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Bangladesh Experience of Radiofrequency Ablation for Management of Hepatic Haemangioma

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ABSTRACT

Introduction: Hepatic haemangiomas are most common benign tumors of the liver. These are vascular malformations, which are usually asymptomatic. However, these may be potential cause of life-threatening complications at times. Methods: There are several treatment options for hepatic haemangiomas. Here we discuss radiofrequency ablation for management of this condition. Results: We included 15 patients with hepatic haemangiomas in this single arm, single Centre study. We ablated their haemangiomas with radiofrequency ablation. None had any major adverse event. At 6-month follow-up, the size of hepatic haemangioma was reduced in all patients. Conclusion: The study suggests radiofrequency ablation for management of hepatic haemangiomas is safe and effective.

INTRODUCTION

Our perception about hepatic haemangiomas, the most common benign space occupying lesion of the liver has changed in recent times. Contrary to our previous understanding, we now know that hepatic haemangiomas are vascular anomalies within the liver without neoplastic transformation. The International Society for the Study of Vascular Anomalies has classified hepatic haemangiomas as venous malformations [1,2]. Hepatic haemangioma are more common in females and in 30–50-year age group. Studies have suggested that approx. 20% of the population have haemangiomas in their livers [3,4]. Although typically asymptomatic, hepatic haemangiomas, specially those over >5cm in size, can lead to pain in the upper right abdomen, decreased appetite, early satiety, abdominal fullness, post-prandial bloating, nausea and vomiting [5]. Spontaneous and/or traumatic rupture of hepatic haemangiomas may endanger life [6,7,8]. Besides large hepatic haemangiomas can also cause Budd Chiari Syndrome and portal hypertension, obstructive jaundice and inferior vena cava obstruction, thrombosis, Kasabach-Merritt syndrome etc. [9]. Diagnosis of hepatic haemangiomas is based on imaging, with triphasic computed tomography (CT) being the imaging modality of choice.

There is centripetal peripheral discontinuous nodular enhancement on triphasic CT in hepatic haemangiomas [4]. For large and/or symptomatic hepatic haemangiomas, several treatment options are now days available. Surgical resection is an option, but most prefer non-surgical interventions namely, trans-arterial embolization (TAE), radiofrequency ablation (RFA), microwave ablation and percutaneous sclerotherapy [7]. In our centre we offer either percutaneous sclerotherapy, TAE or RFA. In this paper, we will share our initial experience of treating hepatic haemangiomas with RFA. This is the first publication of it's kind from Bangladesh.

METHODS

All patients included in this study had hepatic haemangiomas (Table 1). After skin sterilization, 10 ml to 15 ml local anaesthetic agent (2% lidocaine hydrochloride) was injected around the hepatic capsule and in the intercostal space and overlying sub-cutaneous tissue. Prophylactic intravenous antibiotic ceftriaxone (1 gm) was administered in every patient.

Table 1: Patient characteristics and study outcomes

Patient characteristics	
N	15
F:M	10: 5
Age	26 - 61 years
Right lobe hepatic haemangioma	12
Left lobe hepatic haemangioma	3
Size	
At baseline	2 – 4.8 cm
At 6-month follow-up	1 - 2.5 cm
Reduction of hepatic haemangioma at 6-months follow up	15
Adverse events	
Puncture site abscess formation	1
Mild right hypochondriac pain	13
Pain radiating to the right shoulder	9
Fever	2

Grounding was achieved by attaching pads to the patient's thighs, with the patient lying in supine position. Hepatic haemangioma was punctured percutaneously through transhepatic route, under ultrasound guidance with RF electrode (Boston Scientific, USA), which was carefully placed at the center of the haemangioma to minimize heat induced injury to neighbouring healthy liver tissue. Hepatic haemangioma was then ablated using a RF generator (RF-300, Boston Scientific, USA). (Fig. 1 & 2).

RF electrode was removed slowly and manual pressure applied to the puncture site for approx. 5 minutes. Next tight, pressure gauge bandage was applied to the puncture site and patient placed in right lateral position for approx. 2 hours.

Procedures were performed under total intravascular anesthesia using injection propofol (1 mg/kg body weight) by a qualified anesthetist. The patient's vital signs and cardiac rhythms were monitored continuously. Patients were monitored for approx. 6 hours post-procedure. International normalized ratio > 1.5 and/or platelet count <100,000/µL were considered as

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contraindications for the procedure and corrected with fresh frozen plasma and aphaeresis platelet transfusion respectively before the procedure. Patients were monitored for 24 hours post-procedure before being discharged. Injection proton pump inhibitor (40 mg; intravenously), injection timonium methyl sulphate (5 mg; intravenously) and acetaminophen (500 mg; orally) were used to relieve minor symptoms of the patients. At follow-up, liver function tests and abdominal ultrasounds were performed at 6 months.

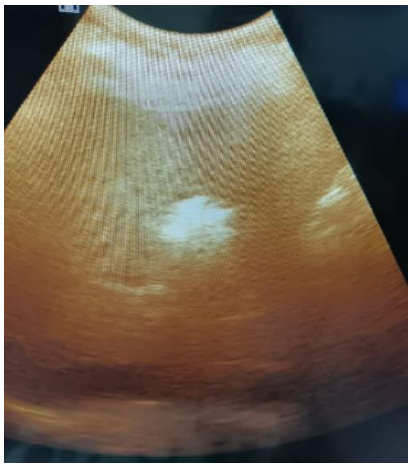

Fig. 1: Ablated hepatic haemangioma

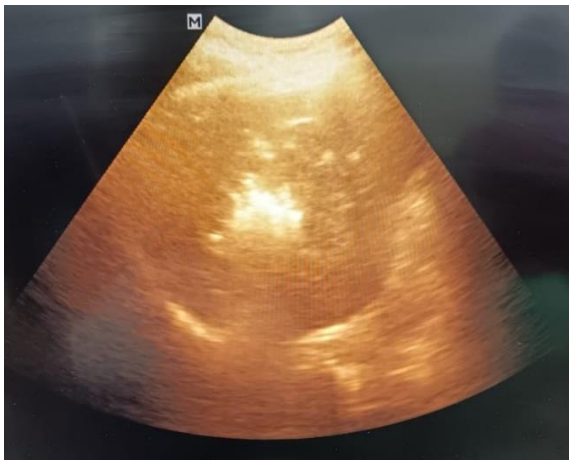

Fig. 2: Ablated hepatic haemangioma

RESULTS

We achieved comparable results from other centres in different countries. We achieved tumor size reduction in 100% cases. There are reports of 90.5-96.3% ablation in the literature [10, 11]. Our data may be slightly more impressive, due to our smaller sample size and as because we have selected haepatic haemangiomas not >5 cm in diameter.

Our other achievement is the absence of significant adverse event. There are reports of major adverse events like lung injury, diaphragmatic perforation, pleural effusion and haemothorax requiring hospitalization following CT guided RFA for hepatic haemangioma requiring hospitalization, none of which was however experienced in our study (Table 1) [11]. Besides we also did not experience adverse events like accidental perforation of adjacent organs like

gall blader and gastrointestinal tract, AKI or skin burn injury, as have been reported by researchers from different centers [5, 10, 12].

DISCUSSION

Treatment is usually indicated for large hepatic haemangiomaso ≥5 cm in diameter and for those that are symptomatic [1]. In our centre we also treat such hepatic haemangiomas that we consider to be of high risk (Table 2), as because we think that the risk of rupture of hepatic haemangiomas is high in Bangladesh, while on the contrary there is extreme lack of expertise in the country to deal with such complications [13]. However, patients who have potential risk of procedure related complications are not offered such treatment (Table 3).

Table 2: Indications for treating hepatic haemangiomas with RFA

Symptomatic hepatic haemangiomas
Increase in size of hepatic haemangiomas at 1-year follow up
Left lobe hepatic haemangiomas close to the heart
Peripherally located hepatic haemangiomas
Hepatic haemangiomas close to the hepatic surface with little or no intervening hepatic tissue

Table 3: Contraindication of RFA for hepatic haemangioma

Platelet count <100,000/L, INR >1.5
Hepatic impairment
Heart failure
Renal impairment

RFA for hepatic haemangiomas was first reported in 2003 in a series of 12 patients. Initially it was done under CT guidance [14, 15]. In 2006, the first paper on laparoscopic RFA in 21 haepatic haemangioma patients was reported [16]. Subsequently studies showed that laparoscopic RFA was superior to surgical resection for hepatic haemangiomas [17]. In our case we only did percutaneous RFA for hepatic haemangiomas under ultrasound guidance. We preferred ultrasound over CT, as it was cost effective, had the advantage of real time guidance and free from the risk of unnecessary radiation exposure. Although several studies have reported RFA for management of ≥10 cm hepatic haemangiomas with 82.4-90.5% ablation [18], in our centre we cannot go beyond 5 cm hepatic haemangiomas, as the RF electrode has a maximum radius of 5 cm.

Both percutaneous sclerotherapy and RFA are associated with complications. Prolonged retention of sclerosing agents in low-flow hepatic haemangiomas can cause endothelial damage, thrombus formation, tissue ischaemia and necrosis [19]. On the other hand, there are reports of thermal injury to the liver and or neighbouring organs from RFA. RFA can also cause haemolysis leading to haemoglobinuria, haemolytic jaundice and acute kidney injury, none of which however was experienced in our series [5]. The later is particularly seen when RFA session is prolonged [A30, A36]. In such cases, a second session may be planned, although having not faced such issue, we performed single RFA session in all our patients.

We always approached the target lesion with RF electrode through transhepatic route to reduce the risk of peritoneal haemorrhage from the RF electrode puncture site of the haemangioma. RF electrode was repositioned in case any adjacent >1 mm visible blood vessel to avoid heat

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sink effect *i.e.* cooling of the RF electrode. Besides, we ensured intra-mural ablation in order to minimize injury to adjacent healthy liver tissue. These are standard practices in other centres too [5, 10]. We had few limitations. We conducted a single centre, single arm study with small sample size and without any control. Another limitation of the study, as one may say is that we selected patients with <5 cm size. However, this may also be interpreted the other way round, as the study widens the scope of treatment of hepatic haemangiomas.

CONCLUSION

Our study suggests RFA may be utilized as a safe and effective treatment option for hepatic haemangiomas that allows early recovery of patients. However, larger, prospective, multi-centre, randomized clinical trial has to carried out before any recommendation can be made.

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