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ORIGINAL ARTICLE – HEPATOBILIARY TUMORS

Totally Laparoscopic Right hepatectomy with Roux-en-Y Hepaticojejunostomy for Right-sided Intraductal Papillary Mucinous Neoplasm of the Bile Duct

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ABSTRACT

Background. Intraductal papillary neoplasm of the bile duct is a precursor lesion of cholangiocarcinoma. We present a video of a totally laparoscopic right hepatectomy with hilar dissection and lymphadenectomy, *en bloc* resection of extrahepatic bile duct and Roux-en-Y hepaticojejunostomy in a patient with intraductal papillary neoplasm of the right hepatic duct.

Methods. A 58-year-old woman with right upper quadrant pain, was referred for evaluation. Abdominal ultrasonography revealed dilatation of intra- and extrahepatic bile ducts. MRI showed a stop in the right bile duct, with dilatation of the distal bile duct. Decision was to perform a totally laparoscopic right hepatectomy with hilar lymphadenectomy and Roux-Y hepaticojejunostomy.

Results. The operative time was 400 minutes. Estimated blood loss was 400 ml, without the need for transfusions. Postoperative recovery was uneventful and the patient was discharged on the 10th postoperative day. Abdominal drain was removed on the 14th postoperative drain with no signs of biliary leakage. Final pathology confirmed the diagnosis of intraductal papillary neoplasm without malignant transformation. Surgical margins were free. Patient is well with no evidence of the disease 14 months after the procedure.

Conclusions. Laparoscopic right hepatectomy with hepaticojejunostomy is feasible and safe, provided it is performed in a specialized center and staff with experience in hepatobiliary surgery and advanced laparoscopic. At the present time, this operation is reserved for selected cases. This video can help oncological surgeons to perform this complex procedure.

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Cholangiocarcinoma is a malignant tumor that can develop within the intrahepatic or extrahepatic biliary tree. Although cholangiocarcinogenesis remains unknown, it has been hypothesized that this tumor may derive from premalignant precursor lesions.[1-3]

Intraductal papillary neoplasms of the bile duct are thought to be a rare precursor lesion cholangiocarcinoma.[3] Improvements in the imaging studies have increased the awareness of this rare but important disease.[4]

This video shows a minimally invasive treatment of a patient with a mucinous-producing intraductal papillary neoplasm of the right hepatic duct. The operation consisted in totally laparoscopic right hepatectomy (removal of segments 5, 6, 7 and 8) with hilar dissection and lymphadenectomy, *en bloc* resection of extrahepatic bile duct and Roux-en-Y hepaticojejunostomy. This video may help oncological surgeons to perform and standardize this challenging procedure.

METHODS

A 58-year-old woman with right upper quadrant pain, was referred for evaluation. Abdominal ultrasonography revealed dilatation of intra- and extrahepatic bile ducts. Medical history was irrelevant except for an open cholecystectomy 30 years before. Magnetic resonance imaging showed a mass in the right bile duct, with

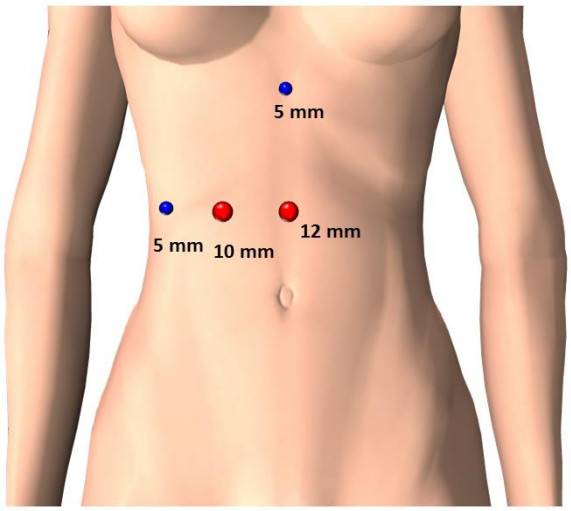

FIG 1. Diagram of type and placement of trocars used for laparoscopic right hepatectomy with Roux-en-Y hepaticojejunostomy. The 1st trocar (12 mm) is inserted in the midline ~ 3 cm above the umbilicus (surgeons right hand and stapler). The second trocar (10 mm) is inserted in the mid-clavicular line (laparoscope). The third trocar (5 mm) is inserted in the subxyphoid position (liver retractor). The fourth trocar (5 mm) is inserted in the axillary line (surgeon's left hand)

dilatation of the distal bile duct. Suspected diagnosis was an intraductal papillary neoplasm of the right hepatic of undetermined malignancy. Decision was to perform a totally laparoscopic right hepatectomy with hilar lymphadenectomy and Roux-Y hepaticojejunostomy.

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 (Figure 1). The first trocar (12 mm) is inserted in the midline about 3 cm above the umbilicus and it is used by the surgeon right hand for hilar dissection, part of the parenchymal transection (harmonic scalpel), stapler (division of the liver parenchyma and Roux-en-Y construction) and for hepaticojejunostomy (3 mm needle-holder). The second trocar (10 mm) is inserted in the mid-clavicular line at the same 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), transverse colon retraction, jejunal loop retraction during Roux-en-Y construction by the second assistant during all time, except during liver mobilization when the surgeon divides coronary ligament with a 5 mm hook. The fourth trocar (5 mm) is inserted in the axillary line at the same level of the first and second trocars and it is used by the surgeon left hand for retraction of hilar structures and jejunal loop, part of the parenchymal transection (harmonic scalpel), and for hepaticojejunostomy (5 mm needle-holder in reverse mode).

First step is to fully mobilize the right liver. 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 hepatic hilum. Extensive hilar lymphadenectomy is performed. Dissection of hepatic hilum is carefully performed exposing the anterior surface of common bile duct, common hepatic artery and portal vein.

Hepatic artery is dissected and encircled. The same maneuver is done with the common bile duct. Dissection progresses and right hepatic artery is encountered and divided. Hepatic hilum is completed skeletonized. Common bile duct is then divided. Distal bile duct is sent to frozen section which came negative. Right portal vein is carefully dissected and ligated. Hepatic pedicle dissection is completed and right liver is now ischemic and ready to be transected. Future line of transection, is marked with cautery, along liver surface. Liver transection is accomplished with harmonic scalpel and endoscopic stapling device as appropriate. Right portal vein is divided with stapler during liver transection. This maneuver is often necessary because the difficulty in allocate the stapler before liver transection. Right hepatectomy is completed. Left hepatic duct is also sent for frozen section (negative). Operation is completed with reconstruction of the biliary tract. Jejunal loop is divided with stapler about 20 cm from Treitz ligament and side-to-side jejunojejunostomy is performed with stapler leaving a 40 cm jejunal loop for hepaticojejunostomy. Next, an end-to-side hepaticojejunostomy is performed with running absorbable suture. Surgical specimen is then retrieved through suprapubic incision. Pneumoperitoneum is reestablished and liver raw surfaces are reviewed for bleeding and bile leaks. Falciform ligament was sutured to maintain the left liver in its original anatomical position avoiding hepatic vein kinking, and abdominal cavity was drained with one round 19-F abdominal drain.

RESULTS

The operative time was 400 minutes. Estimated blood loss was 400 ml, without the need for transfusions. Postoperative recovery was uneventful. Patient resumed clear liquids in he first postoperative day. Bowel movements were perceived on the second PO day. Patient was able to be discharged on the fourth postoperative day but for personal reasons decided to stay at the

hospital little longer. She was then discharged on the 10th postoperative day. Abdominal drain was removed on the 14th postoperative drain with no signs of biliary leakage. Final pathology confirmed the diagnosis of intraductal papillary neoplasm without malignant transformation. Surgical margins were free. Patient is well with no evidence of the disease 14 months after the procedure.

DISCUSSION

Intraductal papillary neoplasms of the bile duct may have a wide clinicopathological spectrum.[6] The better knowledge of the mechanisms involved in the malignant transformation to cholangiocarcinoma makes surgical resection of this neoplasm a recommendation.[3,6] Indeed, a recent review of 24 cases of intraductal neoplasm of the intrahepatic bile duct showed 67% of overt malignancy and 12% of borderline lesions.[7] However, this disease has a good prognosis after complete resection, especially in cases without multiplicity and when the tumor is entirely intraductal.[8-10]

Laparoscopy liver resection is associated with less bleeding, fewer complications, and a better quality of life than open liver surgery.[11] However, in cases where there is need for hilar lymphadenectomy and biliary reconstruction, laparoscopic resection has been rarely performed due to technical reasons. So far, to our knowledge there are only two reports of laparoscopic resection of the liver with biliary reconstruction.[12-13] Both reports have used a limited abdominal incision for the extraction of the specimen and the construction of the Roux-en-Y loop. In the present case both Roux-en-Y loop and hepaticojejunostomy were performed totally laparoscopic. To our knowledge this may be the first case pure laparoscopically. This may be the reason for a long operative time and hospital stay. With greater experience, as occurred with other procedures, operative time, blood loss and hospital stay may decrease. The anastomosis was satisfactorily performed and the patient did not present any biliary leakage or stenosis during the late follow-up. In this particular case, the bile duct was large and it was an easy anastomosis. We have successfully performed several hepaticojejunostomies with small bile ducts (< 5 mm) during totally laparoscopic pancreatoduodenectomies. [14] The greater magnification obtained with high definition laparoscope along technical tips (for example, bevel section of the bile duct, stay sutures, interrupted sutures) has made laparoscopic hepaticojejunostomy feasible and safe even in small ducts. [14]

CONCLUSIONS

Laparoscopic right hepatectomy with hepaticojejunostomy is feasible and safe, provided it is performed in a specialized center and staff with experience in hepatobiliary surgery and advanced laparoscopic. At the present time, this operation is reserved for selected cases. This video can help oncological surgeons to perform this complex procedure.

DISCLOSURES

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

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