

Laparoscopic Hepatectomy for Benign Liver Tumors

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SUMMARY

We describe our initial experience with videolaparoscopic hepatectomies. From November 1997 to May 1999, 6 female patients whose ages ranged from 36 to 71 years with hepatic benign tumors were submitted to laparoscopic hepatectomy. Three patients had hepatic adenomas, 1 non-parasitic cyst, 1 focal nodular hyperplasia and 1 hemangioma. The laparoscopy was performed under general anesthesia with a pneumoperitoneum of carbonic gas. The following were used: 0° and 30° optics, 5, 10 e 12-mm trochars, a ring forceps, dissecting forceps, simple grasping forceps, curved scissors, mono- and bipolar cautery, endoscopic clip and vascular stapler. No ultrasonic

scalpel or argonium coagulation were used. The surgical specimens were removed through a Pfannenstiel incision around 4-5cm long, for a better anatomicopathological evaluation. The surgical time ranged from 3 hours to 4 hours and 30 minutes. One patient had a prolonged ileus during the immediate postoperative period. Only a single patient had an abdominal drain. The time of hospitalization ranged from 2 to 7 days. No complications were observed in relation to the pneumoperitoneum. No deaths occurred in this series. In this way, laparoscopic hepatectomy may be an alternative approach in carefully selected patients.

KEY WORDS:

Laparoscopic hepatectomy;
Benign liver tumors;
Laparoscopic surgeries;
Liver resection

INTRODUCTION

The most frequently performed abdominal laparoscopic procedures are cholecystectomy, exploration and anastomosis of the bile ducts, hernias, operations on the digestive tract and, recently, resections of parenchymal organs such as the spleen, the adrenal glands and the kidneys (1), as well as the resection of tumors located on the surface of the liver (2-4).

Laparoscopic hepatectomy presents technical limitations when compared to other procedures on this organ. The greatest challenges consist of locating the tumor in the hepatic parenchyma (5), performing hemostasis of the sectioned parenchyma and controlling the bleeding of large intrahepatic vessels (6). The use of perioperative ultrasonography (7-9) and ultrasonic scalpel are useful allies to prevent the above-described complications (10). This procedure became possible in selected cases with the development of new laparoscopic instruments, and since Reich (11), in 1991, described two successful cases of laparoscopic hepatectomy for superficial tumors, more cases have been reported (6,12,13).

The purpose of this study is to describe our initial experience with videolaparoscopic hepatectomies.

SURGICAL TECHNIQUE

Patients And Methods

From November 1997 to May 1999, 6 female patients with benign tumors of the liver were submitted to videolaparoscopic hepatectomies after they had signed an informed consent. Their ages ranged from

36 to 71 years. The indications for surgery were 3 adenomas, 1 non-parasitic cyst, 1 focal nodular hyperplasia and 1 hemangioma. Besides the three adenomas for which there was a clear surgical indication due to the risk of becoming malignant, the patient with focal nodular hyperplasia was operated on because there was a diagnostic doubt. This was a similar reason to that of the non-parasitic cyst, which grew in a patient previously submitted to mastectomy for breast cancer. The patient with hemangioma was submitted to surgery because she was in pain.

The preoperative evaluation, consisting of red blood cell count, renal function (creatinine and urea), chest X-ray and electrocardiogram, was normal in all patients. The results of liver function tests (aspartate aminotransferase, alanine aminotransferase, total bilirubin, gamma-glutamyltransferase), performed on all patients, were within the limits of normality. All the patients were submitted to preoperative echography and abdominal computed tomography. All patients received 5,000 units of heparin subcutaneously, starting 2 hours before the surgery and continuing every 12 hours postoperatively to prevent pulmonary embolisms.

Four left lobectomies (segments II and III) and 2 atypical resections were carried out (Table 1). The laparoscopy was performed with a pneumoperitoneum at a maximum pressure of 12 mmHg of carbonic gas. The following were used: 0° and 30° optics, 5-, 10- and 12-mm trochars, a ring forceps to grasp the hepatic parenchyma, a large dissecting forceps, simple grasp-

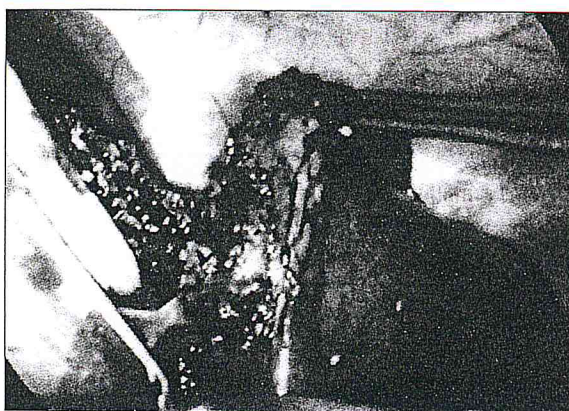


FIGURE 1 The use of the vascular stapler for cutting and ligating the portal branch of segment III.

ing forceps, curved scissors, mono and bipolar cautery, endoscopic clip and vascular stapler (Endocutter). No ultrasonic scalpel or argonium coagulation were used.

The procedures were performed under general anesthesia with the patients in gynecological position. Three 10-mm trochars were introduced, one of them on the left axillary line, one lateral and cranial to the navel, and another at the axillary midline, a 5-mm trocar on the anterior axillary line below the right costal margin and a 12-mm trocar mid-way between the camera and the anterior axillary line. After the hepatic surface resection was demarcated, the parenchyma was cut using the kelliclasia technique. For anatomical resections (left lateral segment), the liver was laterally pulled with a ring forceps starting the liver dissection with the kelliclasia technique. The larger vessels (branches of portal vein to segments II-III and left hepatic vein) were resected with vascular stapler after carefully dissection with a large dissecting forceps (**Figure 1**). The surgical specimens were removed entirely in all cases through a Pfannenstiel incision around 4-5cm long, for a better anatomopathological evaluation.

Results

The patients' ages, description of hepatic lesions, type of resection performed, operation time, hemorrhage and time in hospital are shown in Table 1. It was necessary to perform a 20-minute pedicle clamping in patient 4, who required blood product transfu-

sion during the postoperative period (2 units of packed red blood cells) and she also presented an extensive hematoma in the dorsal region, and no hemodynamic changes were observed during surgery. The surgical time was from 3 hours to 4 hours and 30 minutes. Patient 1 had a prolonged ileus during the immediate postoperative period. Only a single patient had an abdominal drain. The time of hospitalization ranged from 2 to 7 days. No complications were observed in relation to the pneumoperitoneum with carbonic gas. No deaths occurred in this series.

DISCUSSION

The success of laparoscopic cholecystectomy encouraged a growing number of surgeons to perform more complex procedures. However, laparoscopic hepatectomy is not accepted with the same degree of confidence as conventional surgery (12,13).

On the other hand, the development of the equipment used in open surgery, such as the ultrasonic scalpel, argonium coagulation and tissue coagulation using microwaves, seeks to reproduce a safe technique in the laparoscopic procedure (6).

The indications for videolaparoscopic hepatectomy reported in literature so far have been hepatic adenoma (5,14), focal nodular hyperplasia (5,15), single metastasis (6,15), hemangioma, Wilson's disease, hemochromatosis (6) and hepatocellular carcinoma (6,16,17). The assessment of tumor size, type and location are important in planning a laparoscopic hepatectomy. Thus, patients with solid neoplasms, smaller than 5cm in diameter, located in the lower segments (IVB, V and VI) or in the left lateral segment (II and III) are the best candidates for laparoscopic resection (4,6,18).

In our cases, when cutting the parenchyma we used only kelliclasia and vascular stapler for larger vessels, and no significant intraoperative bleeding or biliary fistulae were observed during the postoperative period. Two of our patients had tumors larger than 5cm, but even so it was possible to perform resections and remove the lesions through a low abdominal incision.

Another problem of laparoscopic hepatectomy is the occurrence of gas embolism associated with the use of the pneumoperitoneum (16,19). In order to avoid this risk, Kaneko *et al.* (6) use the mechanical suspension of the abdominal wall. However, the role of

TABLE 1 Characteristics of the Patients and their Hepatic Lesions, together with the Type of Videolaparoscopic Resection Employed and the Hospital Stay

Patients	Age (years)	Lesion	Hepatic segment of the lesion	Resection	Operation time (h: min)	Hemorrhage (mL)	Hospital stay (days)
1	36	Adenoma (6cm)	III	Left lobectomy	4:00	310	6
2	38	Adenoma (5cm)	II-III	Left lobectomy	3:30	350	2
3	36	Adenoma (4cm)	VI	Atypical	3:45	330	2
4	71	Hemangioma (8cm)	II-III	Left lobectomy	4:30	900	7
5	66	Focal Nodular Hyperplasia (5cm)	II-III	Atypical	4:15	265	3
6	47	Non-parasitic cyst (4cm)	III	Left lobectomy	3:30	390	2

the pneumoperitoneum in embolism must be studied further. Our patients did not present any change related to pneumoperitoneum with carbonic gas. Furthermore, all of our patients received low-dose heparin for pulmonary embolism prophylaxis.

The resected specimen must be protected at the time of removal, especially if the lesion is malignant, reducing the risk of possible tumor dissemination. In some cases, when the resected liver parenchyma is large, it is necessary to perform an additional incision at the site where the trocar is inserted, allowing the specimen to be removed without creating problems for the anatomopathological exam, or else a small Pfannenstiel incision should be used as performed in the presented cases.

Depending on the location and volume of the lesion, laparoscopic hepatectomy could be an advantageous choice among the techniques available for liver resection, since this technique requires less hospital

time, and has a lower rate of complications, with a surgical result as good as that achieved by traditional laparotomy (5,6,15,17,20,21), as observed in these cases. However, this procedure should be performed according to strict criteria, and at centers with experience in hepatic and laparoscopic surgery. In addition, though there are some authors describing successfully laparoscopic liver resection in cases of malignant neoplasia (6,16,17), this technique must be further investigated in this kind of patient because the risk of the malignant spread of the disease throughout the peritoneal cavity. In this way, our initial experience is limited to benign liver lesions.

Currently, laparoscopic hepatectomy does not replace the open conventional surgery, but may provide an alternative approach in carefully selected patients. Conversion must be acknowledged as a safety measure and not as a failure in the technique.

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