

Magnetic resonance imaging in the diagnosis of vertebral haemangiomas

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التصوير بالرنين المغنطيسي في تشخيص الأورام الوعائية الفقارية عاصم أحمد الحيارى وبسام نوايسة وهشام جابر

خلاصة : تم إجراء تحليل استعادي لستمئة فحص للعمود الفقري (238 بين الإناث و362 بين الذكور). ولوحظ وجود أورام وعائية فقارية في 160 مريضاً (27%)، من بينهم 74 من الإناث (31%) و86 من الذكور (24%). وكان معظم هؤلاء فوق الخامسة والثلاثين من العمر 132 (82%). وكان الموضع الأكثر إصابة بالورم هو المنطقة القطنية في 64 مريضاً (40%) ثم المنطقة الصدرية في 32 مريضاً (20%)، ثم المنطقة العنقية في 26 مريضاً (16%)، وغالباً ما كانت الأورام تشاهد في المركب المحوري الكثيف. كما وجدت أورام وعائية متعددة لدى 38 مريضاً (24%). وكانت هناك ظاهرة مميزة هي أن جميع الأورام الوعائية الفقارية كانت تلاصق الأوردة القاعدية الفقرية في جسم الفقرات أو تنطوي عليها.

ABSTRACT A retrospective analysis of 600 (238 females, 362 males) spine examinations was carried out. Vertebral haemangioma was observed in 160 patients (27%), 74 females (31%) and 86 males (24%). The majority were over 35 years. The most frequent site was the lumbar region, 64 patients (40%), then the thoracic region, 32 patients (20%), cervical region, 26 patients (16%), predominantly in the dense complex of the axis, and 38 patients (24%) were found to have multiple haemangiomas. Characteristically all vertebral haemangiomas abutted or included the basivertebral veins in the vertebral body.

L'imagerie par résonance magnétique dans le diagnostic de l'hémangiome vertébral

RESUME On a procédé à une analyse rétrospective de 600 examens du rachis (238 femmes, 362 hommes). Un hémangiome vertébral a été observé chez 160 patients (27%) dont 74 femmes (31%) et 86 hommes (24%). La majorité d'entre eux étaient âgés de plus de 35 ans (132 patients, 82%). La localisation la plus fréquente était la région lombaire—64 patients (40%); venaient ensuite la région thoracique—32 patients (20%), la région cervicale—26 patients (16%), principalement dans le complexe dense de l'axis, et la présence d'hémangiomes multiples a été observée chez 38 patients (24%). De manière caractéristique, tous les hémangiomes vertébraux bordaient ou englobaient les veines vertébro-basilaires dans le corps vertébral.

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Introduction

The advent of magnetic resonance imaging (MRI) has modified many medical concepts and thrown light on many normal and abnormal medical situations; one such is vertebral haemangiomas. Ultrasound has elucidated liver haemangiomas from the diagnostic and clinical point of view. The same diagnostic process has emerged since the use of MRI of the spine for diagnosing other diseases, such as disc herniations, spinal cord tumours and spine injury, where vertebral haemangiomas appear as an incidental finding.

In this study we reviewed 600 MRI examinations of the spine obtained consecutively looking for incidental vertebral haemangiomas. We then studied their MRI appearance, their relation to the basivertebral vessels and the age and sex distribution. We also tried to find common features with other haemangiomas in the rest of the human body.

Material and methods

In this study, 600 MRI examinations of the spine done consecutively at King Hussein Medical Centre were reviewed looking for vertebral haemangiomas. There were 238 (40%) female patients, 74 (31%) of whom had vertebral haemangiomas and 362 male patients, 86 (24%) of whom had vertebral haemangiomas. Table 1 shows the sex and age distribution of patients with vertebral haemangiomas and Table 2 shows the spinal region distribution of the vertebral haemangiomas.

Results

Haemangiomas were found in 27% of the sample, being more common in females

Table 1 Sex and age distribution of 160 patients with vertebral haemangiomas

Cases by age	Female (238/600)		Male (362/600)	
	No.	%	No.	%
<35 years	12	5	16	4
>35 years	62	26	70	19
Total	74	31	86	24

Table 2 Spinal region distribution of vertebral haemangiomas

Site	No.	%
Cervical	26	16
Thoracic	32	20
Lumbar	64	40
Multiple	38	24
Total	160	100

(31%) than in males (24%). It was more common in people over 35 years of age (Table 1). More than 75% of all osseous haemangiomas occur in the spine [1]. In our study the lumbar region was the most common site and multiple lesions were seen in about 24% of cases (Table 2).

We noticed that all vertebral haemangiomas abutted or included the basivertebral veins, i.e. they always started from the centre where the basivertebral vein traverses the vertebral body in a horizontal plane (Figure 1).

In our study, 16% of vertebral haemangiomas were found in the cervical spine, and the most common single location was the dense complex of the axis (Figure 2). The vertebral body of the axis is different from other vertebrae. It is composed of two parts, the dense and the vertebral body proper of the axis. The basivertebral ves-



Figure 1 Sagittal lumbar MRI showing a hyperintense lesion abutting the basivertebral vessels in L2 vertebral body representing early haemangiomatous changes

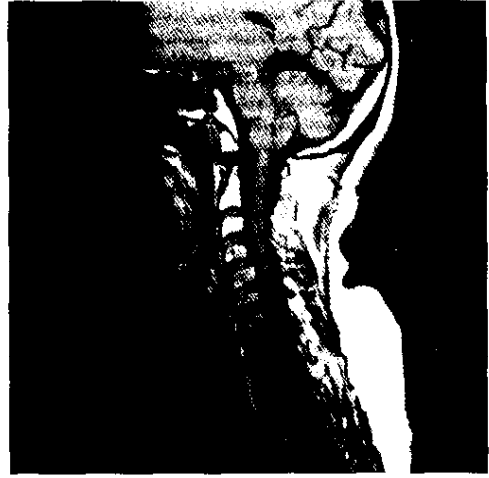


Figure 2 Sagittal cervical MRI showing a haemangioma involving the body and the dense complex of the axis of C2 vertebra

sels pass through the plane of fusion of these two structures [1] (Figure 3).

MRI appearance

The characteristic MRI appearances of vertebral haemangiomas are as follows:

- Hyperintense region in the vertebral body on T_1W and T_2W images because of the fatty matrix [1,2].
- The matrix shows hypointense areas due to bony trabeculation or vascular channels [2].
- Vertebral haemangiomas always have a relation to the course of the basivertebral vessels and their anastomosis with intraspinal and paraspinal vessels [3].
- Haemangiomas may be discrete and well defined or diffuse and ill defined (Figure 4).

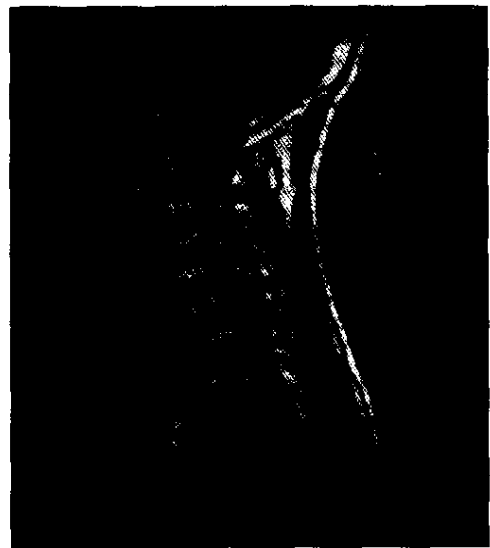


Figure 3 Sagittal cervical spine MRI showing the basivertebral vessels passing through the plane of fusion of the dens and vertebral body of the axis

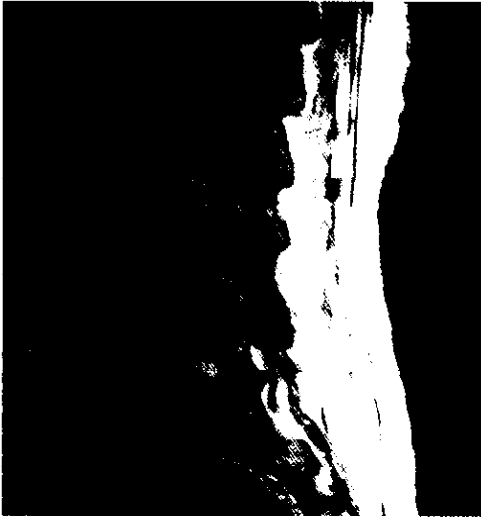


Figure 4 Sagittal lumbar MRI showing multiple well defined vertebral haemangiomas in L3 and L5 vertebral bodies

- They may be single or multiple.
- A haemangioma may involve the whole vertebral body; in this case it can be seen by X-ray (Figure 5).

Most vertebral haemangiomas are located in the vertebral body, some lesions involve only part of the vertebral body, whereas others affect the entire medullary space (Figure 6). Isolated haemangiomas in the neural arch are rare, but 10%–15% of vertebral haemangiomas have concomitant involvement of the posterior elements [1,3,4]. They differ from discogenic degenerative changes in location. The latter appear under the epiphyseal plates of the vertebral bodies (Figure 7).

The MRI appearances of vertebral haemangiomas are pathognomonic and because they are so common we can consider them as normal variations in the vertebral



Figure 5 a) (left) Anteroposterior cervical spine X-ray showing the vertebral haemangioma in the body of C7
b) (above) Sagittal cervical MRI showing the vertebral haemangioma in the C7 vertebral body

bodies. Haemangiomas in the spine increase with age. They could be an aging process and if so, the term haemangiomatosis is preferable to haemangiomas. Haemangiomas occurring in other parts of the body tend to be congenital where they appear in young people (Figures 8,9,10). Haemangiomas in the liver show the same radiological and clinical behaviour as those of the spine.

Discussion and conclusion

Vertebral haemangiomas are slow-growing benign primary neoplasms of capillary, cavernous or venous origin [1,3,5]. The most common histologic type is cavernous haemangioma [1,5]. These lesions are composed of mature thin-walled vessels and large blood-filled endothelium-lined spaces

[3,5,6]. Vertebral haemangiomas vary from predominantly fatty lesions to haemangiomas composed largely of vascular stroma with little or no adipose tissue [1]. They are usually asymptomatic, but may very occasionally be associated with spinal cord compression requiring surgery [2,7-11].

Management of vertebral haemangiomas associated with pain has generally involved either observation only or radiation therapy [2,5,12]. Decompressive surgery, with or without postoperative irradiation, has been the therapy of choice for lesions causing spinal cord compression [2,6,8,11,13,14]. Pregnancy may exacerbate some lesions [10,14]. Involvement of the neural arch can be a cause of massive bleeding during or after surgery if proper precautions are not taken.



Figure 6 Sagittal lumbar MRI showing a vertebral haemangioma involving the whole L4 vertebral body



Figure 7 Sagittal lumbar MRI showing discogenic degenerative changes under the epiphyseal plate of the L4 vertebral body



Figure 8 Coronal MRI showing thigh soft tissue haemangioma in a 38 year-old female patient



Figure 10 Axial MRI showing orbital haemangioma in a 3 year-old boy

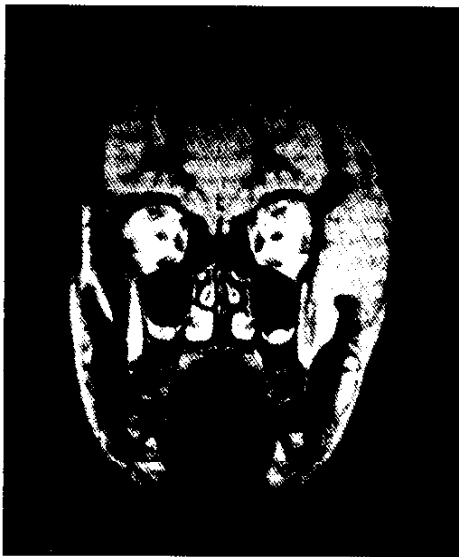


Figure 9 Coronal MRI showing face soft tissue haemangiomas in a 6 year-old boy

Haemangiomas in the spine, liver and other parts of the body are composed of a fatty matrix and vascular channels. Haemangiomas in the spine have an anatomical relation to the basivertebral vessels. Haemangiomas are either congenital, where they appear in young patients, or acquired, as in the spine, where they could be part of a degenerative aging process. The dense-axis complex is a common site. Vertebral haemangiomas are either discrete and well defined or diffuse with ill defined margins, but they are always related to the basivertebral vessels. They are commoner in females and in the elderly people.

Our findings are somewhat different from findings elsewhere because of regional differences; also we concentrated on haemangiomas in the dense-axis complex.

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