Single-port Laparoscopic Liver Bi-segmentectomy II–III

Bisegmentectomía II–III hepática laparoscópica por puerto único

Since the first laparoscopic hepatectomy was performed in 1992[1] and after years of technical and technological improvements, laparoscopic liver surgery is now regarded a feasible and safe technique for selected patients.[2,3] Laparoscopy has advantages including less post-operative pain, a shorter hospital stay, an aesthetic benefit and lower blood loss. Furthermore, oncological results have been demonstrated which are comparable to open surgery.[4–6]

The anatomy of the left lateral sector and the distribution of its portal and suprahepatic pedicles facilitate a laparoscopic approach; many liver surgery groups consider this the technique of choice for a great many lesions located in segments II and II–III.[7,8]

New laparoscopic techniques have been developed aimed at further minimising aggressive surgery. There is, on the one hand, surgery through natural orifices (NOTES) which presents major technical issues (difficult spatial orientation, contamination of the abdominal cavity and safe closure of the orifice made in access organs) and on the other hand there is surgery through a single incision. This remains a minimally invasive technique and is available to surgeons with experience in laparoscopic surgery as it does not require a multi-disciplinary team and has a relatively short learning curve.[9]

Single-port laparoscopic surgery has been accepted by digestive surgeons because of its theoretical advantages (less aggressive with earlier recovery and better aesthetic results). There are numerous studies on its application in cholecystectomy, colectomy, bariatric surgery, splenectomy and appendicectomy.[10] However, little work on single-port liver resections has been done; the majority is on isolated cases or short series.[11,12]

Laparoscopic liver resections, for benign and malignant disease, were started in the Hepatobiliary Pancreatic Surgery Unit in February 2002 and single-port cholecystectomy was started in 2009. This background opened the way to considering single-port liver resection.

The following is the case of a 27 year-old male patient with no significant medical history, who was admitted via the Accident and Emergency Department with abdominal pain and fever. A slightly elevated serum bilirubin level was detected. Ultrasound, CT and C-MRI showed a 60×53 mm cystic lesion in liver segment II–III with thickening of the walls and partially calcified trabeculations, indicative of hydatidic cyst (Fig. 1), with no dilatation of the intrahepatic bile duct or communication of the bile duct with the cystic formation. *Echinococcus granulosus* serology tested positive. After treatment with albendazole for four weeks showing a good clinical outcome, resection of the liver lesion was indicated.

Under general anaesthetic and with the patient in the supine position, legs apart (French position) and in a reverse Trendelenburg position, a transverse incision of approximately 3 cm in length was made about 5 cm above the umbilicus, slightly lateralised to the right of the patient. The Endocone®

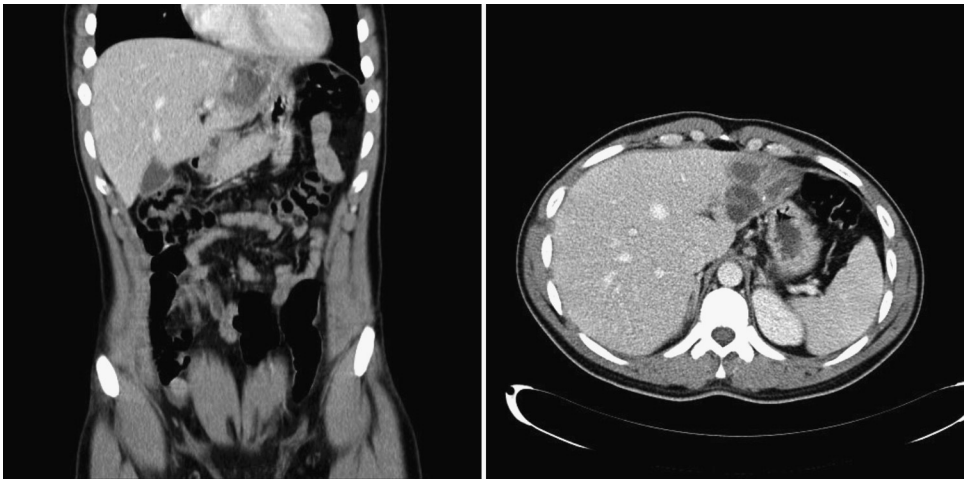

Fig. 1 – Cystic lesions with calcifications located in segments II–III.

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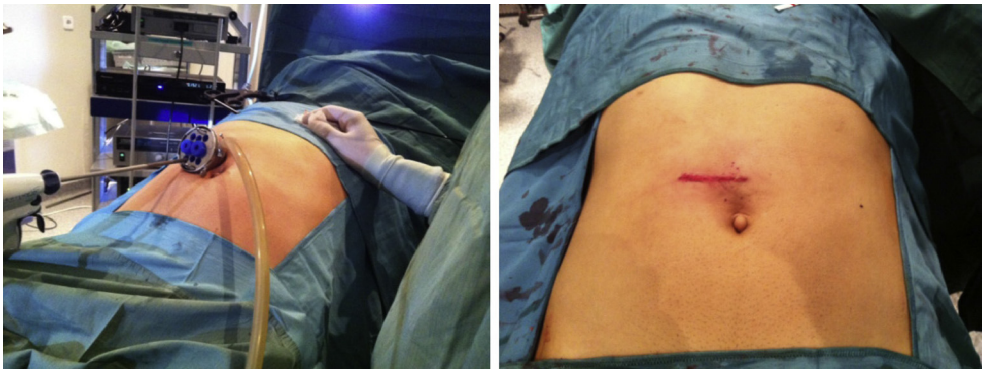

Fig. 2 – Single-port device. Final appearance of the scar.

(Karl Storz GmbH & Co., Germany) single-port device was placed at this level, it offers six ports of 5 mm and two of 10–12 mm. A 10 mm optic with variable direction of view was used which allowed angles of view from 0° to 120° (Endocameleon®, Karl Storz GmbH & Co., Germany). Intra-operative laparoscopic ultrasound ruled out the presence of other liver lesions and confirmed the irregular cystic lesion of about 6 cm in diameter located in segment II–III near the exit of the portal branches of both segments.

A bi-segmentectomy II–III was performed without hilar clamping, using a harmonic scalpel (Ultracission®, Ethicon Endosurgery Inc., USA) for the parenchymal transection and monopolar coagulation (Tissuelink, EndoFB3.0 Floating Ball, Medtronic Advanced Energy, USA). Three endo-GIA with vascular load were used (ETS 45mm, Ethicon Endosurgery Inc., USA) for the section of the portal branches of segments II–III and the left suprahepatic vein. Straight laparoscopic forceps were used to perform traction of the round ligament and to open the transection line, as described in the conventional laparoscopy technique.[7]

A sheet of sealant, haemostatic material (Tachosil®, Takeda) was placed over the resection bed. The specimen was extracted in a pouch (Endo Catch™ II 15 mm Specimen Pouch, Covidien, USA) by expanding the single-port incision at the level of the aponeurosis to 7 cm and 5 cm at skin level. No drain was left. The incision was closed using a continuous absorbable suture in the peritoneal plane and aponeurosis, and the skin was closed with a 3/0 absorbable subcuticular suture (Fig. 2). The operating time was 120 min. The post-operative period was satisfactory and the patient started an oral diet seventeen hours after surgery. Analgesia was administered intravenously for the first 24 h and then orally. The patient was discharged on the third post-operative day.

Single-port laparoscopic anatomical liver resection is a feasible, although technically very demanding, approach and can be performed safely in carefully selected cases, with lesions located in the segments where the laparoscopic approach is considered favourable. Greater experience of surgical teams and future technological improvements will determine the role that this single-port approach will play in liver surgery.

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Esteban Cugat Andorra, Eric Herrero Fonollosa*, Judith Camps Lasa, M. Isabel García Domingo, Fernando Carvajal López

Unidad de Cirugía Hepatobiliopancreática, Servicio de Cirugía General, Hospital Universitari Mutua de Terrassa, Tarrasa, Universitat de Barcelona, Spain

*Corresponding author.
E-mail address: eherrero@mutuaterrassa.es
(E. Herrero Fonollosa).

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Invasion of the Spinal Column by a Posterior Mediastinal Cavernous Haemangioma: A Combined Surgical Approach

Hemangioma cavernoso del mediastino posterior invadiendo la columna vertebral: abordaje quirúrgico combinado

A woman aged 67 with a history of osteoarthritis of the knee was admitted to our centre to investigate a clinical history of weeks of difficulty in walking, dysaesthesia in both lower limbs and pain at the level of the spinal column. A computerised axial tomography scan (CT) and magnetic resonance imaging (MRI) were performed which revealed a well-defined 39 mm×38 mm lesion, in the shape of an hourglass, located at the posterior superior mediastinal level. The lesion extended towards the spinal column through vertebral foramina of T3 and T4, occupying the right part of the epidural space (Fig. 1). On assessing the case, it was decided that a combined surgical approach should be taken, initially resecting the epidural portion of the tumour and then the mediastinal part. With the patient under general anaesthetic, with selective bronchial intubation and positioned in the left lateral decubitus position, the neurosurgical team performed a laminectomy at T3–T4 level resecting the epidural portion of the tumour. Then the thoracic surgery team, with the right pulmonary parenchyma collapsed, performed a videothoracoscopy through three entry ports and a lesion, reddish in appearance, at the level of the posterior superior mediastinum was found. It was well defined and firmly anchored to the paravertebral space (Fig. 2a). The lesion bled easily on manipulation with the endo-instrument; therefore, an auxiliary anterior minithoracotomy was performed to free the mass safely. Once the tumour had been freed a communication orifice from the posterior mediastinum to the epidural space could be observed, created by the growth of the tumour. The anatomo-pathological study showed that the epidural portion of the tumour measured 13 mm×1 mm and the mediastinal portion was encapsulated and measured 35 mm×2 mm×25 mm. The tumour was compatible with a cavernous haemangioma (Fig. 2b). The patients had an uneventful post-operative period and there was improvement of the symptoms on admission.

Mediastinal haemangiomas are extremely rare tumours with an incidence of less than 0.5% of all mediastinal tumours. They are considered vascular development anomalies rather than real neoplasias and rarely become malignant. Almost 50% of patients with mediastinal haemangiomas are asymptomatic and the majority does not require treatment. A few cases which are very large in size need surgical excision because they are affecting adjacent organs. The most common symptoms, which are caused by pulmonary compression, are cough, chest pain and dyspnoea. This case was exceptional for different reasons. Published cases of mediastinal cavernous haemangioma are extremely rare[1] and there are none (as far as we are aware) about those which have invaded the epidural space, which makes the treatment using combined surgery necessary.

Radiologically, mediastinal haemangiomas appear as lobulated masses which are well defined on chest X-ray or CT scan. In 10% of cases they are associated with the appearance of phleboliths which are inherent to their vascular nature.[2] CT scanning is very helpful in assessing the extent of the lesion and whether it has spread to adjacent structures. Angiography rarely detects signs that are suggestive of the vascular origin of the lesion. MRI is the gold standard test; mediastinal haemangiomas appear as slightly hyperintense lesions, and display heterogeneous intensities on T1 and high intensity on T2. These findings are very suggestive of the tumour's vascular origin. Positron emission tomography (pet) displays moderate FDG uptake.[3] Histological confirmation of the diagnosis of mediastinal haemangioma is important since observation is the treatment of

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