Hepatic artery aneurysm in the setting of focal nodular hyperplasia

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ARTICLE INFO

Article history:
Received 1 March 2021
Revised 16 March 2021
Accepted 17 March 2021

Keywords:
Hepatic artery aneurysm
Focal nodular hyperplasia

ABSTRACT

Hepatic artery aneurysms (HAA) are rare and may be seen in the setting of infection and vascular disease. Clinical presentation is variable but many are found incidentally during imaging studies. The association of HAA with focal nodular hyperplasia (FNH) is rarely reported in literature. We present the case of a 68-year-old woman found to have a hepatic artery aneurysm and hepatic mass, both within the same liver segment. FNH and hepatic adenomas share similar imaging features but have different treatments due to malignant potential of the latter, and biopsy should be performed when adenoma cannot be excluded. In this case biopsy of the mass revealed it to be FNH and the aneurysm was treated with embolization rather than surgery.

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Introduction

Hepatic artery aneurysms (HAA) are uncommon, with an incidence ranging from 0.002% to 0.4% [1], and usually associated with infection, atherosclerosis, and other vascular diseases [2]. Symptoms of an HAA can be variable including epigastric pain, obstructive jaundice, and hemobilia but many HAAs are asymptomatic are found incidentally during imaging studies of other problems [3]. HAAs rupture in up to 80% of patients and there is increased risk of rupture for those which are nonatherosclerotic in origin and increased in size with evidence that HAAs <2 cm in size may not require treatment [3,4]. Focal nodular hyperplasia (FNH) is a distinct benign entity of unknown etiology, typically seen as a solitary mass containing increased proliferation of normal hepatic cells surrounding a central area of scarring [5]. This report describes the simultaneous diagnosis and treatment of a hepatic artery aneurysm associated with a hepatic FNH.

Case Summary

A 68-year-old woman presented to urgent care for evaluation of dyspepsia and left sided abdominal pain exacerbated by movement. Her physical exam was notable for normal vital signs with no significant abdominal findings. Single phase contrast-enhanced CT of the abdomen and pelvis showed an 8 cm left hepatic lobe mass, 2 right hepatic lobe masses, and a 2 cm, left HAA.

A multiphase Gadavist contrast-enhanced MRI was completed to further characterize the liver masses. This showed an 8 cm mass within hepatic segment 2/3 with mildly increased signal hyperintensity on T2-weighted images (Fig. 1). There was arterial enhancement on contrast-enhanced T1-weighted images, suggestive of a FNH versus hepatic adenoma. Again seen was a 2 cm saccular left HAA. Two smaller hepatic lesions were noted as well, one within segment 5 and segment 7, each measuring 2-3 cm, both with similar imag-
Fig. 1 – (A) Axial image arterial phase contrast-enhanced T1-weighted MRI shows an enhancing mass (asterisk) in hepatic segment 3. There is an associated saccular aneurysm involving the hepatic artery (arrow). (B) Delayed postcontrast coronal T1-weighted MRI shows persistent enhancement of the mass (asterisk) and re-demonstrates the hepatic artery aneurysm (arrow). (C) Celiac artery digital subtraction angiogram shows the hypervascular mass (FNH) in the left hepatic lobe and the associated hepatic artery aneurysm (arrow). (D) A microcatheter has been advanced into the segment 3 hepatic artery. Selective segment 3 hepatic arteriogram confirms that the saccular aneurysm (arrow) involves the segment 3 hepatic artery that perfuses the FNH. (E) After selective coil embolization (arrow) of the segment 3 hepatic artery, the celiac arteriogram confirms exclusion of the aneurysm.

Fig. 2 – (A) Liver biopsy shows focal nodule of hepatocytes surrounded by thick fibrous septa containing a prominent thick walled vessel (asterisks). There is also marked bile ductular reaction (open arrows) with associated mononuclear inflammatory infiltrates. [Hematoxylin and eosin stain, x 100]. (B) Immunohistochemistry shows patchy and map-like staining pattern of glutamine synthase in focal nodular hyperplasia. [Glutamine synthase immunohistochemical stain, x40].
ing characteristics as the segment 2/3 mass. Germane to the management of this patient is the specific diagnosis of the liver mass, with the recommendation for surgical resection if it were an adenoma, in which case, the HAA would be resected at the same time. To make a definitive diagnosis, a biopsy was performed. Histologic analysis showed altered hepatic architecture with fibrous septa, no atypical cells or increased mitotic activity, and a map-like glutamine synthetase staining pattern yielding a final pathologic diagnosis of FNH (Fig. 2).

With the diagnosis of the hepatic mass established, attention was then turned to treatment of the hepatic artery aneurysm. With right common femoral arterial access, angiography was performed, including celiac arteriography and selective catheterization of the left hepatic artery. Selective arteriography demonstrated the saccular aneurysm involving the segment 3 hepatic artery, perfusing the hypervascular mass in segment 2/3. Selective embolization of the segment 3 artery was performed using detachable coils ranging in size from 3mm to 10mm. The coil pack extended from distal to the neck of the aneurysm, across the neck of the aneurysm and proximally within the segment 3 artery. The post-embolization arteriogram showed expected exclusion of the segment 3 aneurysm. There were no complications with the procedure. On follow up the patient was feeling well and was without symptoms.

Discussion

While uncommon, hepatic artery aneurysms account for 20% of visceral artery aneurysms [6]. However, the association of hepatic artery aneurysms with FNH is quite rare as the authors were able to find only one case of this association in the English literature [7]. The patient described in our current report has no significant history or preexisting condition and presented with vague abdominal pain and mild reflux symptoms. She was diagnosed with a hepatic artery aneurysm and associated hepatic mass that was determined to be FNH based on biopsy.

FNH have no malignant potential and therefore require no intervention unless symptomatic. While it is likely that the co-existence of FNH and hepatic artery aneurysm is merely coincidental given that the incidence of FNH is high compare to that of HAA, it has been speculated that the hypervascular FNH creates a hyperdynamic state in the feeding hepatic artery resulting in increased stress and fatigue of the vessel walls. It is of interest to note that the patient’s left hepatic artery is large compared to the right artery consistent with the increased flow. A common differential diagnosis of FNH includes hepatic adenoma, which can undergo malignant degeneration and possess increased risk for hemorrhage [8]. Hepatic adenomas are managed differently than FNHs, and thus, a clear diagnosis based on imaging and/or histology is important. In our case, if the biopsy showed adenoma, it could be managed by hepatic resection, which would include the removal of the hepatic artery aneurysm. With a tissue diagnosis of FNH, embolization of the aneurysmal feeding artery was successful in eliminating flow to the aneurysm and the hepatic lesion, rendering her symptom-free.

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