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Totally Laparoscopic Hepatic Bisegmentectomy (s4b+s5) and Hilar Lymphadenectomy for Incidental Gallbladder Cancer

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ABSTRACT

Background. Gallbladder cancer is suspected preoperatively in only 30% of all patients, while the other 70% of cases are discovered incidentally by the pathologist. The increasing rate of cholecystectomies via laparoscopy has led to the detection of more gallbladder cancers in an early stage. Extended resection with regional lymph node dissection has been suggested. We present a video of a totally laparoscopic liver resection (segments 5 and 4b) with regional lymphadenectomy in a patient with an incidental gallbladder cancer.

Methods. A 50-year-old woman underwent laparoscopic cholecystectomy. Pathology revealed a T1b gallbladder carcinoma. Patient was referred for further treatment. Contact with primary surgeon, revealed that no intraoperative cholangiogram was performed, and gallbladder was removed intact, with no perforation, and inside a plastic retrieval bag. Pathology revision confirmed T1b and PET-CT was negative. Multidisciplinary tumor board decided to recommend radical re-resection. Decision was to perform a laparoscopic extended hilar lymphadenectomy, along the resection of segments 5 and 4b.

Results. The operative time was 5 hours. Blood loss was 240 mL. Recovery was uneventful and patient was discharged on the 4th postoperative day. Final pathology showed no residual disease and no lymph node metastasis.

Conclusions. Laparoscopic resection of the liver segments 5 and 4b combined with a locoregional lymphadenectomy of the hepatoduodenal ligament is an oncologically appropriate technique, provided it is performed in a specialized center with experience in hepatobiliary surgery and advanced laparoscopic. This video may help oncological surgeons to perform this complex procedure.

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Gallbladder carcinoma is an uncommon cancer with a poor prognosis and is the most common biliary tract malignancy. Women are affected three times more commonly than men.[1] The most important risk factor for the development of gallbladder cancer is cholelithiasis. In the era of laparoscopic cholecystectomy, incidental gallbladder carcinoma has increased and allows detecting cancer at early stages with a better prognosis.[2,3] In fact, the diagnosis of a malignancy on pathological examination after simple cholecystectomy for presumed benign disease is estimated to vary from 0.3 to 2% and often needs radical surgery to obtain appropriate oncological treatment surgery to obtain radical treatment.[3,4] This video shows a minimally invasive treatment of a patient with an incidental gallbladder cancer diagnosed after laparoscopic cholecystectomy. The operation consisted in totally laparoscopic liver resection (segments 5 and 4b) and regional lymphadenectomy. This video may help oncological surgeons to perform and standardize this complex procedure.

METHODS

A 50-year-old woman underwent laparoscopic cholecystectomy. Pathology revealed a T1b gallbladder carcinoma. Patient was referred for further treatment. Contact with primary surgeon, revealed that no intraoperative

cholangiogram was performed, and gallbladder was removed intact, with no perforation, and inside a plastic retrieval bag. Pathology revision confirmed T1b and PET-CT was negative. Multidisciplinary team decided for radical re-resection. Laparoscopic hilar lymphadenectomy, along resection of segments 5 and 4b, was proposed.

The patient is placed in a supine position with the surgeon standing between patient's legs. This technique uses 4 trocars. Pneumoperitoneum is established at a pressure of 12 mm Hg. Type and location of trocars are described elsewhere.[5] Briefly, two 5mm trocars, one 10 mm trocar and one 12 mm trocar are used. The first trocar (12 mm) is inserted in umbilicus and it is used by the surgeon right hand for hilar dissection and parenchymal transection. The second trocar (10 mm) is inserted in the mid-clavicular line about 3 cm above the level of the first trocar and it is used by the first assistant for the 10 mm, 30 degrees laparoscope during all steps of the surgery. The third trocar (5 mm) is inserted in the sub-xyphoid position and it is used for liver retraction with the snake retractor (usually positioned at the gallbladder bed). The fourth trocar (5 mm) is inserted in the axillary line and it is used by the surgeon left hand for retraction of hilar structures and saline irrigation during parenchymal transection.

At laparoscopy, we can see adhesions on the gallbladder bed and no signs of peritoneal or trocar implants are detected. Adhesions are divided, leaving part of the omentum along the gallbladder bed. A laparoscopic 5-mm snake liver retractor is introduced by the epigastric port and it is used for upward liver retraction and exposure of the hepatoduodenal ligament. Extensive hilar lymphadenectomy is carried out. Dissection of hepatic hilum is carefully performed exposing the anterior surface of common bile duct, common hepatic artery and portal vein. Cystic duct stump is identified and ligated near main bile duct. Frozen section biopsy of cystic duct stump is performed and was negative. Hepatoduodenal ligament lymphadenectomy is then completed (Fig.1a).

Future line of transection, is marked with cautery, along the liver surface. The liver parenchyma is divided with bipolar forceps with saline irrigation along previous demarcation. Glissonian pedicles from segment 4b are identified and divided within liver substance, resulting in ischemic delineation of segment 4b (Fig. 1b). Next step is to divide the liver along the right anterior glissonian pedicle. Usually the segment 5 has three glissonian pedicles arising vertically. These pedicles are identified and divided, sparing segment 8 glissonian pedicle (Fig. 1c). These maneuvers result in ischemic delineation of segment 5 and 4b (Fig. 1d). Liver transection continues with the use of bipolar forceps. Liver resection of segments 5 and 4b is completed (Fig. 1e). All these steps were performed without the Pringle maneuver.

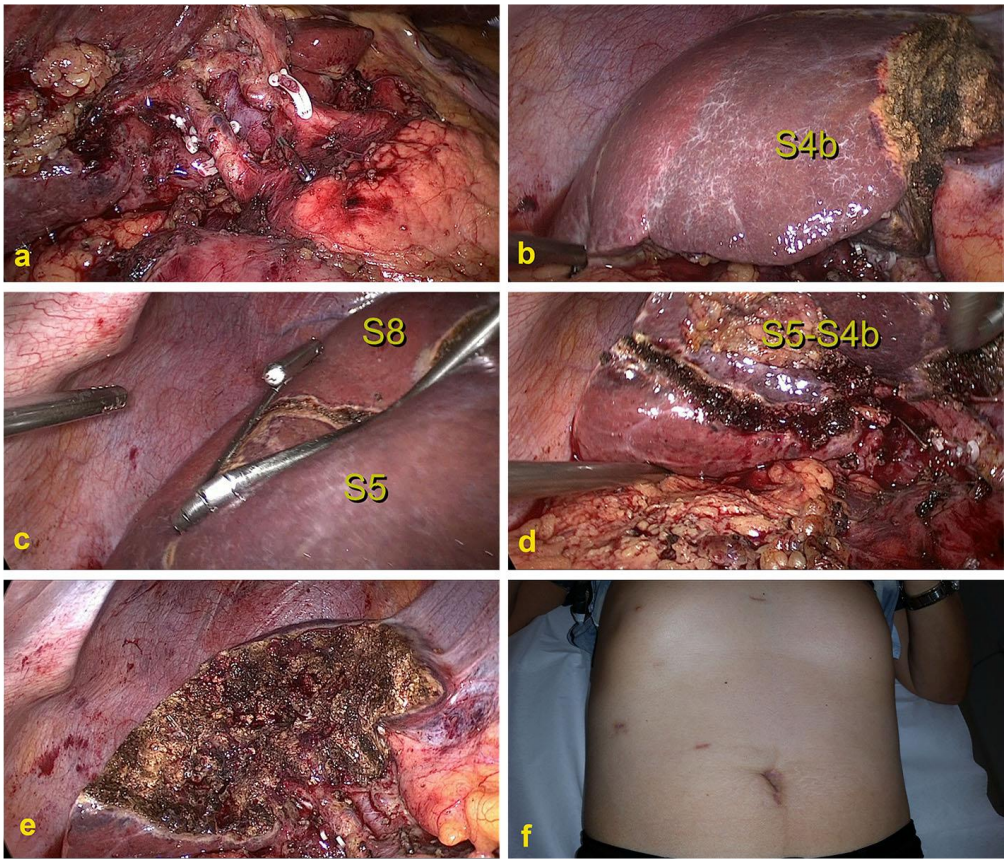

FIG. 1 Laparoscopic hepatic bisegmentectomy (s4b+s5) and hilar lymphadenectomy for incidental gallbladder cancer. **a** Final aspect after hilar lymphadenectomy; **b** ischemic delineation of segment 4b (S4b); **c** ischemic delineation of segment 5 (S5), sparing segment 8 (S8);**d** ischemic delineation of segments 5 and 4b (S5-S4b); **e** final aspect after resection of segments 5 and 4b; **f** trocar incisions 1 month after the procedure

Surgical specimen is removed inside a plastic bag and retrieved through extended umbilical incision. Pneumoperitoneum is reestablished and liver raw surface is reviewed for bleeding and bile leaks. Hemostatic tissue is applied and abdominal cavity is drained with one round 19-F drain.

RESULTS

Operative time was 5 hours. Estimated blood loss was 240 mL, without the need for transfusions. Postoperative recovery was uneventful. Patient resumed clear liquids in the first postoperative day. Bowel movements were perceived on the second PO day. Patient was discharged on the fourth PO day. Abdominal drain was removed on the seventh postoperative drain with no signs of biliary leakage. Final pathology showed no residual disease in the liver specimen and no metastasis among nine retrieved lymph nodes. Patient is well with no evidence of the disease 12 months after the procedure (Fig. 1f).

DISCUSSION

Laparoscopic technique is not oncologically inferior to open approach given that it follows the same principles of the oncologic surgery for the treatment of incidental gallbladder cancer. Although it lacks tactile feed-back, laparoscopy allows a more extensive visual exploration of the entire abdomen than through an open incision.

Cancer of the gallbladder is the most frequent cancer of the biliary tract worldwide and the sixth most frequent cancer of the gastrointestinal tract. However, adequate surgical treatment is performed in less than 20% of cases.5 The best survival rates are for patients with incidental tumors who undergo radical surgery.[6-8] Although cholecystectomy is an appropriate treatment for T1a patients, radical resection has shown benefits in the survival of patients in more advanced stages.[9,10]

Simple laparoscopic cholecystectomy is appropriate for T1a patients with clear margin and unbroken gallbladder, whereas extended radical resection is recommended for patients with T1b or more advanced incidental gallbladder cancer. [11] An intact surgical specimen and the use of plastic retrieval bags are important to reduce the risk of port-site recurrences and disease relapse.[11] In the present case, contact with referring surgeon assured that gallbladder was removed intact with no spillage of bile. Early diagnosis, meticulous perioperative assessment, and precise surgery are essential factors to obtain good results in incidental gallbladder cancer treatment.[11] In a systematic review, the pooled proportion of patients with unresectable disease when attempting revisional surgery was 23%.[10] When it is feasible, further surgery with radical resection offers the only chance for cure. The standard treatment is radical resection consisting of a hepatic resection with lymphadenectomy but there is some debate about the appropriate extent of parenchyma resection. For incidental gallbladder cancer, our standard approach is hilar lymphadenectomy and the resection of segments 4b and 5 without port-site resection. This approach is similar to that used by other authors.[4,6,9] In a German multicenter study, resection of segments 4b and 5 was associated with improved long-term survival. [12,13] In a large cohort of patients from the French registry and Memorial Sloan-Kettering Cancer Center, port-site excision was not associated with improved survival and therefore should not be considered mandatory during definitive surgical treatment of incidental gallbladder cancer. [14,15] Lymphadenectomy of the hepatoduodenal ligament is useful for staging gallbladder cancer and may reduce the incidence of local recurrence in incidental tumors where lymph node metastases may be found in up to 45% of cases. [16,17] As already reported, positive cystic duct margin correlates with 42% of residual disease in the common bile duct. [17] Therefore, resection of the common bile duct is only performed if cystic duct margin is positive. In the present case, margin was negative and common bile duct resection was not necessary. If necessary, laparoscopic resection of common bile duct with Roux-en-Y hepaticojejunostomy is feasible and safe.[18,19]

Laparoscopic bisegmentectomy (s4b+s5) was performed without the use of intrahepatic Glissonian approach due to the fact that the previously described technique uses hepatotomy incisions to control the right anterior pedicle (segments 5 and 8) and segment 4a and 4b altogether. [20,21] Segment 5 pedicles are usually in number of three and arise vertically from the right anterior pedicle. The same is true for the segment 4b, the Glissonian technique controls the root of segment 4. In order to control the segment 4b alone, one needs to individually divide branches from 4b sparing 4a pedicles.[20,21]

Laparoscopy liver resection is associated with less bleeding, fewer complications, and a better quality of life than open liver surgery.[22] However, in cases of incidental gallbladder cancer laparoscopic revisional surgery has been rarely performed. So far, to our knowledge, there are only three reports (two from the same service) of laparoscopic treatment of gallbladder cancer.[19,23,24]. A recent paper describes 11 patients with T1b/T2 gallbladder carcinoma (4 preoperative diagnosis and 7 incidentally discovered after/during elective laparoscopic cholecystectomy) treated with laparoscopic removal of gallbladder bed and lymphadenectomy (two cases of common bile duct resection). The authors concluded that laparoscopic radical cholecystectomy is safe and beneficial for those patients.[22] These three reports have used a limited resection of the gallbladder bed instead of resection of segments 5 and 4b. To our knowledge, this may be the first case of laparoscopic anatomical resection of segments 5 and 4b and hilar lymphadenectomy used for incidental gallbladder cancer.

CONCLUSIONS

Laparoscopic resection of the liver segments 5 and 4b combined with a locoregional lymphadenectomy of the hepatoduodenal ligament is an oncologically appropriate technique, provided it is performed in a specialized center with experience in hepatobiliary surgery and advanced laparoscopic. This video may help oncological surgeons to perform this challenging procedure.

DISCLOSURE Drs. Machado, Makdissi and Surjan have no conflicts of interest or financial ties to disclose.

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