Surgical management of giant hepatic haemangioma – need for redefining the nomenclature according to the size

Chirurgiczne postępowanie w olbrzymim naczyniaku wątroby – potrzeba ponownego zdefiniowania nazewnictwa w zależności od rozmiaru (wielkości)

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ABSTRACT:

Introduction: Haemangiomas are the most common benign tumours of the liver. Most of them are asymptomatic. Giant hepatic haemangioma is defined as of size greater than 5 cm in diameter. The surgical treatment for giant hepatic haemangioma is not very well defined and reported. Here we analysed the treatment outcome of giant hepatic haemangiomas and redefined the nomenclature according to the size, proposing an algorithm for management of all hepatic haemangiomas.

Material and methods: Retrospective analyses of 6 giant hepatic haemangiomas more than 10 cm in size treated by a single surgeon were included. The clinical characteristics, diagnosis, management and outcomes were recorded. Review of literature was done for definitions, management strategies and treatment outcome of giant haemangiomas and an algorithm was proposed.

Results: Five patients were female and the mean age was 36.6 years (range 32 to 45). Pain of the abdomen was the most common symptom (100%). Ultrasound of the abdomen was the initial diagnostic modality followed by contrast-enhanced computed tomography. The mean size of haemangioma was 17.4 cm (range from 12 cm to 32 cm). Four patients had haemangioma in the left lobe and two in the right lobe of the liver. Formal hepatectomy was done in three patients and enucleation was done in three patients. The mean operating time was 3.66 hours (range from 2.5 hours to 5 hours). The mean blood loss was 840 mL (range from 300 mL to 1500 mL). There was no surgical morbidity or mortality. On follow-up, no haemangioma-related complications are reported.

Conclusions: Giant hepatic haemangioma is mostly symptomatic. Hepatectomy and enucleation can be done without significant morbidity and mortality. There is a need for redefining the nomenclature of giant hepatic haemangiomas according to their size.

KEYWORDS: Enucleation, Giant Hepatic Haemangioma, Liver Resection, Kasabach-Merritt Syndrome

STRESZCZENIE:

Wstęp: Naczyniaki są najczęstszymi łagodnymi guzami wątroby i większość z nich przebiega bezobjawowo. Olbrzymiego naczyniaka wątrobowego definiuje się jako zmianę o rozmiarze powyżej 5 cm średnicy. Leczenie chirurgiczne olbrzymiego naczyniaka wątrobowego nie jest dobrze zdefiniowane ani opisane. W tej pracy przeanalizowaliśmy wyniki leczenia olbrzymich naczyniaków wątrobowych i ponownie zdefiniowaliśmy nazewnictwo w zależności od ich wielkości oraz zaproponowaliśmy algorytm postępowania w przypadku wszystkich naczyniaków wątroby.

Materiał i metody: Badaniem objęto retrospektywnie analizę 6 olbrzymich naczyniaków wątroby o wielkości powyżej 10 cm leczonych przez jednego chirurga. Opisano ich: charakterystykę kliniczną, rozpoznanie, postępowanie i wyniki leczenia. Dokonano przeglądu literatury pod kątem definicji, strategii postępowania i wyników leczenia naczyniaków olbrzymich oraz zaproponowaliśmy algorytm.

 Wyniki: Pięcioro pacjentów było żeńskie, a średni wiek wynosił 36.6 lat (zakres: 32–45). Ból brzucha to najczęstszym objawem był częstym objawem (100%). Początkowym badaniem diagnostycznym była ultrasonografia jamy brzusznej, a następnie tomografia komputerowa ze wzmocnieniem kontrastowym. Średni rozmiar naczyniaka wynosił 17,4 cm (zakres: 12–32 cm). Czterech pacjentów miało naczyniaka w lewym płacie, a dwóch w prawym płacie wątroby. U trzech chorych wykonano formalną hepatektomię (resekcję wątroby), u trzech zabieg enukleacji (wyłuszczenia). Średni czas zabiegu wynosił 3,66 godziny (zakres: 2,5–5 godzin). Średnia utrata krwi wynosiła 840 ml (zakres: 300 ml–1500 ml). Nie stwierdzono chorobowości ani śmiertelności związanej z zabiegiem. Ponadto nie zgłaszano powikłań związanych z naczyniakami podczas obserwacji kontrolnej po leczeniu.

Wnioski: Olbrzymi naczyniaki wątrobowy jest przeważnie objawowy. Resekcję wątroby i zabieg enukleacji można wykonać bez znaczących powikłań chorobowych czy śmiertelności. Istnieje potrzeba ponownego zdefiniowania nazewnictwa olbrzymich naczyniaków wątroby w zależności od ich rozmiaru.

SŁOWA KLUCZOWE: enukleacja, olbrzymi naczyniaki wątrobowy, resekcja wątroby, zespół Kasabacha-Merritt
Haemangiomas are the most common benign tumours of the liver. The reported incidence is 0.4 to 20% in general population [1, 2]. Hepatic haemangiomas are more common in females, with a 5:1 ratio [1, 2]. The majority of hepatic haemangiomas are small and asymptomatic and incidentally detected on imaging of the abdomen. Most of the small and asymptomatic hepatic haemangiomas do not require any treatment or follow-up. Giant or large haemangiomas can be asymptomatic or they can produce symptoms depending on their location and rate of growth. The definitions of giant haemangioma are controversial [3–6]. Generally, hepatic haemangioma larger than 5 cm is referred to as giant haemangioma [3–7]. At present, there is no consensus regarding the size for terming it as giant hepatic haemangioma. Some authors have termed haemangiomas larger than 4 cm as giant, but others larger than 5 cm and 10 cm [6–8]. Therefore, clarity is needed here. Giant haemangioma can become symptomatic and is prone to ruptures and other rare complications, like the Kasabach-Merritt syndrome [9]. Surgery is the treatment of choice for hepatic giant haemangioma. Both formal hepatic resection and enucleation are curative for haemangiomas [8–10]. In rare circumstances, like diffuse hepatic haemangioma, liver transplantation may be an option [11]. Consensus and experience in optimal management of giant haemangiomas is lacking, especially in those more than 10 cm in size. Here we report our experience with 6 giant hepatic haemangioma, more than 10 cm in size, managed surgically, and a review of literature concerning treatment strategies. We have also suggested an algorithm for the management of hepatic haemangiomas according to the redefined nomenclature depending on the size.

MATERIAL AND METHODS

We retrospectively reviewed 6 cases of giant symptomatic hepatic haemangiomas that were more than 10 cm in size. After reviewing the medical records, the presenting symptoms, relevant investigations, surgical procedure, intra-operative and post-operative outcomes were recorded (Tab. 1). As this was a retrospective surgical audit, this study was exempted from Institutional Review Board evaluation. Written informed consent was taken from each patient.

Initially ultrasound (USG) of the abdomen was done which was followed by contrast-enhanced computed tomography (CECT) of the abdomen for confirmation of the diagnosis. All diagnoses were made based on characteristic USG and CECT findings. The characteristic findings of hepatic haemangioma on abdominal USG were well-defined homogenous hyperechoic lesions in the liver. Abdominal CECT showed classic peripheral nodular enhancement with centripetal filling and enhancement in delayed phases (Fig. 1). No preoperative histopathological diagnosis was attempted. Other possible causes of abdominal pain such as acid peptic disease, gallstones, pancreatitis and gastroesophageal reflux disease were ruled out before performing surgical interventions. The type of surgical procedure was based on the size, number and location of haemangioma within the liver. Trans-catheter arterial embolization was performed in one patient (case 1) to reduce the vascularity and size, but without much success.

RESULTS

A total of 6 patients were included in the study. The mean age was 36.6 years (range 32 to 45) with a female preponderance. Abdominal pain was the most common symptom (100%). The mean size of haemangiomas was 17.4 cm (range from 12 to 32 cm). Four patients had haemangiomas in the left lobe and two had in the right lobe of the liver.

In 1 patient (case 1) trans-arterial embolization of the left hepatic artery was performed but the patient had persistent symptoms and no reduction in size. Following preoperative optimization, case no 1, 4, and 5 underwent enucleation. Case no 2 and 3 underwent combined formal left hepatectomy and enucleation of haemangioma in the right lobe (Fig. 2., 3.). The type of the procedure (enucleation or resection) was decided based on the size, location and morphology of the lesions. Patients (case no 2 and 3) who underwent combined formal hepatectomy and enucleation had longer operative time, more blood loss and longer postoperative hospital stay as compared to patients (case no 1, 4 and 5) who underwent enucleation alone. Case no 6 underwent formal left lateral hepatectomy. One of the patients (case no 2) had Kasabach-Merritt syndrome (pancytopenia and coagulopathy) preoperatively and showed complete normalization following removal of haemangioma. The mean operating time was 3.66 hours (range from 2.5 to 5 hours). The mean blood loss was 840 mL (range from 300 to 1500 mL). There was no surgical morbidity or mortality (Tab. 1). Postoperative course was uneventful and all the patients were discharged in a satisfactory condition. All surgically resected specimens were subjected to histopathological examinations and hepatic haemangioma was confirmed (Fig. 4.). On follow-up visit after more than minimum of 6 months, no haemangioma- or surgery-related complications were reported on.

DISCUSSION

Haemangiomas are the most common benign incidental lesions of the liver [1, 2]. Most of them are asymptomatic and are detected incidentally during an imaging work-up of an unrelated disease. They have a strong female predilection (5:1) [1, 2]. The aetiology and pathogenesis of haemangioma remains largely unknown. Some of these tumours have oestrogen receptors, and high oestrogen states such as puberty, pregnancy and oral contraceptive pills have been shown to accelerate the growth [12].

At present, there is no consensus regarding the definition of the term "giant haemangioma". Many authors have categorized giant haemangioma as a haemangioma of more than 4 cm, 5 cm and 10 cm in size [3–5] but most of the authors classify giant haemangioma as bigger than 5 cm [3–6]. Few authors have defined the size of more than 10 cm as giant haemangioma [5, 6]. There is also a suggestion of terming them “Hyper-giant” and “Mega” haemangiomas if their size is more than 10 cm [7, 8]. So there is lots of ambiguity.
regarding the definitions of giant haemangiomas. Therefore, there is a need for defining the size categories to define haemangiomas. We think labelling a 5-cm-large haemangioma as “giant” is not right. According to the English dictionary, the meaning of “giant” is something “extremely large” or “strong”. That is why, this is incorrect to call so a 5-cm lesion of the liver, which is the largest solid organ in the body. Labelling a 10-cm haemangioma as giant is fair and acceptable. Using the adjectives like “hyper-giant” or “mega” will lead to confusions, so they should be strictly avoided. We have proposed three terminologies for labelling hepatic haemangiomas according to their size. Small haemangioma (up to 4 cm), large haemangioma (4.1 to 9.9 cm), and giant haemangioma (more than 10 cm) (Fig. 5. – management algorithm). The size categorization of hepatic haemangioma is important for appropriate management strategies.

The majority of haemangiomas are asymptomatic and their size remains stable over a long period of time. About 10–20% of haemangiomas can increase in size over a period of time and become symptomatic [13]. Symptoms include pain of the abdomen, nausea and vomiting, which may be due to the stretching of the liver capsules and local surrounding organs compressing effects. In the present study all patients had abdominal pain in the right upper quadrant and epigastrium. Spontaneous bleeding (1–4%) associated with thrombosis and infarctions has been reported in giant haemangiomas [1–4, 14]. The associated morbidity and mortality may be very high (36–39%). The Kasabach-Merritt syndrome is a very rare but well-known complication of giant haemangioma [9]. This syndrome is characterised by consumptive coagulopathy and is reversible after haemangioma resection [9]. One of the patients (case 3) in the current study had consumptive coagulopathy and thrombocytopenia, which resolved completely after resection of the haemangioma.

Haemangiomas can be diagnosed with USG, abdominal CECT and MRI (magnetic resonance imaging) [15–18]. The first diagnostic investigation for liver haemangioma is abdominal USG, as it is easily available, reproducible, with no risk of irradiation. Conventional USG shows a homogenous hyperechoic lesion with well-defined margins and posterior acoustic enhancement [15, 16]. However, larger lesions may appear non-homogenous, with mixed echogenicity (hypo/hyper) possibly due to haemorrhage, fibrosis or necrosis. CECT of the abdomen shows a well-defined hypodense lesion; presence of peripheral nodular enhancement with progressive centripetal filling at arterial phase has a sensitivity of 67% and specificity of 99% and PPV of 86% [16, 17]. On MRI, haemangioma shows high signal intensity on T2-weighted images with well-defined margins. Gadolinium-enhanced imaging further increases the specificity. The sensitivity and specificity of T2-weighted images and gadolinium-enhanced T1-weighted images reach 98%, with the accuracy of 99% [18, 19]. In the current study, abdominal CECT was performed in all patients to delineate the precise location and to decide on the optimal surgical procedure.

Currently, the management of haemangioma is not very well defined [20, 21]. In asymptomatic small haemangiomas (up to 4 cm), no treatment is required, maybe except for a follow-up [1–4, 20–22]. In cases of symptomatic haemangioma other causes
mangioma, then surgery should be done. In asymptomatic large haemangioma (4.1 to 9.9 cm), no surgery is indicated but watchful observation is advised. Abdominal USG examinations should be performed every 6 months to follow up the size and type of haemangioma. If there are significant changes and new-onset symptoms develop, the haemangioma should be operated. Giant haemangiomas (more than 10 cm) should be operated irrespective of their symptom status [7, 8]. This group of haemangiomas are mostly symptomatic and prone to develop all complications like spontaneous rupture and bleeding, and the Kasabach-Merritt syndrome [9, 14, 15].

Four types of surgical procedures have been described for the management of hepatic haemangioma [15, 16]. These are enucleation, formal hepatic resection, hepatic artery ligation and liver transplant [23–25]. With the most commonly used procedures being enucleation and hepatic resection [26]. Surgical intervention in the form of enucleation or resection (formal hepatectomy) mainly depends on the size, location, number, growth pattern, preference and surgical skills of the surgeons. Till date, no randomised controlled trials have been published to compare enucleation and resection. Available case series have shown that enucleation is associated with less intraoperative bleeding and lower risk of bile leak [26]. In our current study, mean blood loss in the enucleation group was 460 mL, as compared to 1400 mL in the resection group. Two patients in the resection group underwent enucleation in addition to resection. So, enucleation appears to be an acceptable, safe alternative as compared to resection. Mortality following liver resection for haemangioma is low; ranging from 0–4.3%; however life-threatening intraoperative bleeding can happen [24]. In a study on a giant haemangioma, > 20 cm, where surgery was performed, the authors recommended resection over enucleation, as the latter would result in more blood loss and it was technically difficult due to the attachment of surrounding vascular structures [8]. They showed preoperative selective transcatheter hepatic artery embolization to reduce the size. They also recommended staged liver resection for multiple liver haemangiomas. In our experience, patients of giant haemangioma are associated with symptoms and complications, which requires surgical intervention. Enucleation appears to be superior to resection in terms of intraoperative blood loss and operative time. Recently, laparoscopic and robotic resection of giant hepatic haemangioma has been reported [27].

On hepatic artery ligation has been also reported on for unresectable haemangioma with good long-term effect [28]. But currently this is not widely practised. Liver transplant has also been reported on for haemangioma management [11]. This is mainly for diffuse haemangiomas involving both lobes of the liver and for emergency situations.

If the lesion is very big and the locations is very close to the vascular and biliary tree, preoperative trans-arterial embolization (TAE) has been shown to reduce the size and vascularity of giant haemangioma, thereby facilitating the surgical procedure [29]. One patient in the current study (case 1) underwent left hepatic artery embolization. There was no reduction in size. The patient underwent enucleation. With advancement in intervention radiology and super-selective transarterial catheterization, many authors have used TAE as the sole treatment for giant haemangioma, but only short-term results have been report-
Second, the size of the giant haemangiomas varied widely, i.e. ranging from 12 cm to 32 cm. So the results may have been influenced by the size of individual haemangiomas. Third, the proposed algorithm is based on the review of the available literature, not on personal experience or depending on this study. That is why there may have been some bias on the recommendations.

CONCLUSIONS

Haemangiomas are the most common benign tumours of the liver. Most of them are asymptomatic and do not require treatment. Consensus and experience on optimal management of giant hepatic haemangiomas (especially those more than 10 cm in size) are lacking.

We have proposed three terminologies for labelling hepatic haemangioma according to its size. Small haemangioma (up to 4 cm), large

Fig. 5. Algorithm for the management of hepatic haemangiomas. *GSD – Gall stone disease; GERD – Gastro-Esophageal Reflux Disease; APD – Acid Peptic Disease; *USG – Ultrasonography; CECT – Contrast Enhanced Computed Tomography; MRI – Magnetic Resonance Imaging.
haemangioma (4.1 to 9.9 cm) and giant haemangioma (more than 10 cm) (Fig. 5. – management algorithm). The size categorization of hepatic haemangioma is important for appropriate management strategies. Treatment should be tailored according to size, number, location, available expertise, patient’s performance status and underlying liver status. Even though the incidence of complications is very low, they can be life-threatening. Expectant management is justifiable for small asymptomatic haemangiomas < 4 cm in size, with no follow-up. Large haemangiomas, measuring between 4.1–9.9 cm require surveillance every 6 months with ultrasound examination. Surgical treatment is recommended for all giant haemangiomas greater than 10 cm. Finally, all symptomatic haemangiomas, irrespective of their size, should be considered for surgical management.

REFERENCES


