The I-HCA subtype accounts for 40–50% of all adenomas and has been demonstrated to be associated with alcohol abuse and obesity.[5] Recently, new risk factors for HCA have emerged, including metabolic syndrome,[5]

This study was presented as a poster at the 10th Congress of the European Hepato-Pancreato-Biliary Association, 29–31 May 2013, Belgrade.

use of clomiphene, methyltestosterone or danazol, Klinefelter's syndrome, types Ia, Ib and III glycogen storage disease,[6] and familial adenomatous polyposis.[1] Hepatocellular adenoma is usually a solitary tumour of variable size, but in 10–24% of patients it presents with multiple nodules; the presence of more than 10 nodules is defined as liver adenomatosis.[7–9] Symptoms can be related to tumour size or to specific complications. Size-related symptoms are usually non-specific, such as right upper quadrant tenderness, dyspepsia or abdominal mass presentation. A specific and potentially life-threatening complication of HCA is tumour rupture with haemorrhage, observed in 20–40% of patients.[10–12] Malignant transformation affects up to 10% of patients and does not distinguish between isolated HCA and liver adenomatosis.[1]

Diagnosis is based on multi-phase spiral computed tomography (CT) and multi-phase contrast-enhanced magnetic resonance imaging (MRI), but a definitive diagnosis is possible only after a histopathological examination.[13,14] Biopsy can be useful in subtyping HCA, but is not always recommended for diagnosis because it can induce bleeding and tumour dissemination.[15,16] Moreover, biopsy cannot completely rule out the occurrence of malignant transformation.[17] Although there has been no consensus on the management of HCA, surgical resection is generally indicated for tumours larger than 5 cm, in symptomatic patients, or when there is strong concern regarding malignant transformation.[18,19] For liver adenomatosis, liver transplantation is the only cure because of the frequent bilobar distribution of the lesions.[20]

The application of laparoscopic liver surgery in benign diseases was first reported in 1991.[21] Since then, many authors have presented series of patients submitted to laparoscopic resection for benign liver tumours.[22] Although there has been a lack of international guidelines, the laparoscopic approach has been used mainly in patients with peripheral lesions located in the left lateral (segments II and III) and anterior (segments IVb, V and VI) liver, which have required limited resections.[23–25] However, major laparoscopic liver resections (more than three segments) have also been reported with successful outcomes when performed by experienced surgeons in specialized centres.[23,26–28]

The few studies in the literature that have reported the laparoscopic management of liver adenomas have mostly described heterogeneous populations of patients presenting with different benign liver diseases requiring surgery.[22,23,29] The aim of the present study was to report the 23-year experience of a specialist hepatobiliary unit in the surgical resection of HCA, managed by both open and laparoscopic approaches. The indications, outcomes, complications and advantages of both techniques are discussed.

Materials and methods

This was a retrospective study of a prospectively maintained database on HCAs. Demographic, preoperative, operative and postoperative data for patients diagnosed with HCA and submitted to surgery between 1989 and 2012 were retrieved and analysed after institutional board approval.

Patients were included in the study if the diagnosis of HCA had been confirmed by a histopathological analysis of the surgical specimen. All resected HCAs were classified using common histological and immunohistochemical criteria.[30]

Surgical resection was performed in all symptomatic patients and in those with lesions measuring >5 cm. Patients with polyadenomatosis (≥10 nodules) were excluded.

Prior to surgery, all patients underwent imaging including abdominal ultrasound, multi-phase spiral CT and multi-phase contrast-enhanced MRI. Liver biopsy was performed selectively when preoperative imaging was unclear. Each patient was individually evaluated in a multidisciplinary meeting during which the best surgical approach and technique were collegially discussed and chosen.

The surgeries were performed using either an open or a laparoscopic approach on a patient-by-patient basis. The main clinical criteria used to select the surgical technique were lesion size and location (i.e. proximity to major vascular structures) and, consequently, the extent of hepatic tissue (i.e. segments) that required to be resected. Surgical decisions were based on imaging studies. Both elective and emergency settings were included. Emergency surgery was performed when tumour rupture was identified, based on clinical symptoms and radiological findings. The surgeries included all types of liver resection (e.g. major resection, bisegmentectomy, segmentectomy, wedge resection), performed according to the location and size of the tumour. The Pringle manoeuvre was not used as a routine procedure.

The same team has previously described laparoscopic liver resection performed using the standard nomenclature.[22,31] Major hepatectomy was defined as resection of three or more liver segments, whereas minor hepatectomy included segmentectomy, bisegmentectomy and wedge procedures.[22,32] For open liver resection, a right subcostal incision, with or without an upper midline extension, was performed. Crush and clamp techniques, oversewing of biliary ducts, monopolar and bipolar cautery, and, more recently, the Cavitron ultrasonic surgical aspirator (CUSA; Tyco Healthcare, Covidien, Inc., Mansfield, MA, USA) and vascular stapler were used. For laparoscopic liver resections, liver parenchyma transection was performed using a combination of the LigaSure (Valleylab, Covidien, Inc.), the Harmonic Scalpel (Ethicon EndoSurgery, Inc., Cincinnati, OH, USA), the Endo GIA vascular stapler (US Surgical Corp., Norwalk, CT, USA), and bipolar cautery. In all patients, prior to surgical transection, intraoperative liver ultrasound was performed to guide and limit the resection margins.

After liver resection, patients were included in a 1-year and 3-year follow-up protocol. The following variables were analysed: patient demographics [e.g. age, sex, body mass index (BMI), medications taken]; imaging studies; laboratory tests; biopsies; surgical technique (i.e. open or laparoscopic); surgical complications (e.g. duration, conversion, blood loss); tumour characteris-