

**A PROSPECTIVE ANALYSIS OF HEMANGIOMA OF LIVER IN A TERTIARY  
CENTER**

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**ABSTRACT**

Benign liver tumors are common and account for 83% of all hepatic tumors identified on diagnostic imaging or at the time of laparoscopy. Benign liver tumors may arise from either epithelial or mesenchymal cells (Table-1). In rare instances, a variety of miscellaneous disorders may masquerade as liver tumors. Hemangiomas and benign cysts constitute more than 50% of all hepatic lesions while focal nodular hyperplasia (FNH), metastatic tumors from a known or unknown primary cancer, hepatic adenomas and hepatocellular carcinomas constitute the remaining common diagnoses.<sup>[1]</sup> Despite significant advances in diagnostic imaging modalities, the appearance of these lesions on imaging may not be always classical and biopsy or resection may be required in cases in which the diagnosis cannot be confidently made on imaging. The inability to exclude a possible malignancy is the most common indication for surgical intervention in a benign liver tumor.

**KEYWORDS:** Hemangioma, enucleation, hepatic, Hepatocellular carcinoma, benign, giant.

**INTRODUCTION**

Hemangiomas are the most common benign tumors of the liver, with frequency in autopsy series ranging from 4 to 20%.<sup>[2-4]</sup> Liver hemangiomas occur at all ages with a female to male ratio of 3:1 to 5:1.<sup>[5,6]</sup> In adults, hemangiomas are usually found between the ages of 30-70 years. Cavernous hemangiomas arise from the endothelial cells that line the blood vessels and consist of multiple, large vascular channels lined by a single layer of endothelial cells and supported by collagenous walls.

These tumors are frequently asymptomatic and incidentally discovered at imaging, surgery, or autopsy. Usually, cavernous hemangiomas occur as solitary lesions; however, they may be multiple in as many as 50% of patients [Figure-1]. No lobar predilection exists, and the tumors may be associated with focal nodular hyperplasia. Small capillary hemangiomas are more common than the larger cavernous variant but are of little clinical significance.

**Table 1: Benign Lesions of the Liver.**

Cell of Origin	Lesion
Epithelial	
Hepatocellular	Focal Nodular Hyperplasia (FNH)
	Hepatocellular Adenoma
	Nodular regenerativeHyperplasia
Cholangiocellular	Biliary Adenoma
	Billiary cystademona
Mesenchymal	
Endothelial	Hemangioma
Mesothelial	Solitary Fibrous tumor (benign mesothelioma)
Adipocyte	Lipoma
	Angiomyolipoma Myelolipoma
Miscellaneous	
Heterotropic tissue	Adrenal, pancreatic, splenic tissues
<b>Others</b>	Peliosis hepatis
	Focal fatty infiltration
	Inflammatory pseudotumor
	Chronic abscess

### Morphology and pathology

Cavernous hemangiomas are considered to be congenital vascular malformations and have no malignant potential; however, their exact pathogenesis is yet unknown. The prevalence of hemangioma in the general population ranges from 1% to 20% in different study They are often solitary, but multiple lesions may be present in up to 40% cases.<sup>[7]</sup> They are found in both lobes of the liver with equal frequency and the majority of them are <5 cm in diameter. Giant hemangiomas are those >5 cm in size.<sup>[8]</sup> But in a reported series Blumgarts et al opined that >10 cm size is regarded as giant hemangioma and are present with fibrosis, thrombosis and calcifications.<sup>[9]</sup> The pathogenesis of hemangioma is not well understood. Some of these tumor has estrogen receptors and accelerated growth has been observed with high estrogen states such as those associated with puberty, pregnancy, use of oral contraceptives and with androgen treatment. These findings suggest that hormonal effect may be one of the pathogenic mechanisms. Macroscopically they are well-circumscribed, well delineated flat reddish purple hypervascular lesions and are surrounded by a thin fibrous capsule. Thrombosis may result in inflammatory changes which subsequently lead to fibrosis and even calcification. Microscopically there are large blood-filled spaces lined by endothelial cells and separated by thin incomplete fibrous septa.

### Clinical presentation

Vast majority of hemangiomas are less than 5 cm and are often incidentally discovered at laparotomy or abdominal radiological investigation for some other cause. Small lesions are generally asymptomatic and if an accurate diagnosis is made then no further therapy is required .[Figure-2] Even larger lesions are typically asymptomatic unless producing symptoms such as upper abdominal pain, distension or due to mass effect on neighboring structures, hemorrhage or thrombosis. The pain is generally wrongly attributed to the hemangioma and usually another cause (other than hemangiomas) can be determined for the abdominal pain. Large hemangiomas may be asymptomatic or may manifest as mass or pain. Rarely, symptoms of acute abdomen can be produced by spontaneous rupture with intrabdominal hemorrhage.<sup>[10]</sup> Another rare but documented presentation which may require resection is of thrombocytopenia due to a thrombosis within a large hemangioma leading to a consumption coagulopathy. This is known as Kasabach-Merritt syndrome.<sup>[11]</sup> This is more common in adult .Here coagulopathy consist of intravascular coagulation, clotting and fibrinolysis within the hemangioma and may lead to increased fibrinolysin and thrombocytopenia but all these reversible after removal of hemangioma. Spontaneous rupture is very rare. Large lesion of left lobe may cause pressure effect on adjacent structures with resulting symptoms. Jaundice as such may be possible by pressure on bile ducts but it is very rare. Liver function test (LFT) usually remain normal. Hence normal LFT with large tumor and with mild symptoms could be of help to

diagnose hemangioma. There are reports of rapid increase in size of cavernous hemangiomas in women taking oral contraceptive pills or during pregnancy. However studies have shown that the growth of hemangiomas and the risk of rupture are similar between pregnant and nonpregnant women.<sup>[12]</sup> Complications in large tumor include (1) Inflammation (2) Coagulopathy, may lead to haemorrhage(3) and ompression of adjacent structure. Inflammation may reflect as- low grade fever, weight loss, pain, high ESR, normal WBC, anaemia, thrombocytosis, and increased fibrinogen level.

### MATERIALS AND METHODS

37 patients were studied at Gauhati Medical College (a tertiary superspeciality center) since last 3 years from April,2016 till July,2019.28 patients were female and 9 patients were male with a female to male ratio is 4:1Age group from 35 years to 63 years. Maximum patients were under age group of 35-45 years. It is 22 patients.All patients were having cavernous type and solitary. Confined in the right lobe.1 patients showed multiple in both lobe. 1 patient had in the left lobe.1 patient had in caudate lobe.10 patients had enucleation done and 3 patients resected. All other patients did not produce any symptoms managed medically. The size of hemangioma were less than 5 cm were managed non-operatively.They were constantly observed.9 patients were started steroid and venusmin. 1-3 monthly CT scan was done. Thorough counseling was done. Those patients operated showed symptoms of pain off and on. Size was more than 7 cm.3 patients gave diagnostic dilemma and did not proved to be benign.

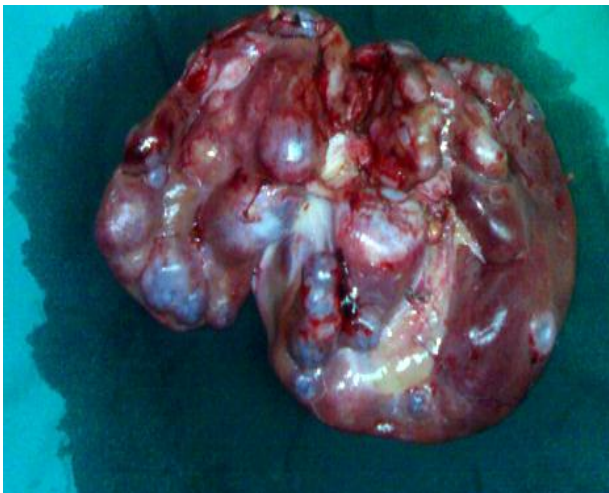
### Diagnosis

Liver function tests are usually normal. Thrombocytopenia may be found in patients with Kasabach-Merritt syndrome. The typical ultrasound (US) appearance of a hemangioma is that of a well-demarcated, hyper echoic mass with faint acoustic enhancement and sharp margins. Usually they are less than 3-5 cm. No vascular pattern is usually identified in colour doppler. On contrast US peripheral globular enhancement in the portal phase and isoechoic pattern seen on late phase in atypical hemangioma.<sup>[13]</sup> On non-contrast computed tomography (CT) scanning they appear as a well-defined hypodense mass with lobulated borders. Calcification may be seen in 10% of cases.<sup>[14]</sup> On a triple phase contrast CT scan, they appear showing peripheral nodular enhancement in the arterial phase followed by centripetal enhancement in the delayed phase. Variations may, however, be present and these may cause difficulty in differentiation from other hyper vascular liver lesions. Presence of peripheral puddles on the arterial phase has a sensitivity of 67%, a specificity of 99% and a positive predictive value of 86% for hemangiomas. On MRI- hypointense lesion in T1 and well defined homogeneous masses of hyper intense sequences in T2 with a light bulb pattern of appearance.<sup>[15]</sup> These features are better demonstrated after intravenous gadolinium-contrast administration. In

10% of the cases multiple hemangiomas are encountered and even innumerable lesion may be present and when present called hemangiomatosis.

Labeled red blood cell scintigraphy using single positron emission tomography (SPECT) is highly specific for hemangiomas. They are seen as a filling defect in the early phase that fills in centripetally in the delayed phase.<sup>[16]</sup> Given the reported incidents of hemorrhage after needle biopsy and the significant false negative rate, percutaneous needle biopsy is indicated only in cases of suspected hemangiomas with atypical features.<sup>[17]</sup> Hemangioma in chirrhosis are difficult to diagnose as these are much fibrotic and smaller in size. Half of hyperechoic lesion are hepatocellular carcinoma (HCC). In 25% cases hemangiomas are associated with focal nodular hyperplasia with focal arterial enhanced flow and like hemangioma this is thought to be vascular origin. About 42% cases the size are <2cm which are rapid filling. Here CT and MR imaging show immediate homogeneous enhancement in the arterial phase; which makes differentiation from other hypervascular tumor difficult. Their diagnosis is based on strong hyperintensity on T2 weighted images, the parallel enhancement with arterial structures and the persistent enhancement on delayed phase imaging. These induces arterio-venous-portal shunt. In fatty liver hemangiomas looks on ultrasound as isoechoic or hypo echoic. Strong hyper intensity in T2 on MRI is significant and more helpful to diagnose.

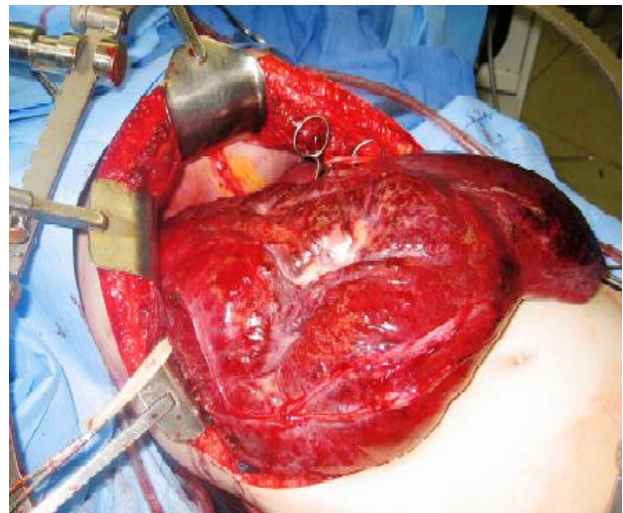
MRI is said to be gold standard and needle biopsy is restricted in exceptional cases.



**Fig. 1: Multiple hemangioma (Post-op).**



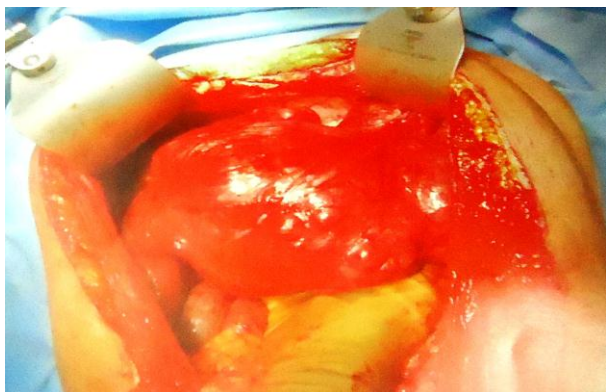
**Fig. 2: A large incidentally detected hemangiomas in the right lobe of the liver. CT scan shows the typical nodular enhancement from the periphery. Patient was asymptomatic and no treatment was offered.**



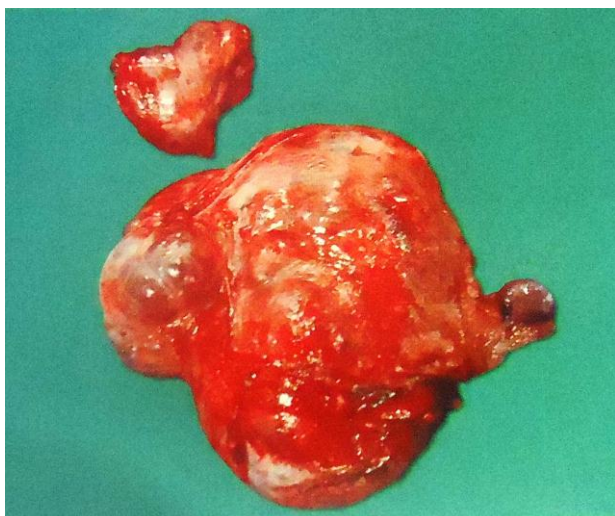
**Fig. 3: Giant hemangioma (Pre-op).**



**Fig. 4: It is a simple procedure to enucleate hemangioma. It is firm in consistency and there is very little bleeding. The pedicle of the hemangioma is seen.**



**Fig. 5: A large hemangioma of the left lobe of the liver. It was causing discomfort as well as pressure effects on the stomach.**



**Fig. 6: The resected hemangioma. There was another smaller hemangioma in the caudate. Resection of hemangioma, either anatomical or by enucleation is usually technically easy.**

#### Management in general

Whatever the size, there is no treatment for asymptomatic hemangiomas (as per present guideline) [Figure-2]. Majority are asymptomatic and less than 2 cm. After diagnosis no therapeutic measure to be adopted. Counseling to the patient is of prime importance than type of treatment. Oral contraceptives.<sup>[18]</sup> are allowed to be continued. Pregnancy are allowed to be planned. Sporting activity not to be interrupted. Even no follow up is justified.<sup>[19]</sup> It is opined that the complications are due to surgery but not due to hemangiomas. Indications of treatment include severe symptoms, complications and inability to exclude malignancy.<sup>[20]</sup> Symptoms are usually related with giant hemangiomas [Figure.3]. Though surgery is the option of choice yet other options include hepatic artery ligation, radiation therapy can also able to reduce the size. But adverse effect of radiation can not be ruled out. Use of steroid in hemangiomas are also to be considered. Arterial embolization in temporary control of bleeding has been adopted in different center. Arterial ligation during surgery can facilitate easy manipulation and

enucleation. Non anatomical enucleation is advocated mainly in peripheral tumor where as in deeply placed tumor and tumor occupying majority of parenchyma the resection is usually preferred. Generally symptomatic hemangiomas become asymptomatic after resection or enucleation [Figure-4]. Laparoscopic enucleation is also an acceptable alternative procedure. Liver transplantation is an option for special circumstances like symptomatic unresectable giant hemangiomas. The natural history of hemangiomas is still not fully understood. The risk of spontaneous rupture and intrabdominal hemorrhage is very low (<1%). Pregnancy or oral contraceptives.<sup>[21]</sup> have not been found to be risk factors for spontaneous rupture. There have been no reports of malignant transformation. There is no definite evidence linking growth of hemangiomas with oral contraceptives or pregnancy. Patients with persistent pain or symptoms due to pressure on adjacent structures may be considered for surgical management [Figure. 5&6]. However, before surgery, all other possible causes for the symptoms should be excluded before attributing the symptoms to the hemangioma. The only absolute indication for resection of a hemangioma is the development of complications such as rupture with intra abdominal hemorrhage, rapid change in size resulting in suspicion of a malignant nature of the lesion or development of Kasabach-Merritt syndrome.<sup>[22,23,24]</sup> Patients with rupture and intrabdominal hemorrhage may benefit from preoperative conventional angiography and embolization. There are also report of liver transplantation for symptomatic unresectable giant hamangiomas.

As mentioned use of nonsurgical treatment for hemangiomas includes angiography and embolization, hepatic artery ligation, local irradiation and system steroids are considered time to time as and when indicated.<sup>[22,23]</sup>

#### SUMMARY

1. Hepatic hemangiomas are probably the most common of all liver tumors. These tumors occur at all age group; however, because of the difference of histologic structures between the adult and the infants forms and the different clinical presentation, they must be regarded as separate entities.
2. In Asymptomatic hemangioma, proper counseling and observation are sufficient. No any treatment are advisable.
3. No evidence to recommend avoidance of pregnancy in women with hemangiomas. No interruption of contraception are advocated.<sup>[24]</sup>
4. For Incidental type, no further investigations are advisable.
5. In symptomatic hemangiomas, exclude other possible causes of symptoms.
6. Surgery is indicated only if- Complications like rupture, rapid size change, Kasabach Merritt syndrome, inability to exclude malignancy despite

all possible effort to diagnose and IVC obstruction with back pressure changes.

7. Surgeries commonly adopted are-Resection, pre-operative conventional angiography and embolization followed by resection (In rupture).Nonanatomic resection or enucleation (preferred), formal anatomic resection (for large lesions), liver transplantation (symptomatic unresectable giant hemangiomas) has been reported from few center.
8. Nonsurgical treatment like, angiography, embolization, hepatic artery ligation, local irradiation and systemic steroids are considered to be effective in special circumstances.

## REFERENCES

1. Chamberlaines RS, Blumgart LH: In Hepatobiliary Surgery (Vademecum) Publisher: Landes Bioscience; 1st edition, 2002.
2. Choi BY, Nguyen MH: The diagnosis and management of benign hepatic tumors. *J Clin Gastroenterol*, 2005; 39: 401-12.
3. Trotter JF, Everson GT: Benign focal lesions of the liver. *Clin Liver Dis.*, 2001 Feb; 5(1): 17-42.
4. Ishak KG, Rabin L: Benign tumors of the liver. *Med Clin North Am.*, 1975 Jul; 59(4): 995-1013.
5. Glinkova V, Shevah O, Boaz M, Levine A, Shirin H: Hepatic haemangiomas: Possible association with female sex hormones. *Gut.*, 2004 Sep; 53(9): 1352-5.
6. Reddy KR, Kligerman: Benign and solid tumors of the liver: Relationship to sex, age, size of tumors, and outcome. *American Journal of Surg.*, 2001; 67(2): 73-8.
7. Semelka P, Tait N, Richardson AJ, Muguti G, Little JM: Hepatic cavernous haemangioma: a 10 year review. *Aust N Z J Surg.*, 1992, 1997; 62(7): 521-4.
8. Corigliano N, Mercantini P et al: Hemoperitoneum from a spontaneous rupture of a giant hemangioma of the liver: report of a case. *Surg Today*, 2003; 33(6): 459-63.
9. Cobey FC, Salem RR: A review of liver masses in pregnancy and a proposed algorithm for their diagnosis and management. *Am J Surg.*, 2004; 187(2): 181-91.
10. Seymour I, Schwartz MD, Husser CW: Cavernous Hemangioma of the Liver. *Ann. Surg.*, 1987; 205(5): 456-463.
11. Cavernous hemangioma and Kasabach-Merritt syndrome: L H Blumgart P.1252, 5<sup>th</sup> edition.
12. Schumacker HB Jr: Hemangioma of the liver. *Surgery*, 1942; 11: 209-222.
13. Quaia, Kim KW, Kim TK et al: Hepatic hemangiomas: Spectrum of US appearances on gray-scale, power Doppler, and contrast-enhanced US. *Korean J Radiol*; Blumgart L H., 2000 and 2002; 1(4): 191-7&1253.
14. Mitsudo K, Watanabe Y, Saga T, Dohke M, Sato N, Minami K, Shigeyasu M: Nonenhanced hepatic cavernous hemangioma with multiple calcifications: CT and pathologic correlation. *Abdom Imaging*, 1995; 20(5): 459-61.
15. Semelka RC, Brown ED, Ascher SM et al. Hepatic hemangiomas: A multi-institutional study of appearance on T2-weighted and serial gadolinium-enhanced gradient-echo MR images. *Radiology*, 1994; 192(2): 401-6.
16. Borse R, Mahapatra GN, Meht R, Plumber S, Dhuri S, Ali S: Scintigraphic finding of a silent hepatic haemangioma. *J Assoc Physicians India*, 2010; 58: 637-40.
17. Caldironi MW, Mazzucco M, Aldinio MT et al: [Echo-guided fine-needle biopsy for the diagnosis of hepatic hemangioma. A report on 114 cases]. *Minerva Chir.*, 1998; 53(6): 505-9.
18. Rosenberg L: The risk of liver neoplasia in relation to combined oral contraceptive use. *Contraception*, 1991; 43(6): 643-52.
19. Jacques Belghiti, Schwartz SI, Husser WC: Cavernous hemangioma of the liver. A single institution reports. *Ann Surg.*, 1987; 205(5): 456-65.
20. Duxbury and Garden, R. Gedaly, J. J. Pomposelli, E. A. Pomfret, W. D. Lewis and R. L. Jenkins: "Cavernous Haemangioma of the Liver," *Archives of Surgery*, 1999 and 2010; 134: 407-411.
21. Toro A, Mahfouz AE et al: What is changing in indications and treatment of hepatic hemangiomas. A review. *Ann Hepatol*, 2014; 13: 327-339.
22. Terkivatan T, de Wilt JH, de Man RA, van Rijn RR et al: Indications and long-term outcome of treatment for benign hepatic tumors: A critical appraisal. *Arch Surg*, 2001; 136(9): 1033-8.
23. M. A. M. Brouwers, K. P. De Jong, E. B. Haagstmast, J. Klampmakert, M. A. Bijleveidt, J. H. Zwaveling and M. J. H. Sloot: "Surgical Treatment of Giant Haemangioma of the Liver," *British Journal of Surgery*, 1997; 84(3): 314-316.
24. F. C. Nicholis, J. A. Van Heerden and L. H. Weiland: Benign Liver Tumors- The Surgical Clinics of North America, 1989; 69(2): 297-314.