

Pseudotumours of the liver: diaphragmatic slip simulating hepatic metastases

WFC van Gelderen
FFRad(D)(SA) and

TM Williams
DMU

Department of Radiology
Wanganui Base Hospital
New Zealand

Abstract

The radiological features of a diaphragmatic slip in an unusual location and simulating liver metastases on computed tomography (CT) are described and the relevant literature is reviewed. The fact that the features so closely mimicked metastases on CT and that ultrasound so readily excluded this possibility, prompted this report.

Introduction

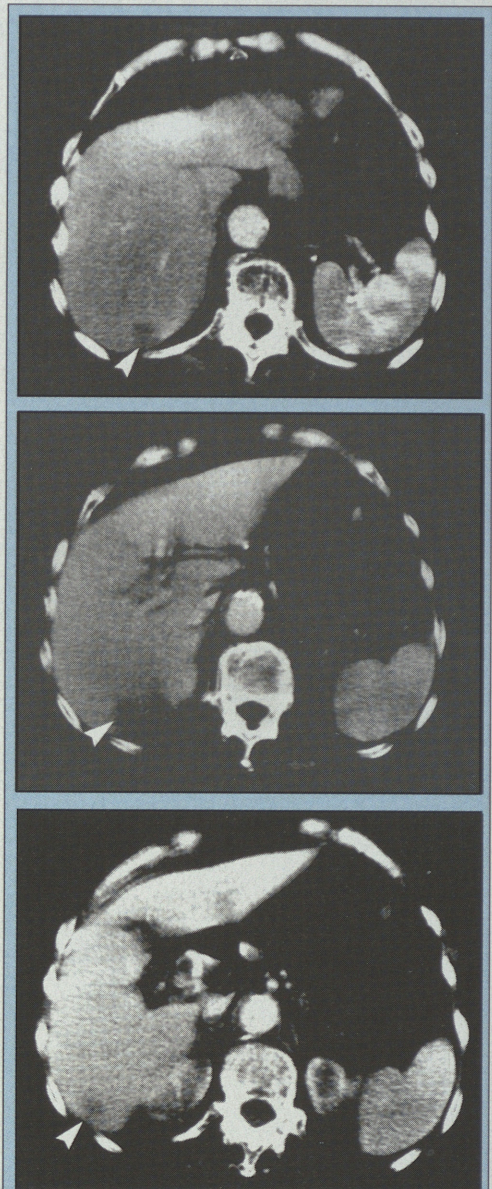
Diaphragmatic slips are not uncommon, especially in the elderly. On occasion they can simulate liver tumours

on CT and in such instances the appearances should be further evaluated by ultrasound (US) examination.

Case report

An 86 year old woman was referred for an abdominal radiograph with complaints of abdominal pain, nausea and severe constipation. Clinically an enlarged liver was palpable. A supine abdominal film confirmed faecal loading and demonstrated a calcified aortic aneurysm which had increased in size compared to previous X-rays.

Dynamic CT of the abdomen using 10 mm collimation confirmed an infrarenal aortic aneurysm measuring 45 mm in diameter but no evidence of leak was found. Rounded low attenuation defects were found on contiguous sections posterolaterally within the right lobe of the liver (Figures 1, 2, 3). These were thought to be due to intrahepatic cysts or metastases, but their close proximity raised the possibility of a tubular structure being responsible.



Figures 1 - 3: Three low attenuation rounded areas (arrows) are demonstrated on contiguous 10 mm dynamic CT sections through the liver. The diagnosis of metastases was considered, but the apparent contiguity of the 'lesions' and their possible tubular nature argued against this consideration.

US examination was performed forthwith, again demonstrating the aortic aneurysm, but confirming that the intrahepatic lesions shown at CT were not pathological but were the result of an echogenic tubular structure (with a central hypoechoic stripe), in all probability due to a 'diaphragmatic slip' (Figure 4).

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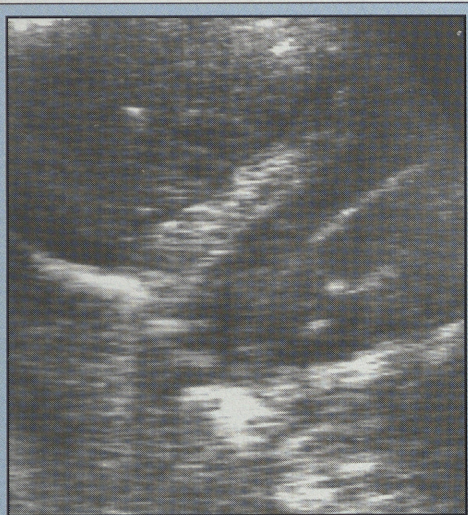


Figure 4: Longitudinal US demonstrated a thick band of increased echogenicity extending from the lower right hemidiaphragm, within the posterior part of the liver and parallel to the long axis of the kidney. A diaphragmatic slip was confirmed by this appearance, and liver metastases could be excluded.

The US examination was most reassuring and the patient was discharged on conservative treatment and advised to return for follow-up US of the aortic aneurysm.

Discussion

Diaphragmatic slips, folds or muscular bundles are known to be common and were found in 25% of 102 CT scans increasing to 71% in those aged 80 years and older¹. The same study also found slips to extend deeper than 2 cm into the liver in 37% of patients. At CT the most common location for slips was anterosuperiorly at the junction of the right and left lobes of the liver, an area difficult to visualise with US. Few slips were found laterally in the right lobe of the liver and none were seen posteriorly. In contrast most slips seen at US were

lateral or even posterior in the right lobe of the liver.² In a prospective US study the incidence of slips among 200 patients was found to be 15%, rising to 30% in those aged 80 or over. Multiple slips were seen in 4%, all females.² According to Yeh *et al* the most common location found in all 34 patients studied by US was the right anterior slip which extends from the anterior aspect of the dome of the diaphragm in the midclavicular line (or more laterally) in a medioposterior direction ending just anterior to the hiatus for the inferior vena cava.³

Slips have to be distinguished from accessory fissures of the liver, the most important being the right inferior accessory fissure. This fissure usually extends inferolaterally from the gallbladder fossa.⁴

Rosen *et al* found nodular infoldings of the diaphragm (diaphragmatic pseudo-tumours) in 24% of 150 deep inspiratory CT scans, approaching 60% in patients older than 60.⁵ They recorded a marked diminution in the size and number with expiration.

The patient described above presented an appearance unlike the other examples in the literature. The fact that the features so closely simulated metastases on CT and that US so readily excluded this possibility, prompted this report. The well-defined low attenuation 'lesions' all of which were in a peripheral location, militated against multiple rounded lesions and a tubular structure was suspected as being responsible.

US clearly demonstrated a broad band of hyperechoic fatty density within the liver extending from the posterior aspect of the right hemidiaphragm and parallel to the long axis of the kidney. The band was 4 cm in length and 1 cm in thickness. The hyperechoic nature of the band demonstrated its fatty nature, although longer and thicker than most diaphragmatic slips previously described. Hounsfield unit measurements on CT were inconclusive.

The 'pseudotumours' on axial CT or the 'diaphragmatic slip' on longitudinal US described above is unusual in location, but whenever such an appearance is encountered on CT the true nature can readily be ascertained by ultrasound.

References

1. Auh YH, Rubenstein WA, Zirinsky K, Kneeland JB, Pardes JC, Engel IA, Whalen JP, Kazam E. Accessory fissures of the liver: CT and sonographic appearance. *AJR* 1984;143:565-572.
2. Hawkins SP, Hine AL. Diaphragmatic muscular bundles (slips): Ultrasound evaluation of incidence and appearance. *Clin Radiol* 1991;44:154-157.
3. Yeh HC, Halton KP, Gray CE. Anatomic variations and abnormalities in the diaphragm seen with US. *RadioGraphics* 1990;10:1019-1030.
4. Auh YH, Lim JH, Kim KW, Lee DH, Lee MG, Cho KS. Loculated fluid collections in hepatic fissures and recesses: CT appearance and potential pitfalls. *RadioGraphics* 1994;14:529-540.
5. Rosen A, Auh YH, Rubenstein WA, Engel IA, Whalen JP, Kazam E. CT appearance of diaphragmatic pseudotumors. *J Comput Assist Tomogr* 1983;7(6):995-999.