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Multifocal Nodular Fatty Infiltration of Liver: Approach to a Radiological Masquerader

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Abstract **Case Report**

Fatty infiltration of liver is a common metabolic abnormality; which usually follows a diffuse pattern. However; in very rare cases; it may present as multiple focal hepatic lesions which may be mistaken for hepatic metastases on imaging. An accurate diagnosis is therefore vital for predicting prognosis and subsequently appropriate treatment. In this case report we are presenting a case of a young adult female patient who presented to our institution with the clinical complaint of pain in abdomen. She had past history of renal transplant for chronic kidney disease followed by intake of oral glucocorticoids for over 2 years. She was eventually investigated with various imaging modalities including ultrasound scan of abdomen as well as MRI scan of abdomen. Based on the imaging findings; a diagnosis of multifocal nodular hepatic steatosis was given.

Keywords: Multiple hepatic lesions, multifocal nodular fatty infiltration, MNFIL, Multifocal nodular hepatic steatosis.

INTRODUCTION

NAFLD is a leading cause of liver disease globally; showing increasing prevalence with growing trend of obesity [1, 2]. It has been associated with other systemic diseases including metabolic syndrome, steroid intake, diabetes mellitus and hemochromatosis [3, 4].

Hepatic steatosis usually is characterized by diffuse infiltration of hepatic parenchyma. However, in rare cases, it may also present as multiple nodular areas of fatty infiltration separated by intervening normal hepatic parenchyma. This has been described as multifocal nodular fatty infiltration of liver (MNFIL) [3, 5-7].

MNFIL presents a diagnostic dilemma on imaging as it presents with multiple nodular hepatic lesions and hence mimics multiple hepatic metastases and hence is challenging to diagnose accurately.

CASE HISTORY

A 36 years old female patient presented to our hospital with the chief complaints of dull aching pain in right upper quadrant of abdomen for 6 months. There was no history of altered bowel habits or jaundice. Patient had history of renal transplant 3 years back for ESRD followed by intake of oral gluco-corticoids for over 2 years. There was no history of diabetes mellitus, alcohol intake, smoking or previous malignancy in the past.

Physical examination revealed mild hepatomegaly. No obvious mass lesion was palpable in neck and breasts.

All blood investigations including blood sugar, lipid profile, and tumor markers including CEA, AFP, Ca19.9 and Ca-125 were within normal limits.

The patient was eventually referred to our department for diagnostic imaging. US examination of abdomen was performed which showed multiple well-defined homogeneously hyperechoic lesions scattered throughout both lobes of liver (Image 1). No hypoechoic halo was seen surrounding the lesions. No mass effect was seen on surrounding branches of portal vein. Rest of the organs were unremarkable.

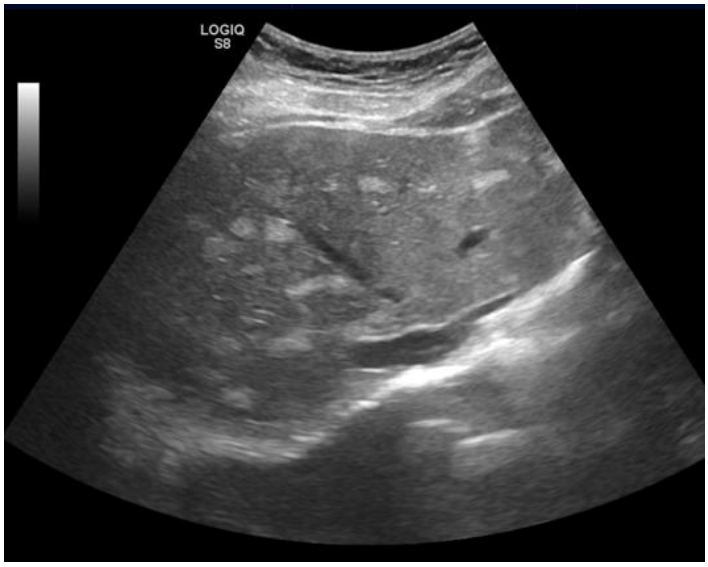
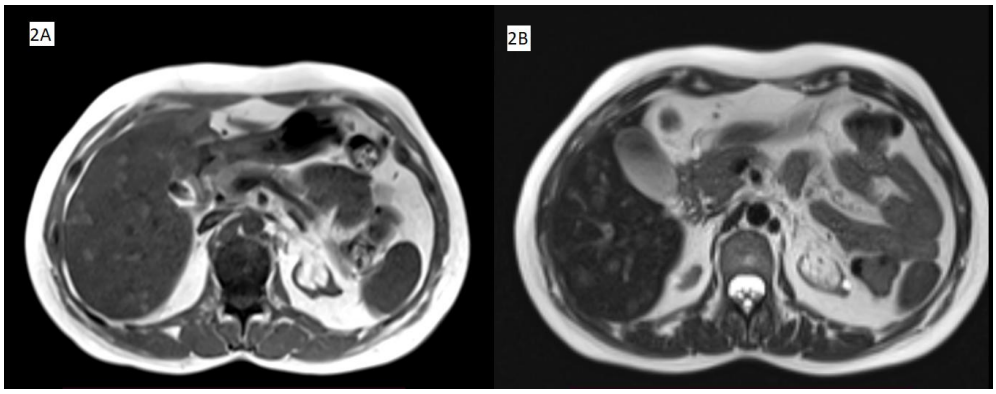
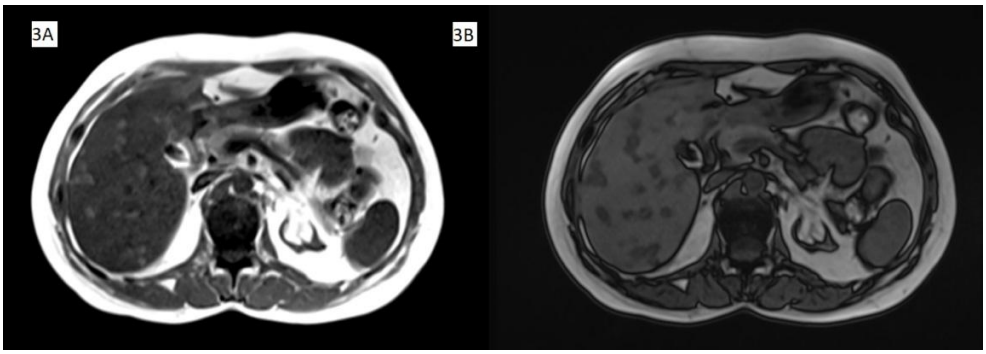


Image-1: Multiple hyperechoic lesions in both lobes of liver

Due to the suspicion of multiple hepatic metastases; CE-MRI of abdomen was performed for further workup of the patient; which revealed multiple well-defined focal lesions with smooth margins in both lobes of liver. The lesions were appearing hyperintense on T2WI (Images 2A and 2B). On chemical shift imaging, the lesions were showing hyperintense signal on T1 in-phase images with signal drop on T1 opposed phase images; indicative of presence of intracellular fat (Images 3A and 3B). None of the lesions were appreciable on fat suppression images. No restricted diffusion was seen on DWI in any of the lesions (Image 4A). None of the lesions showed any enhancement after administration of GBCA (Image 4B). No surrounding edema/mass effect/infiltration into surrounding vessels was seen. Rest of the visualized organs appeared unremarkable. No portal/mesenteric/peri-gastric/retroperitoneal lymphadenopathy was seen. No intra-peritoneal free fluid was seen.



Images 2A and 2B: Axial T1WI (2A) and
Axial T2WI (2B) showing multiple well-defined hyperintense lesions in liver.



Images 3A and 3B Chemical Shift Imaging

A. Axial T1-in phase images showing multiple well-defined hyperintense lesions.
B. Axial T2-opposed phase images showing signal drop in the lesions

Findings are indicative of presence of intracellular fat

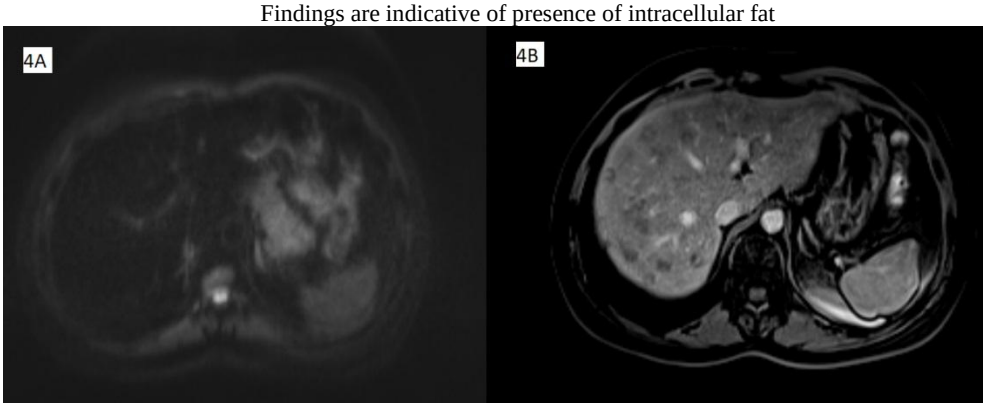


Image 4A: Axial DWI. No restricted diffusion is seen in any of the lesions.
Image 4B: Axial post-contrast T1 image. No post-contrast enhancement is seen.

Above findings were consistent with the presence of fat in the lesion without internal cellularity or vascularity. Conclusively, the diagnosis of MNFIL was made based on imaging finding and history of long term steroid intake.

DISCUSSION

Fatty infiltration of liver is a benign disorder. Although often being idiopathic; it is also associated with diabetes mellitus, obesity, steroid intake and metabolic syndrome. In addition, MNFIL is also shown to be related with systemic diseases such as porphyria cutanea tarda and hemochromatosis [3, 4].

Pathophysiology underlying MNFIL is yet not understood with tissue hypoxia, toxin build-up and portal flow alterations considered to be possible mechanisms [8].

MNFIL is a rare manifestation of NAFLD which can be misdiagnosed as multifocal primary or metastatic hepatic tumor with other differentials being hemangiomatosis, lymphoma, abscesses etc.

Despite having high sensitivity [9] for liver lesions, US has low specificity [10]. Hepatic metastases usually show a typical targetoid appearance with surrounding hypoechoic halo. Most common differential for multiple hepatic hyperechoic lesions is hemangiomatosis.

MRI provides valuable information for characterization of lesions including predicting histological characteristics with high specificity, especially for lipid containing lesions [11] using combination of special sequences including chemical shift imaging, fat suppression sequences, post-contrast sequences and DWI. MNFIL usually follows signal intensity of fat on various sequences. No post-contrast enhancement is seen due to lack on vascularity as seen in our case. Due to high specificity, it has also been suggested as a viable alternative to biopsy [12, 13].

Based on the above findings; histopathological examination was deemed unnecessary and was advised for follow-up imaging at every 6 months to monitor the lesions.

CONCLUSION

Being a radiological masquerader, MNFIL presents a diagnostic dilemma and US shows low specificity for diagnosis. CE-MRI can more reliably predict the diagnosis due to high specificity for predicting histopathological characteristics of lesions especially fat containing lesions.

So in the absence of history of primary malignancy and history of precipitating factors such as steroid intake, characteristic MRI appearance can be helpful in suggesting the diagnosis.

Conflict of Interest

The authors have no conflict of interest to disclose.

Abbreviations

NAFLD: Non-alcoholic fatty liver disease, MNFIL: Multifocal nodular fatty infiltration of liver, ESRD: End stage renal disease, US: Ultrasound, CE-MRI: Contrast enhanced magnetic resonance imaging, T1WI: T1 weighted image. T2WI: T2 weighted image, DWI: Diffusion weighted image, GBCA: Gadolinium based contrast agent

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