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Von Meyerberg Complexes: An Underrecognized Predisposing Factor for Focal Nodular Hyperplasia–Like Lesions

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Abstract

Von Meyerberg complexes (VMCs), also termed as biliary hamartomas, are common ductal plate malformations and are considered as benign incidental findings. These are occasionally discovered in histopathological examination or on imaging in individuals being investigated for an unrelated issue and do not warrant any active intervention. However, it is important to recognize that sometimes VMCs can predispose to malignant masses or rarely to hypervascular benign masses as in present case, causing diagnostic dilemma.

Keywords

- Von Meyerberg complexes (VMCs)
- biliary hamartomas
- focal nodular hyperplasia (FNH)
- FNH-like lesions

Introduction

Von Meyerberg complexes (VMCs) are typically not associated with any clinical manifestation and do not require any follow-up once diagnosed adequately. However, there have been uncommon occurrences of development of malignancy in VMCs, the most common tumor arising in this setting being cholangiocarcinoma besides the rarely occurring hepatocellular carcinoma, intraductal papillary cholangiocarcinoma, and adenocarcinoid tumor.[1–5]

Focal nodular hyperplasia (FNH) and FNH-like lesions of the liver are another set of incidentally discovered benign liver lesion, not requiring any further intervention after diagnosis. Contrary to the sporadic occurrence of classical FNH, FNH-like lesions originate as a hyperplastic response of hepatocytes, usually due to some inciting factor causing alteration in the hepatic microenvironment. Here, we present an unusual occurrence of FNH-like lesions in a background of multiple VMCs in a young male. This association has not been commonly described in the literature except in a single case series by Tohmé-Noun et al, despite being clinically significant, as it can mimic malignancy associated with VMCs, documented in prior studies.[1,2]

Case Summary

A 40-year-old male presented with complaint of recent chest pain. After a normal cardiac evaluation and lab parameters, he underwent abdominal sonography revealing multiple hypoechoic liver masses. He underwent a contrast-enhanced

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computed tomography scan of the abdomen, which revealed presence of multiple (> 20) hypervascular nodules/masses in the liver parenchyma. Additionally, there were numerous subcentimetric cystic areas in both lobes of the liver showing absent/minimal thin rim-like enhancement, suggestive of biliary hamartomas (►**Fig. 1**). Differential diagnoses of hepatic adenomatosis, multiple FNH, or hypervascular metastases were considered and the patient was advised magnetic resonance imaging (MRI) with hepatobiliary contrast to differentiate between these entities. Serum tumor markers including alpha-fetoprotein, cancer embryonic antigen, and carbohydrate antigen levels were within normal range. MRI demonstrated numerous hypervascular liver parenchymal lesions showing homogenous arterial-phase hyperenhancement with iso/hyperenhancement on equilibrium and delayed hepatobiliary phase images. Additionally, there were numerous VMCs in the liver showing fluid isointense signal (►**Fig. 2**). A diagnosis of FNH-like lesions over a background of VMCs was considered. Due to the rarity of this association, the patient was advised biopsy, which confirmed the diagnosis (►**Fig. 3**).

Discussion

VMCs are ductal plate malformations seen as small cystic dilatations of intrahepatic bile ducts embedded in fibrous stroma. These are the most innocuous lesions in the spectrum of fibropolycystic diseases of the liver, the more clinically significant counterparts being polycystic hepatic disease, Caroli's disease, congenital hepatic fibrosis, and biliary atresia.[6,7] On imaging, VMCs present as tiny cystic spaces interspersed in the liver parenchyma, more in the periportal and subcapsular locations. These are predominantly nonenhancing, and may demonstrate thin rim-like enhancement or a tiny enhancing mural nodule representing ductular proliferation.[2]

Sometimes, VMCs may be mistaken for metastases or infective lesions, especially when the interpretation is biased by any prior history.[8] In rare situations, these lesions may be associated with cholangiocarcinoma.[1] On the other hand, considering their innocuous nature, they are even acceptable in a liver graft in case of limited donor availability during liver transplant surgery.[9]

FNH is classically a benign hypervascular hepatic neoplasm, generally found in young females. FNH-like lesions may arise in altered hepatic microenvironment without any gender predilection. Any condition causing hepatic hypo/hyperperfusion may lead to regenerative hyperplastic response of hepatocytes, predisposing for development of FNH-like lesions. There is a paucity of literature about the association of FNH-like lesions over a background of ductal malformations. However, as we know that the FNH-like lesions develop in an abnormal liver parenchymal background, it is plausible to think that VMCs contributed in the development of these lesions. Tohmé-Noun et al described FNH-like lesions in three patients with VMCs, speculating that VMCs may predispose to increase in hepatic arterial and decrease in portal venous perfusion accounting for this association.[2] They also suggested that bile stasis in VMCs can lead to liver parenchymal exposure to chemicals present in the bile, contributing to neoplastic transformation.[10,11] Jain et al have documented gradual transition from VMCs to hyperplastic or adenomatous lesions and cholangiocarcinoma.[12] The present case is only the third article in available English medical literature to our knowledge highlighting this important association.

To conclude, the case highlights the importance of identifying and documenting VMCs in healthy asymptomatic individuals who present with hypervascular liver masses to obviate any undue apprehension of malignancy if the imaging features are indicative of the diagnosis of FNH and to avoid undue interventions.

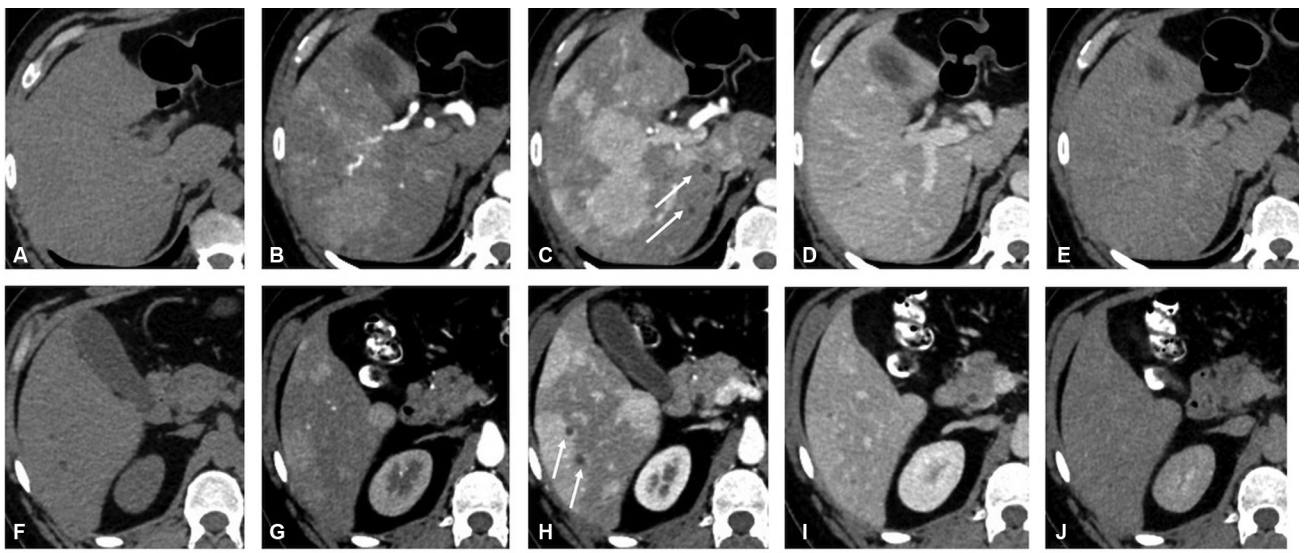

Fig. 1 (**A**, **F**) Noncontrast, (**B**, **G**) arterial phase, (**C**, **H**) portal venous phase, (**D**, **I**) equilibrium phase, and (**E**, **J**) delayed phase images of the liver at two different levels (**A–E** and **F–J**) show presence of multiple isoattenuating lesions on noncontrast images, showing hyperenhancement on arterial and portal venous phase images with iso- to hyperenhancement on equilibrium phase images and isoenhancement on delayed images. Multiple small nonenhancing tiny cystic spaces are noted in the images, consistent with von Meyerberg complexes (thin arrows, **C**, **H**).

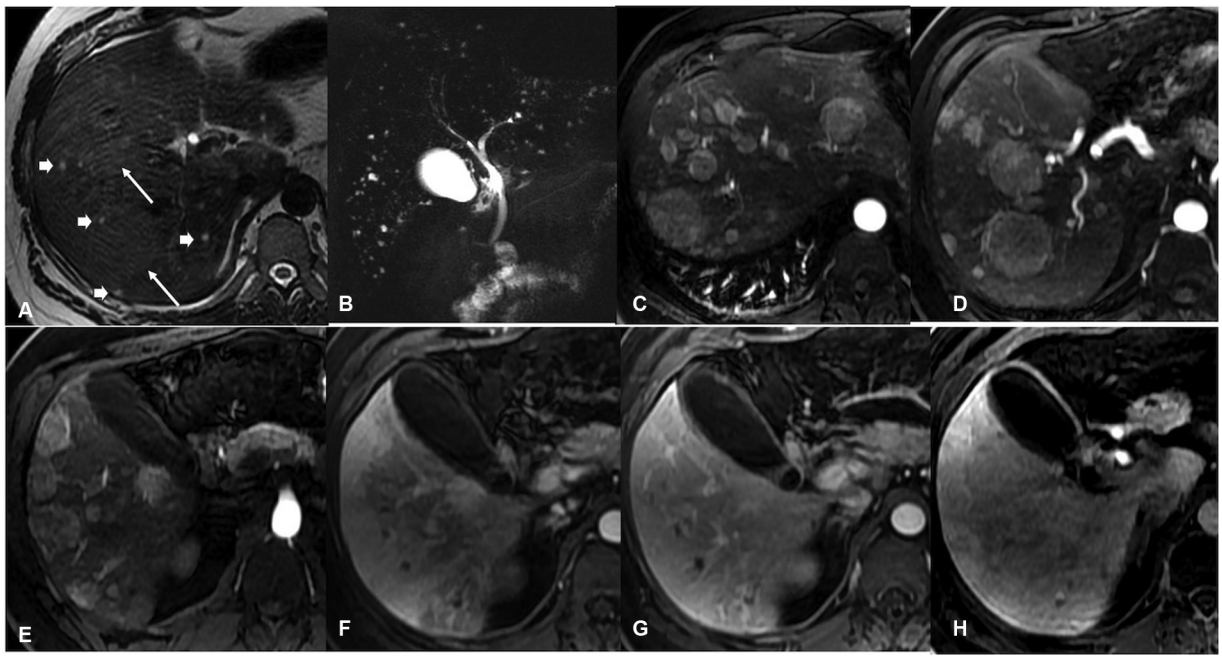

Fig. 2 (**A**–**H**) Axial T2-weighted image (**A**) shows presence of small hyperintense cystic foci in the liver parenchyma (thick short arrows) and ill-defined nearly isointense masses in the right lobe (thin long arrows). The biliary hamartomas are better visualized on two-dimensional (2D) single-shot magnetic resonance cholangiopancreatography (MRCP) images (**B**). Multiple hypervascular nodules and masses are seen in the liver parenchyma on fat-suppressed T1 spoiled gradient recalled echo (SPGR) image showing arterial phase enhancement (**C**–**E**) with progressive enhancement on portal venous images (**F**), mild hyperenhancement on equilibrium phase images (**G**), and isointense signal on 120-minute delayed hepatobiliary phase images (**H**).

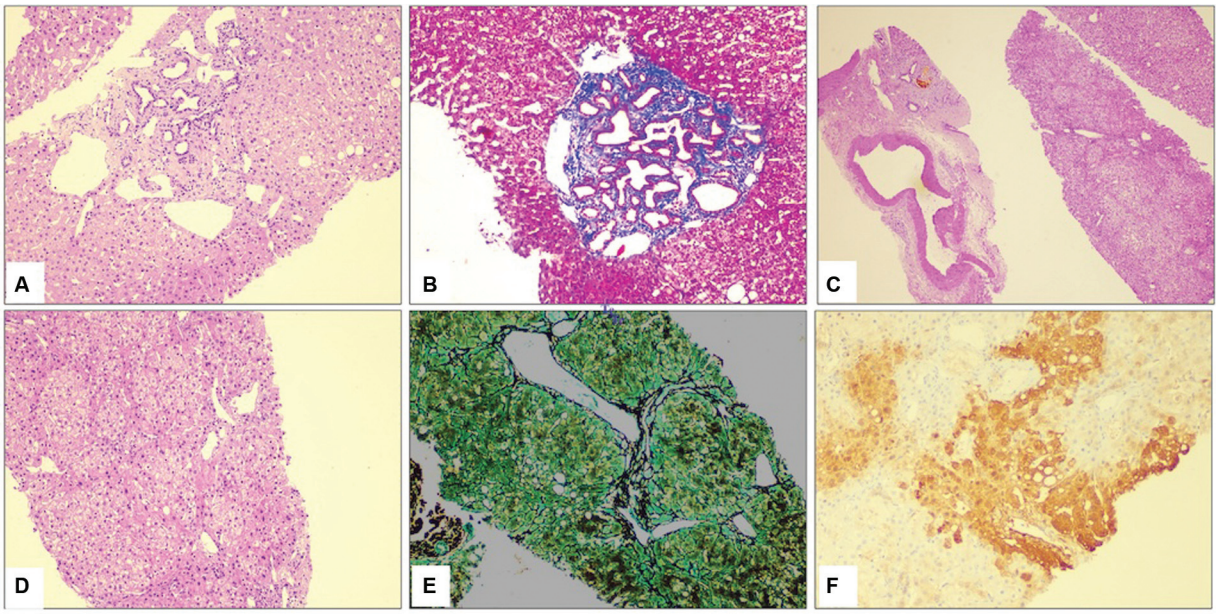

Fig. 3 (**A**) Low-power microphotograph shows a Von Meyerberg complex characterized by the presence of dilated and angulated ductal profiles (hematoxylin and eosin [H&E],10 ×). (**B**) Another Von Meyerberg complex better delineated on Masson trichrome (MT) stain (MT stain, 10 ×). (**C**) Scanner view microphotograph shows a fibrous septa with thick-walled blood vessels and surrounding hepatocytic nodules with maintained hepatocytic cell plate thickness and reticulin network (H&E, 4 ×). (**D**, **E**) Low-power microphotograph shows a hepatocellular lesion with a vague nodular configuration and maintained hepatocytic cell plate thickness and reticulin network (**D**, H&E,10 ×; **E**, reticulin stain, 10 ×). (**F**) Immunostaining with glutamine synthase demonstrates a map-like staining pattern consistent with focal nodular hyperplasia (immunohistochemistry [IHC] - glutamine synthase, 10 ×). No fibrosis was seen in the background liver parenchyma.

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Conflict of Interest
None declared.

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