

# Focal nodular hyperplasia presenting as acute abdomen

S K Y Chang, Y F A Chung, C H Thng, H W Loo

## ABSTRACT

**Focal nodular hyperplasia (FNH) is a benign liver tumour with an asymptomatic course, rarely causing complications. When the diagnosis is certain, only watchful observation is necessary. We highlight an interesting case of a 42-year-old woman with a FNH that ruptured and became haemorrhagic, thus presenting as an acute surgical abdomen. The diagnosis was only established after surgical resection with histopathological confirmation. Although haemorrhage of hepatic FNH is extremely rare, this case highlights the small risk of rupture in large lesions.**

**Keywords: focal nodular hyperplasia, liver, liver tumour rupture, tumour haemorrhage**

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## INTRODUCTION

We present a patient with focal nodular hyperplasia, a condition that has always been considered innocuous, manifesting itself as an acute abdomen. This case illustrates an unusual presentation, which not necessarily mandates an emergency operation.

## CASE REPORT

A 42-year-old Chinese woman with no significant past medical history presented at the Emergency Department complaining of epigastric pain associated with nausea and vomiting. She had no history of use of oral contraceptives. Clinically, the epigastrium was tender. Blood investigations revealed serum white cell count of 14,500, while the haemoglobin dropped from 12.0 g/dL to 8.2 g/dL. Her bilirubin and alkaline phosphatase (ALP) levels were normal. Alanine aminotransferase (ALT) was 633mmol/L and aspartate aminotransferase (AST) was 373mmol/L. while the gamma-glutamyltranspeptidase (GGT) was 49mmol/L.

Computed tomography (CT) of the abdomen done on the day of onset of symptoms showed a large heterogeneous mass measuring 10 x 8 cm in size in the right hepatic lobe (mainly in segment 7/8 extending into segment 5/6). The mass had a non-enhancing

component that was hyperdense on the unenhanced images, compatible with a haematoma. There is also a soft-tissue component next to it that demonstrated enhancement in the portal venous phase. There was blood seen in the subcapsular space but there was no radiological sign of active extravasation, thus evading the need for emergency surgery.

The patient's pain subsided the next day while the haemoglobin count improved and remained stable. Decision was therefore made to perform the surgery after further evaluation of the lesion. Further investigations with hepatitis B and C markers were negative. Serum alpha-fetoprotein (AFP) and carcinoembryonic antigen (CEA) levels were normal. Magnetic resonance (MR) imaging was performed on the fifth day of onset of symptoms to further characterise the liver lesion. The haematoma component demonstrated a methaemoglobin rim that was of high signal on T1-weighted scans and low signal on T2-weighted scans. The soft-tissue component showed homogeneous hepatic arterial enhancement with intravenous gadolinium administration (Fig. 1). As the lesion demonstrated hepatic arterial enhancement, the working radiological diagnosis was that of ruptured liver adenoma.

At elective operation, there was a large tumour on the right lobe of the liver, measuring 10cm across, with an intraparenchymal haematoma. Histology of the right hepatic lobectomy lesion was focal nodular hyperplasia with irregular central haemorrhage. There was focal necrosis which extended along the subcapsular region, with perforation and peritoneal haemorrhage. Patient recovered uneventfully and was discharged on the eighth post-operative day.

## DISCUSSION

The commonest liver tumour that ruptures is hepatocellular carcinoma, followed by hepatocellular adenoma. Other tumours that are known to rupture spontaneously include haemangioma<sup>(1)</sup> or other vascular abnormalities<sup>(2)</sup>, and liver metastases<sup>(3)</sup>. As far as we know, there have only been three previous reports of focal nodular hyperplasia rupture<sup>(4)</sup>.

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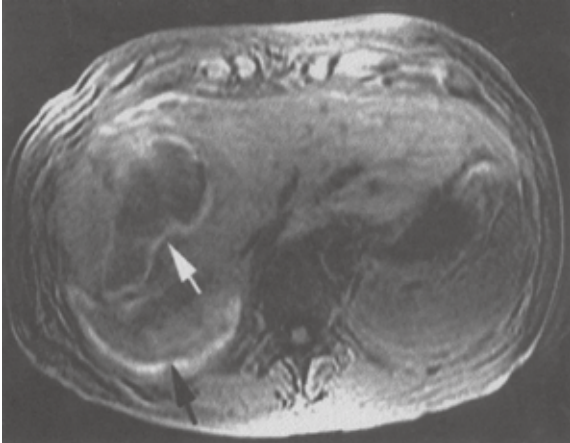
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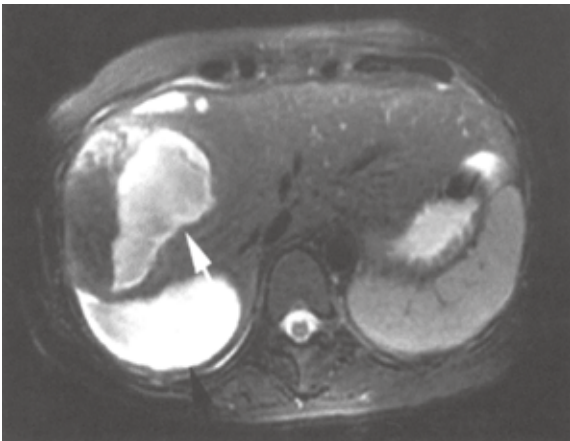
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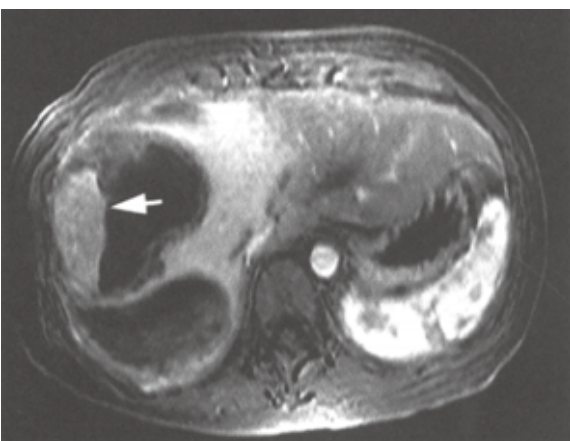
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**Fig. 1a** Unenhanced fat-suppressed axial gradient-echo T1-W MR image shows the haematoma has a high signal rim (white arrow) indicating the presence of methaemoglobin. A similar rim is noted in the subcapsular haematoma (black arrow).



**Fig. 1b** Fat-suppressed axial T2-W MR image shows that the rims are of low signal (black and white arrows) indicating the presence of paramagnetic methaemoglobin.



**Fig. 1c** Dynamic enhanced fat-suppressed gradient-echo T1-W MR image obtained during the hepatic arterial phase shows that the soft tissue component enhances homogeneously (white arrow).

Surgical resection is recommended for hepatic adenomas because of the risk of spontaneous life-threatening haemorrhage<sup>(5)</sup>. They are benign liver tumours associated primarily with the use of oral

contraceptive pills<sup>(6)</sup>, most commonly in women aged between 20 to 40 years. They are large, fleshy, well-circumscribed tumours consisting of sheets of hepatocytes without bile ducts or portal areas. Most of them are picked up incidentally on CT. They may present as a right hypochondrium or epigastrium mass or pain. These lesions are prone to central necrosis and haemorrhage because the vascular supply is limited to the surface of the tumour. As such, they tend to bleed, leading to haemoperitoneum and shock. There is also the possible likelihood of malignant transformation<sup>(7)</sup>.

On the other hand, focal nodular hyperplasia (FNH), because of their benign nature, does not warrant treatment once the diagnosis is established. FNH is the 2<sup>nd</sup> most common benign lesion of the liver, after liver haemangioma. It is more commonly found in women between 20 and 40 years of age<sup>(8)</sup>. It is generally considered a developmental vascular malformation of the liver<sup>(9)</sup>. The majority of patients with FNH are asymptomatic, and are detected incidentally at laparotomy or after abdominal imaging for other reasons. Rarely do they present with symptoms<sup>(10)</sup>, which may include vague right upper quadrant discomfort or fullness. Complications such as rupture, bleeding or infarction that may result in an acute abdomen, such as the case reported here, have been rarely reported, compared with hepatic adenomas.

The soft tissue component of the lesion in our patient demonstrated hepatic arterial enhancement. This raises several differential diagnosis, including hepatic adenoma, FNH, hepatoma and hypervascular metastases. It is difficult to make a definitive radiological diagnosis. The diagnosis of FNH is suggested if the lesion is homogeneous in appearance, enhances homogeneously in the hepatic arterial phase, and demonstrates a central scar that is of high signal on T2-weighted images and that enhances in the portal venous phase<sup>(11)</sup>. However, there can be overlap in appearances with hepatic adenoma and hypervascular hepatic tumours.

Earlier case reports of management of liver tumours that have ruptured involves mainly emergency resective procedures<sup>(12)</sup>. Subsequently, some authors reported planned resection in patients with stable vital signs<sup>(13)</sup>. A delayed "interval" resection may even allow reduction in tumour size for hepatic adenoma, which has resulted in a lower rate of peri-operative transfusion<sup>(14)</sup>. With improvements in angioembolisation techniques, it became possible for patients to be stabilised using such procedures. In fact, embolisation has become the treatment of choice for patients with poor liver function and who are therefore at higher risk for surgical resection<sup>(15)</sup>.

In conclusion, contrary to common observation, FNH can present with rupture. With rupture, the typical radiological features may become obscured, making accurate diagnosis difficult. Rupture of liver tumours does not necessarily require emergency surgery or embolisation. Provided the patient remains stable, radiological or other investigations may be performed to further assess the bleeding lesion prior to definitive surgery.

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