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Prevalence and clinical outcome of hepatic haemangioma with specific reference to the risk of rupture: A large retrospective cross-sectional study

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ABSTRACT

Background: Prevalence and incidence of hepatic haemangioma are estimated from autopsy series only. Although benign and generally asymptomatic, hepatic haemangioma can cause serious complications.
Aims: The aim of the study was to assess the prevalence of hepatic haemangioma and to attempt to quantify the risk of major complications such as spontaneous rupture.
Methods: We retrospectively analyzed the radiology database of a Regional University Hospital over a 7-year period: the radiological records of 83,181 patients who had an abdominal computed tomography or magnetic resonance scan were reviewed. Diagnoses made at imaging were reviewed and related to clinical course.
Results: Hepatic haemangioma was diagnosed in 2071 patients (2.5% prevalence). In 226 patients (10.9%), haemangioma had diameter of 4 cm or more (giant haemangioma). The risk of bleeding was assessed on patients without concomitant malignancies. Spontaneous bleeding occurred in 5/1067 patients (0.47%). All 5 patients had giant haemangioma: 4 had exophytic lesions and presented with haemoperitoneum; 1 with centrally located tumour experienced intrahepatic bleeding.
Conclusion: Giant haemangiomas have a low but relevant risk of rupture (3.2% in this series), particularly when peripherally located and exophytic. Surgery might be considered in these cases.

1. Introduction

Haemangioma is considered the most common benign tumour of the liver; however, little epidemiological data are available on its prevalence, which is estimated from autopsy series only: in these series, prevalence ranges from 0.4% to 7.3% [1–3]. The female to male ratio of the incidence of haemangiomas is 5:1, and they are identified more frequently in middle-aged women [4]. Although its pathogenesis is not well understood, hepatic haemangioma (HH) is considered as a congenital vascular malformation that enlarges by ectasia rather than by neoplastic growth. Macroscopically, HHs are well-circumscribed, hypervascular lesions that microscopically arise from the endothelial cells that line blood vessels and consist of multiple, large vascular channels lined by a single layer of endothelial cells and supported by collagenous walls [5]. Their blood supply arises from the hepatic artery. HHs are typically diagnosed incidentally during a routine abdominal ultrasound and generally present as small-sized, asymptomatic nodules, although they may grow in size. In most cases, HHs are of little, if any, clinical relevance however, some cases of bleeding or rupture have been reported, thus

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raising concerns regarding the possible evolution of the disease [6]. Other possible complications of HH are severe abdominal pain not responsive to medical therapy, symptoms related to the compression of adjacent organs, uncertainty regarding the diagnosis with a suspicion of malignancy, increasing size during follow-up and incidence of Kasabach–Merrit syndrome [7]. Some studies reported that giant haemangiomas (main diameter ≥ 4 cm) [8] are more frequently symptomatic and carry a higher risk of rupture [9–14].

The aim of this study is to assess the prevalence and the incidence of the disease and to quantify the risk of major complications, with particular reference to spontaneous HH rupture. For this purpose, all the HH cases observed at a regional hospital over a 7-year period were reviewed.

2. Materials and methods

The University Hospital of Ancona is a regional hospital that serves a population of 150,000. The hospital Department of Radiology has a centralized picture archiving and communication system (PACS), in which the reports and images of computed tomography (CT) and magnetic resonance imaging (MRI) investigations are stored; the system is electronically accessible and is searchable for specific information.

PACS was retrospectively analyzed, focusing on a 7-year period (January 2005–December 2011); all radiological reports of CT and MRI scans of the abdomen containing the following key words: haemangioma, haemangiomas, hemangiomatous and haemangiomatosis, were reviewed by two trained radiologists.

Liver CT scans were performed with a 64-row CT scanner (LightSpeed VCT, GE). All acquisitions were performed at 120 kV with automatic mA, reconstructing contiguous axial slices of 2.5 mm, completed with coronal and sagittal reconstructions. All baseline CT exams were conducted with a pre-contrast scan and a triphasic study, administering iodine contrast media at 350–370 mgI/ml with a dose of 1.5–1.8 ml/kg of body weight with an injection rate of 3–4 ml/s, followed by a saline bolus. Arterial phase was obtained with bolus tracking technique with an aortic threshold of 150 HU and 7 s of scan delay or, alternatively, with 25–30 s fixed delay from bolus injection. Portal venous phase was obtained with a 60–70 s fixed delay or a 40 s delay from bolus tracking threshold. Equilibrium phase was obtained at 120–180 s, sometimes completed with an ultra-delayed phase to demonstrate the fill-in pattern.

MRI examinations were performed with 1.5T superconductive scanners (GE Signa Hdxt; Philips Achieva) with T2-weighted images: axial FSE, coronal SSFSE axial fat saturated SSFSE (slice thickness 5 mm, slice spacing 5 mm). T1-weighted axial images were obtained with GRE sequences in and out of phase (slice thickness 5 mm, slice spacing 5 mm), ad with fat saturation. Triphasic study was performed after administration of Gd-Chelates (Gd-DOTA: 0.1 mmol/kg body weight @ 2 ml/s) followed by a saline bolus. Images were obtained with T1-weighted 3D GRE fat saturated pulse sequences (slice thickness 4 mm, and slice spacing 2 mm) within the maximum k-space contrast resolution at approximately 25–35 s after bolus injection for the arterial phase, 45–65 for the portal venous phase and 120–180 s for the equilibrium phase. Sometimes the study was completed with ultra-delayed acquisitions.

A diagnosis of liver haemangioma was made when the following features were present on CT or MRI [15]: a sharply defined and hypodense nodule on a non-contrast CT scan or the presence of an hypointense nodule on T1-weighted images and an intensely hyperintense nodule on T2-weighted images at the MRI; a contrast-enhancement pattern characterized by peripheral nodular enhancement followed by a progressive centripetal filling on scans of both imaging techniques.

Table 1
Aetiology of malignancy in 1004 patients with incidental haemangioma.

Colon-rectum	225 (22.4%)
Lung	157 (15.6%)
Female genital tract	93 (9.2%)
Male urinary tract	85 (8.5%)
Breast	80 (8.0%)
Kidney	71 (7.1%)
Pancreas	55 (5.5%)
Liver (primary and secondary neoplasm)	48 (4.8%)
Haematological System	42 (4.2%)
Esophageal-gastric tract	38 (3.8%)
Neuroendocrine System	18 (1.7%)
Other	92 (9.2%)

Overall, 83,181 patients were reviewed, of whom 70,163 (84.3%) had undergone abdominal CT scan only, 8678 (10.5%) had undergone abdominal MRI only and 4340 (5.2%) had undergone both CT and MRI.

The overall prevalence and incidence of HH, as well as prevalence and incidence at CT scan and MRI were calculated on this population.

The study on the clinical features of HH was performed on all those patients who had a radiological diagnosis of the disease, while the risk of bleeding over time was assessed only in those HH patients who did not have concomitant malignant disease, in order to prevent any influence of the malignancy on follow-up.

In this latter group (HH carriers without malignant disease), we completed follow-up by reviewing PACS and by collecting clinical information through an interview performed by a single physician assessing three specific features, namely: symptoms or complications related to the haemangioma, need for hospitalization, follow-up that was carried out after the diagnosis of HH. In addition, the patients were asked to inform us whenever a new event took place and were advised to undergo abdominal ultrasound examination yearly. In the presence of symptoms, complications or hospitalizations, clinical reports were collected and accurately examined to correlate the clinical picture with the benign liver tumour. This accurate review of data allowed us to evaluate the rate of symptoms, complications, rupture, morbidity and mortality related to HH. Descriptive statistics were reported as percentage, mean ± standard deviation (SD) or median and range. Duration of the follow up was defined as the time interval between the diagnosis of HH and the time of the survey.

3. Results

Of the patients reviewed, 2071 met the radiological criteria for the diagnosis of HH. In 1767 of these 2071 patients (85.3%), the diagnosis of liver haemangioma was incidental and in 214 (10.3%) of these patients it resulted from the diagnostic CT or MRI characterization of a liver lesion identified using ultrasonography; in additional 90 of these patients (4.4%), HH was known and imaging was part of a regular follow-up. Incidental diagnosis was made during the evaluation or the follow-up of a malignancy in 1004 (48.5%) patients, during the assessment of a benign disease in 759 (36.6%) patients and at the time of the spontaneous rupture of a previously unknown haemangioma in 4 (0.2%) patients (Tables 1 and 2).

Data of the 90 patients with a regular follow-up for a previously diagnosed HH were updated, imaging was reviewed to assess possible morphological and clinical changes over time. The records of the 4 patients who presented with spontaneous bleeding were reviewed.

The overall prevalence of haemangioma at the radiological imaging during the study period was 2.5% (2071 patients with a diagnosis of HH in the entire study population). The prevalence of haemangioma at the CT scan was 2.4% (1660 patients with HH