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Combination Laparoscopic Radiofrequency Ablation and Partial Excision of Hepatic Hemangioma

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INTRODUCTION

Hepatic cavernous hemangioma (HCH) is the most common benign liver tumor, with a reported incidence of 0.4%–20% and prevalence of 0.4%–7.4% in autopsy studies.[1–5]

It is usually discovered incidentally at autopsy, laparotomy, or with investigations with the increased availability of imagining like abdominal ultrasonography and computed tomography, as it is often asymptomatic.[2,5] Definitive diagnosis with percutaneous biopsy has been reported to be safe with a small risk of hemorrhage.[2,3]

HCH is usually asymptomatic, but it may cause symptoms, such as abdominal pain due to pressure on adjacent organs or partial infarction within the tumor, and swelling.[1–5] Early satiety, nausea, and vomiting have been reported.[5]

Traditionally, surgical resection has been the treatment of choice.[2,5] However, substantial recovery time and morbidity are associated with open hepatectomy or enucleation.[3] The morbidity is reported to be 15%–30% and mortality up to 5%.[2,6]

CASE REPORT

A 36-year-old woman was referred with pain suggestive of a biliary colic, with a positive hydroxy iminodiacetic acid (HIDA) scan, 2 weeks after dilatation and curettage of a partial molar pregnancy. This was confirmed with the abdominal ultrasound scan showing cholelithiasis, and a hemangioma was noted. She underwent a laparoscopic cholecystectomy. Intraoperatively an exophytic HCH was found in segment 4B (Figure 1). When the liver was placed down, the HCH was noted to compress the first part of the duodenum (Figure 2). Her pain improved significantly postoperatively, but she had ongoing pain, as well as episodic reflux, nausea, and profound weight loss, requiring an insertion of a nasojejunal feeding tube to help maintain her nutrition.

Magnetic resonance imaging (MRI) scanning showed the HCH to be quite large within segment 4 extending from the inferior vena cava posterior to the portal vein confluence medially and also projecting out of segment 4B (Figure 3). Due to ongoing disabling symptoms, it was felt that treatment for the HCH was needed.

Transfemoral arterial embolization was attempted but was unsuccessful due to vascular spasm and small feeding vessels that the catheter was unable to enter. Full surgical excision was deemed high risk because of the proximity to portal vein and inferior vena cava (Figure 3). A combination radiofrequency ablation (RFA) and partial excision of her HCH was decided to be the safest option. She underwent laparoscopy and the HCH was easily accessible.

Figure 1. A 3.7-cm HCH found in segment 4B during laparoscopic cholecystectomy.

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Figure 2. HCH compressing the first part of the duodenum.

Multiple-electrode RFA was used and resulted in thrombosis of the HCH. Once the RFA had been completed, the HCH noticeably changed and became firm. This was followed with serial shearing of the ablated HCH down to the liver surface with the laparoscopic bipolar forceps (Gyrus, Southborough, MA). When the exophytic portion was excised, there was minimal bleeding. Hemostasis was assisted with the use of FLOSEAL and TISSEEL (Baxter, Deerfield, IL) fibrin glues. The total surgical time was 2 hours. Postoperative computed tomography showed reduction in the lesion size and minimal vascularity (Figure 4). Her serial liver function tests were unremarkable. She had an uncomplicated postoperative recovery and was discharged on day 8, with complete resolution of her symptoms clinically. Her follow-up MRI scan (Figure 4) showed an overall reduction in the HCH size, without compromise of vascular or biliary structures.

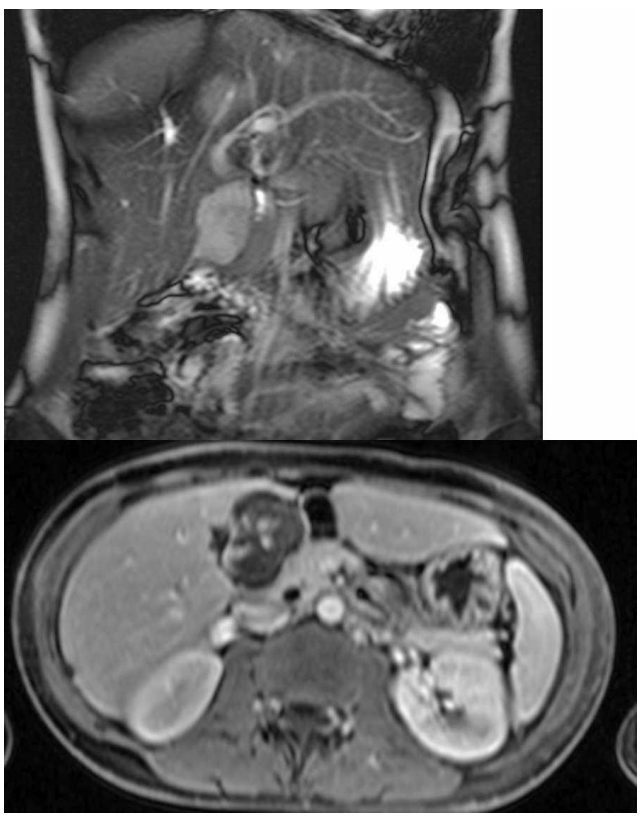

Figure 3. Preoperative MRI showing HCH within segment 4 extending from the IVC posterior to the portal vein confluence medially as well as projecting out of segment 4B. Top = coronal view; bottom = transverse view.

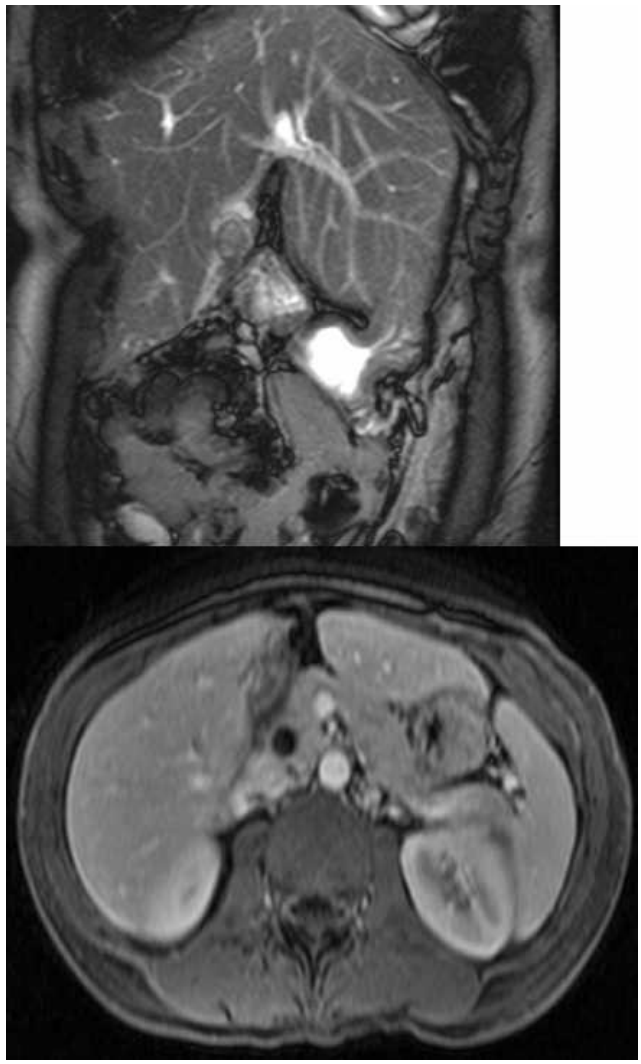

Figure 4. Postoperative MRI showing overall reduction in HCH size. Top = coronal view; bottom = transverse view.

DISCUSSION

The partial molar pregnancy was believed to cause an acute increase in the size of her hepatic cavernous hemangioma via hormonal influence. Its

size and relation to the gallbladder caused biliary pain and positive HIDA by local irritation. Its relation to the duodenum resulted in duodenal compression, causing decreased gastric emptying, which explained her ongoing nausea and weight loss.

There are few data in the literature on RFA of benign liver neoplasms.[2] Successful experience in the treatment of hepatic malignancies with RFA since its introduction in 1990 has led to its use in HCH.[5] RFA is reported to be a safe and effective minimally invasive treatment in many clinical settings.[1,2] The effect of RFA is the cauterizing effect of tissue heating. The small size of the radiofrequency electrode (17 gauge) and the lack of requirement to ablate every malignant cell make it an ideal therapy for benign lesions.[3] The mechanism of action is yet to be elucidated, but it is thought to involve its thrombogenic effect by inducing endothelial lining damage in the vascular structures.[1,2] This generates ionic agitation in the tissue surrounding the tip, and the frictional heat thus created exceeds 80°C–100°C in the tissues surrounding the electrode, causing localized areas of coagulative necrosis and tissue desiccation.[1,3,7,8] It creates a 3.5- to 5-cm oval of spherical thermal coagulative necrosis.[3] The dead cells eventually shrink and become scar tissues.[3]

RFA has a low morbidity and mortality.[2] It compares favorably with surgical resection.[2,6] Laparoscopic RFA is minimally invasive while providing access for intraoperative ultrasound examination of the liver for biopsy and RFA needle placement guidance, better detection of lesions, accurate targeting, and evaluation of therapeutic efficacy.[1] The pneumoperitoneum would elevate the diaphragm and displace adjacent organs to avoid injury and facilitate needle placement.[1] Incomplete ablation is less of a problem as it can be followed up percutaneously as surface lesions would have been well ablated and remnants are usually situated within the liver.[1] RFA is therefore suitable for subcapsular lesions near the gallbladder, as cholecystectomy and deroofing can be performed simultaneously.[1] Bleeding from hepatic puncture sites can be readily recognized and controlled with laparoscopic visualization.[1]

Once coagulated, the lesion is much easier to resect, and using bipolar cutting forceps is an ideal method. FLOSEAL is ideal for stopping the tissue ooze that often follows liver resections and once stopped, TISSEEL glue will seal the surface.

CONCLUSION

RFA is a promising technique for the treatment of symptomatic HCH, which should be considered as an alternative or a minimally invasive procedure that may be curative, and which if unsuccessful, does not compromise subsequent surgical resection. This technique of RFA and serial excision is an effective and innovative therapy for different liver lesions.

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