Laparoscopic Diagnosis and Treatment of a Twisted Accessory Liver Lobe

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ABSTRACT

Accessory liver lobe (ALL) is a rare congenital abnormality characterized by the presence of hepatic tissue outside of, but attached to, the liver. ALL is usually asymptomatic, but in the case of torsion, it can be confused with an acute surgical emergency or a tumoral mass. Conventional imaging is often inconclusive, and diagnosis is generally made during laparotomy. We report the case of a patient with left ALL torsion who, for the first time, was successfully diagnosed and treated with a laparoscopic resection.

Key Words: Congenital abnormalities, Laparoscopy, Liver, Radiology.

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INTRODUCTION

Accessory liver lobe (ALL) is a congenital abnormality resulting from an error during the embryogenetic process of the endodermal caudal foregut at the third gestational week and is characterized by the presence of hepatic tissue outside of, but adjacent to, the liver.[1,2] ALL is a rare entity, usually asymptomatic, with a reported incidence of 0.44%.[3] Among the possible complications of ALL, torsion of the pedicle is the most serious, and very few cases have been reported.[4,5] Twisted ALL is associated with abdominal pain and/or impaired liver function, which may be confused with an acute surgical emergency or a tumoral mass. Imaging results are often inconclusive, and an exploratory laparotomy is generally required for a definitive diagnosis.

We present the case of a patient with left ALL torsion who was successfully treated with an elective laparoscopic resection. We have included an overview of previously reported cases of ALL.

CASE DESCRIPTION

A 21-year-old woman suddenly complained of a continuous abdominal pain in the right upper quadrant. Physical examination revealed normal temperature (36.8°C), absence of abdominal distension, and no scars. At palpation, no tenderness, masses, or rebound was detected. The patient showed no abdominal distension; the abdomen was not tympanic; and bowel sounds were hyperactive. Laboratory examinations were normal. She underwent ultrasonography of the upper abdomen, which showed a 6-cm epigastric mass. After adequate pain control, the patient was discharged from the emergency department.

A week later, she underwent magnetic resonance imaging (MRI) of the upper abdomen. The MRI scan showed a mass located between the left liver lobe and the right gastric wall that was suggestive for an expansive neoformation of liver origin **(Figure 1)**. Considering the proximity of the mass to the gastric wall, an upper endoscopic ultrasonogram was performed. This evaluation did not

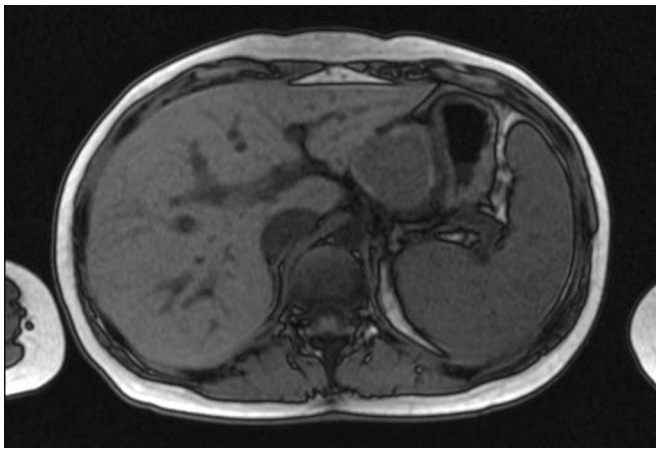

Figure 1. Magnetic resonance imaging showing a subhepatic mass

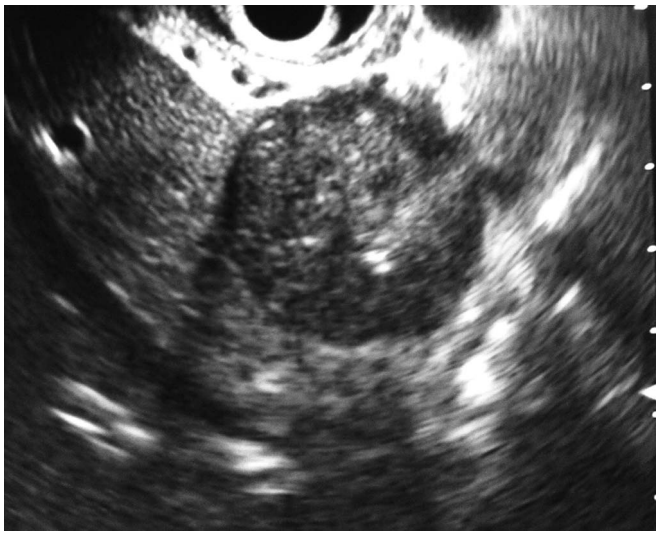

Figure 2. Endoscopic ultrasonography revealed a mass consistent with liver parenchyma, adjacent to the lesser curve of the stomach.

show any connection to the stomach, suggesting the diagnosis of a left hepatic mass **(Figure 2)**. A computed tomography (CT) scan combined with positron emission tomography showed mildly metabolic activity on the periphery of the mass with a maximum standardized uptake value of 5.4, which is definitely not suggestive of hepatic tumor **(Figure 3)**. During this time, the patient remained mildly symptomatic (postprandial pain), and light tenderness was detected at physical examination.

The case was evaluated during a meeting of the multidisciplinary team on soft tissue and visceral sarcomas. Expert opinion supported exploratory laparoscopy, which was accepted by the patient. After positioning the patient in

Figure 3. Positron emission tomography CT scan showed a mass between the lesser curve of the stomach and the left liver lobe.

the lithotomy position with her legs placed in stirrups, the initial 12-mm trocar was placed via the open technique in the midline 5 cm cephalad to the level of the umbilicus. Once pneumoperitoneum (12 mm Hg) was achieved; the second and third 12-mm trocars were symmetrically inserted on opposite sides of the abdomen, in the midclavicular line just cephalad to the level of the optical trocar. A fourth 5-mm trocar was placed in the right anterior axillary line for liver retraction. The monitor was placed at the head of the patient on the right side, and the surgeon stood between the legs of the patient.

During laparoscopic exploration, it became evident that the mass was located inside the hepatogastric ligament and attached by a short pedicle to the second segment of the liver **(Figure 4)**.

The mass appeared operable, and resection was performed using a 3-port access. The liver mass was dissected from the ligament tissue with an ultrasonic scalpel (Harmonic Ace, 36 mm, Ethicon, Somerset, New Jersey) and sectioned with an endoscopic stapler (Endo Gia Autosuture Universal stapler, 12 mm, vascular cartridge, Covidien, Mansfield, Massachusetts). The specimen was extracted from the abdominal cavity using an endobag. A tubular drain was placed under the liver for detecting and eventually treating small postoperative biliary leaks.

The postoperative course was uneventful, and the patient was discharged on the fourth postoperative day, after abdominal drain removal.

Histopathological examination of the mass showed an accessory liver lobe with signs of hemorrhagic infarction.

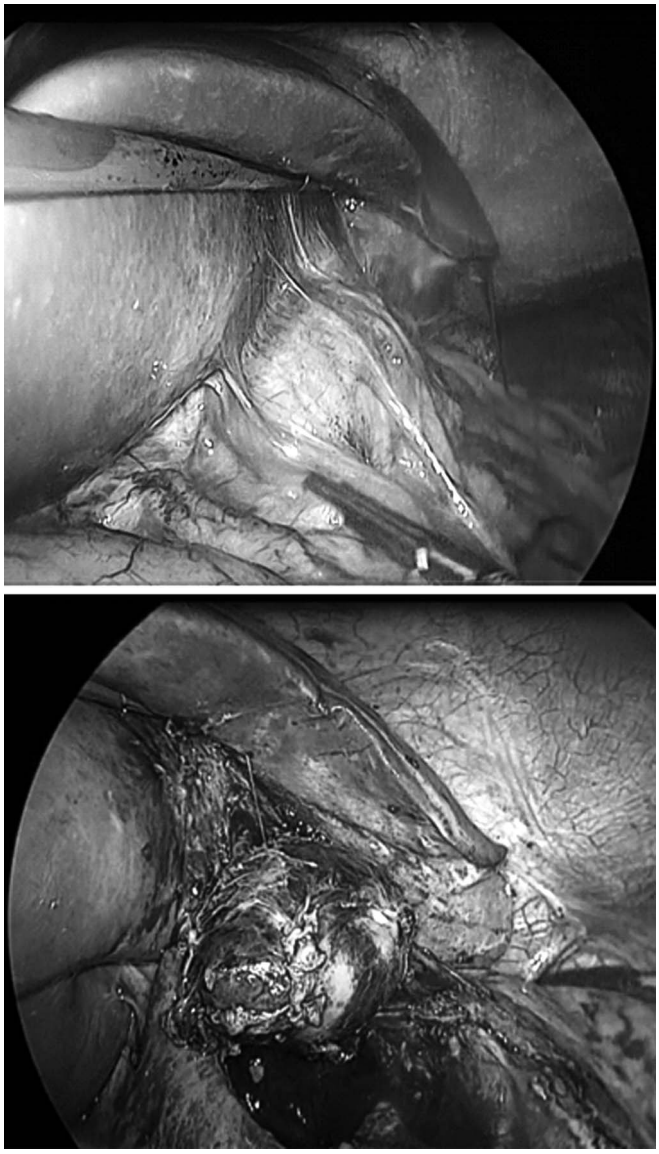

Figure 4. Laparoscopic exploration revealed the mass inside the hepatogastric ligament and connected to the liver by a bridge of liver parenchyma.

The patient underwent follow-up after 6 months with abdominal ultrasonography, which did not show any abnormalities.

Informed consent for publishing data and images was obtained from the patient.

DISCUSSION

ALL is defined as an embryological abnormality characterized by the presence of extra liver tissue connected to the liver by a bridge of hepatic tissue, a mesentery, or a stalk. If continuity with the liver is not present, this abnormality is defined as an ectopic liver.[1,5] ALL is a rare entity, usually asymptomatic, and found during autopsy, surgery (laparotomy/laparoscopy), or abdominal imaging performed for other reasons.[3,6,7] In a recent study on congenital anomalies of the liver observed during laparoscopic exploration, an incidence of 0.44% of ALL has been estimated.[3] Potential complications of ALL, which have previously been described, are bleeding, rupture, and malignant degeneration.[8–10] Torsion of ALL is rare with only 16 cases being reported (up-to-date) in the English language literature[4,11–25] **(Table 1)**.

Most twisted ALL cases were found in young females and in male infants and are often associated with abdominal wall defects.

The most common clinical presentations were acute abdominal symptoms that required surgical exploration, or as an abdominal mass, of which the differential diagnosis with a tumor appeared uncertain.

Experience on imaging of liver abnormalities has been increasing over time, and uncomplicated ALL can be easily diagnosed with CT or MRI scan, either of which allows a clear identification of the arterial and portal supply and a direct visualization of the anatomic connection to the liver.[20–22]

In case of a torsion of the pedicle and a consequent ALL infarction, diagnostic imaging often fails to formulate an accurate preoperative diagnosis. In twisted ALL, a contrast-enhanced CT scan usually shows vascularization defects, loss of normal architecture of liver parenchyma, and uncertain origin of the mass,[14,15] which may be confused with an extrahepatic tumor of pancreatic, ovarian, or peritoneal origin or an acute inflammatory condition (eg, cholecystitis and appendicitis). MRI does not offer a diagnostic advantage because the results are not specific and sometimes suggestive of a cystic mass.[14] On ultrasonography, a twisted ALL appears as an hypoechogenic mass caused by congestion, and on color Doppler ultrasonography, it appears to be without vascular supply.[11,15] Nuclear medicine techniques and angiography are inconclusive, as the only diagnostic sign suggestive of an infarction of ALL is lack of vascularization and viable tissue in the mass.[5] Although in our patient, the positron emission tomography CT findings were not specific, the presence of hypermetabolic tissue surrounding the mass suggested a necrotic tumor or an abscess.

Table 1.
Published Case Reports in English Language Literature on Torsion of ALL

Author	Publication Year	Age, y	Sex	Preoperative Workup	Suspected Diagnosis	Time to Treatment, days	Site	Size, mm	Histology
Cullen[11]	1925	45	F	NR	Appendicitis	3	Gallbladder	60 × 80 × 30	Fibrous and hemorrhagic tissue
Watson and Lee[12]	1964	56	F	NR	Tumoral mass	12	Segment 1	48 × 25 × 20	Necrosis
Levi et al[13]	1971	23	F	NR	Ovarian/appendicular abscess	NR		230	Necrosis
Llorente and Dardik[14]	1971	70	F	NR	Retroperitoneal mass	7	Segment 1	130 × 190 × 90	Postnecrotic cirrhosis
Omanik and Jablonsky[15]	1972	29	F	NR	Mesenteric cyst	NR	Left lobe	130 × 120 × 70	Hemorrhagic infarction
Pujari and Deodhare[4]	1976	32	F	Abdominal X-rays; oral cholecystogram; barium meal X-rays	Cholecystitis/duodenal ulcer	21	Gastrohepatic ligament	50 × 40 × 20	Dilatation of portal tracts and central veins
Grunz et al[16]	1992	<1	M	US, CT	Gastric duplication, liver hematoma, or tumor	2	Left lobe	29 × 16 × 19	Necrosis
Sanguesa et al[17]	1995	2	M		Hepatic mass	8	Hepatic hilum	40 × 25	Necrosis
Elmasalme et al[18]	1996	<1	M	US, CT	Abdominal mass	14	Hepatic hilum	80 × 100	Necrosis
Koumadinou et al[19]	1998	12	F	US, CT, MRI	Hepatic hematoma, cystic lymphangioma, echinococcus cyst, gastrointestinal duplication cyst	NR	Caudate lobe	40	NR
Koplewitz et al[20]	1999	8	F	US, CT	Post-traumatic hematoma	NR	Hepatic hilum	80 × 80	NR
Ladurner et al[21]	2005	19	F	CT	Portal vein thrombosis and infarction accessory lobe	1	Segment 4	NR	Necrosis
Peŕez-Martiń̃ez et al[22]	2006	<1	M	US, barium swallow-rays	Gastric duplication	Urgent	Left lobe	NR	NR
Umehara et al[23]	2009	14	F	US, CT	Lymphangioma, gastric/ pancreatic tumor	2	Left lobe	75	Congestion, hemorrhage, necrosis
Carrabetta et al[24]	2009	45	M	Abdominal X-rays, CT, FNAB	NR	Urgent	Left lobe	26 × 16 × 10	Hemorrhagic infarction
Jambhekar et al[25]	2010	24	F	CT, MRI, ERCP	Intermittent torsion of ALL	120	Left lobe	NR	Normal liver
Present case	2012	21	F	US, MRI, endoscopic US. PET	Liver tumor	30	Segment 2	60 × 55 × 55	Hemorrhagic infarction

ALL, accessory liver lobe; CT, computed tomography; ERCP, endoscopic retrograde cholangiopancreatography; F, female; FNAB, fine-needle aspiration biopsy; M, male; MRI, magnetic resonance imaging; NR, not reported; PET, positron emission tomography; US, ultrasonography.

Considering these diagnostic challenges, twisted ALLs are generally diagnosed and treated during surgical exploration. In the context of a specific diagnostic algorithm, the laparoscopic exploration has been suggested as a useful tool in cases of unexplained upper abdominal pain and suspected ALL.[5] The laparoscopic visualization allows a definitive diagnosis and a conservative treatment when viable tissue is demonstrated.

In cases of torsion of ALLs, our report confirmed the diagnostic role of laparoscopic exploration; in these cases, laparoscopic resection is feasible, simple, and definitive.

Generally, laparoscopic liver resection seems to offer a significant advantage over an open approach and has been proposed for treatment of different liver conditions, especially in cases of left located masses.[23] Thus, laparoscopic resection seems the most appropriate approach for ALL, as the presence of a small bridge of hepatic tissue can be easily isolated and sectioned with endosurgical staplers. In the presence of an ALL located within a different liver area, such as the caudate segment or the right lobe, or of greater volume, the laparoscopic resection may present additional operative difficulties than those in our case.

CONCLUSIONS

Diagnostic imaging is often inconclusive in cases of twisted ALLs, and laparoscopy seems the best method for a definitive diagnosis. Resection is advisable in cases of ALLs with infarction, preferably during laparoscopy as we have for the first time reported herein.

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