CASE REPORT

Solitary necrotic nodule of the liver: a very challenging diagnosis!

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Accepted 6 February 2014

SUMMARY

Solitary necrotic nodule of the liver is a rare entity of unknown aetiology. We describe the case of a 59-year-old woman reporting sporadic right upper quadrant pain. An abdominal CT scan revealed a liver nodule located in segment 4. The complementary investigation was unable to identify the neoplastic lesion, and its surgical resection was performed, with an uneventful recovery. Pathological examination revealed a 'solitary necrotic nodule of the liver.' The patient remains asymptomatic and free of recurrence 3 years after surgery. This case corroborates that despite the advances in liver imaging and biopsy, liver nodules are sometimes a diagnostic challenge; quite often, only its surgical resection allows a definitive diagnosis.

BACKGROUND

Despite huge progresses in diagnostic reliability of liver imaging and biopsy, liver nodules seldom represent diagnostic challenges. First described by Shepherd and Lee in 1983,¹ solitary necrotic nodule of the liver embodies a rare entity of unknown aetiology, with nearly 60 cases described so far.²⁻⁴ Its symptoms are often vague or inexistent, thus, its diagnosis is most often incidental.^{2,3} The differential diagnosis with other tumours (benign or malignant) is often difficult; its resection is frequently needed to achieve a definitive diagnosis.^{4,5}

CASE PRESENTATION

A 59-year-old woman was observed in consultation reporting sporadic right upper quadrant pain. She had a medical history of hypertension, osteoarticular pathology and penicillin allergy. On examination, there were no relevant findings other than a slight chronic oedema of the right knee.

INVESTIGATIONS

Blood tests only revealed a slight elevation of creatine kinase (227 U/L—N: < 145). An abdominal ultrasound displayed a nodular formation in the left lobe of the liver. The complementary CT scan (figure 1) showed a 'nodular area with 4.2 cm in segment 4, with non-specific characteristics, possibly a secondary tumour'. Tumour marker tests were normal (Ca 19.9, Ca 72.4, Ca 125, carcinoembryonic antigen, alpha-fetoprotein, cytokeratin fragment 21.1 and neuron specific enolase). An electrophoretic proteinogram was normal. The viral serological testing was positive for hepatitis A virus (hepatitis B virus, hepatitis C virus and HIV were negative). An MRI with liver-specific contrast (figure 2) exhibited diffuse hepatic

Figure 1 Abdominal CT showing a nodule with 4.2 cm in segment 4 of the liver.

steatosis, with a sub-capsular nodule in segment 4, adjacent to the falciform ligament, with 4.1 cm (slightly hypointense in T1 and heterogeneous in T2; ring shaped with a central area of marked hyper-signal). The contrast administration exposed a peripheral enhancement in the arterial phase suggestive of metastasis.

Upper (UGE) and lower (LGE) gastrointestinal endoscopies were performed without an evidence of a primary tumour (UGE with biopsy: antral chronic gastritis, with activity and colonisation by *Helicobacter pylori*; LGE with biopsy: thickened fold of regular mucosa with loco-regional hyperplasia of lymphoid tissue without epithelial dysplasia). The thoracic CT scan was normal and an endovaginal ultrasound showed a millimetric cystic formation in the uterine cervix. A thyroid ultrasound exposed two nodules in the right lobe, smaller than

Figure 2 Hepatic MRI showing a sub-capsular lesion in the segment 4, adjacent to the falciform ligament, with 4.1 cm.

To cite: Martins RJT, Tralhão JG, Cipriano MA, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-202364

6 mm, without lymph nodes enlargement. The bilateral mammography disclosed bilateral benign calcifications. Thus, none of the performed studies unveiled any evidence of primary or metastatic tumours. Other investigations were performed and considered to be normal (iron metabolism; folic acid and vitamin B₁₂; autoantibodies (antinuclear antibodies, antineutrophil cytoplasmic antibodies, antimyeloperoxidase, antiproteinase 3, antimitochondrial, antipyruvate); antiestreptolisine O; the rheumatoid factor; thyroid hormones; hydatidosis, toxoplasmosis, cytomegalovirus, herpes simplex virus, Epstein-Barr virus, syphilis and brucellosis serologies; insulin; glucagon; chromogranin A; parathormone, 5-hydroxy-indol-acetic acid and urinary metanephrine).

A CT-guided biopsy of the hepatic nodule revealed 'necrotic tissue, apparently neoplastic, not assessed in this sample'. A positron emission tomography scan (figure 3) displayed increased and heterogeneous uptake of fluorodeoxyglucose-18 in the hepatic nodule without hypermetabolic changes compatible with a primitive tumour location.

DIFFERENTIAL DIAGNOSIS

The imaging features of the necrotic nodules of the liver^{2 4 5} are often similar to those found in metastatic lesions and primary hepatic tumours (pseudotumour, lymphoma, regenerative or dysplastic nodules) making the differential diagnosis with these

tumours very difficult or even impossible^{2 4 6} (particularly those with unique hepatic secondary lesions).

TREATMENT

Due to diagnostic uncertainty, the nodule resection was proposed to the patient. In May 2010, a liver segmentectomy 4b extended to segment 3 was performed after a preoperative ultrasound.

OUTCOME AND FOLLOW-UP

Patient was discharged on postoperative day 4, without any complications. The pathological examination (figure 4) revealed a solitary necrotic nodule of the liver. The patient remains asymptomatic without signs of relapse, 3 years after surgery.

DISCUSSION

Solitary necrotic nodule of the liver is a rare entity. Its aetiology has been widely discussed and several hypothesis have been suggested: sclerotic evolution of small hemangiomas⁷ parasitic causes⁸ of trauma, haematoma or abscess, hepatic procedures or the combination of various causes.^{3 4} As verified in our case, the symptoms are practically inexistent and often times they are found incidentally in imaging studies (specially ultrasound), or when an exploratory laparotomy or a necropsic study is performed.^{9 10} In contrast to our case, it prevails in male individuals. In more than 75% of the cases, the lesions are located in the right lobe of the liver

Figure 3 Positron emission tomography scan showing increased and heterogeneous capture of fluorodeoxyglucose-18, in the hepatic nodule in segment 4 and no hypermetabolic alterations compatible with primitive tumour location were identified.

Figure 4 Pathological examination revealed solitary necrotic nodule of the liver (H&E $\times 40$).

(there are few cases described in the left lobe) and present as unique nodules most of the time.¹¹ They are usually smaller than 2.5 cm and never bigger than 5 cm.⁴ The imaging features of the necrotic nodule of the liver^{2 4 5} are often similar to those found in metastatic lesions and primary tumours (pseudotumour, lymphoma, regenerative or dysplastic nodules) making the differential diagnosis very difficult or even impossible^{2 4 6} (particularly those with unique hepatic secondary lesions). The hepatic biopsy is not

reliable for the differential diagnosis because it shows, in most cases, the presence of necrotic tissue; and does not permit the differential diagnosis with hepatic metastases.^{2 4} The anatomic and pathological study of the sample reveals a clear delimitation by a fibro-hyaline capsule and a necrotic core, which can contain granular eosinophilic material, combined with calcifications, cholesterol, 'foam cells' and inflammatory cells.⁹

The natural history of this lesion is not totally known yet. Some reports reveal either reduction or increase in size of the nodule, in patients who underwent watchful waiting.^{4 12 13}

The apparent benign behaviour of this lesion and the absence of symptoms suggest that surgical resection is unnecessary. Nonetheless, the uncertainty raised by the imaging study, the unspecific results of the biopsy and the difficulty (or even impossibility) to establish a differential diagnosis with malignant tumours, seems to claim that liver resection is in most cases mandatory, being the only way to ascertain a definitive diagnosis; as shown in the clinical case described above.

Contributors RJTM, JGT, MAC and FCS contributed in the article design, research, writing and reviewing of the manuscript.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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Learning points

- Despite huge progresses in diagnostic reliability of liver imaging and biopsy, liver nodules seldom represent diagnostic challenges; quite often, only surgical resection of the lesion allows a definitive diagnosis.
- The imaging features of the necrotic nodule of the liver are often similar to those found in metastatic and primary tumours of the liver, making the differential diagnosis with these entities very difficult or even impossible.
- The apparent benign behaviour of this lesion and the absence of symptoms suggest that surgical resection is unnecessary. Nonetheless, the uncertainty raised by the imaging study, the unspecific results of the biopsy and the difficulty to establish a differential diagnosis with malignant tumours, seems to claim that liver resection is in most cases mandatory.

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