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Incidence of Vertebral Hemangioma on Spinal Magnetic Resonance Imaging in Northern Iran

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Abstract: The incidence of vertebral hemangiomas as the most common benign spinal neoplasms has been differently reported from 10 to 27% based on autopsy series, plain X-rays and MRI reviews. In this study, we reviewed consecutive 782 standard spinal MRI with axial and sagital T_1 weighted and T_2 weighted images looking for hemangiomas. In this study, the incidence of hemangioma was 26.9%, more common in females (30%) than males (23%), in older age group and in lumbar spine. Most hemangiomas (65%) were less than 10 mm in diameter. Multiple hemangiomas were seen in 33% of cases. The results of this study are similar to another Mediterranean study reported based on MRI findings, but differ from other reports using X-ray or autopsy as diagnostic tool, suggesting the influence of either the race or the sensitivity of the diagnostic tool on the incidence of vertebral hemangioma.

Key words: Medical imaging, spinal hemangioma, epidemiology

INTRODUCTION

Spinal hemangiomas are the most common benign spinal neoplasm often located in the thoracic and lumbar spine with a peak incidence of occurrence in the fourth to six decades (Chasi and Hide, 2008; Bandiera *et al*., 2002; Templin *et al*., 2004; Murugan *et al*., 2002; Ross, 2004). These lesions can involve only a portion of or the entire vertebral body and are multiple in one third of the cases (Ross, 2004; Caragaine *et al*., 2002; Murphy *et al*., 1995). Bone hemangiomas are usually asymptomatic lesions discovered incidentally on imaging or post-mortem examination (Chasi and Hide, 2008). Symptomatic vertebral hemangiomas are rare and represent less than 1% of all hemangiomas and cause pain, discomfort and neural compression (Chasi and Hide, 2008; Templin *et al*., 2004) which if untreated, they can lead to serious neurological deficits (Aksu *et al*., 2008). Incidence of vertebral hemangioma has been reported from 10 to 27%, based on diagnostic modality including autopsy, plain radiographs and MRI (Schmorl and Junghanns, 1971; Ross, 2004; Dagi and Schmidek, 1990; Lang and Peserico, 1960; Reizine *et al*., 1986; Hiari *et al*., 1998). Imaging appearance of hemangiomas can be pathognomonic and the diagnosis is made by radiologic studies (Chasi and Hide, 2008; Aksu *et al*., 2008), however most vertebral hemangiomas are small and cannot be seen on plain radiographs, MRI appearance of vertebral hemangioma is characteristic and small hemangiomas can be detected on MR images (Ross *et al*., 1987; Caragaine *et al*., 2002).

Because of different incidences of vertebral hemangioma in various reports, we were encouraged to find out the incidence of hemangioma in our patients based on spinal MRI.

MATERIALS AND METHODS

In present study, 800 consecutive cases of spinal MRIs, who referred for spinal MRI to Imam Hospital of Sari were enrolled. The cases were collected during a three month period from October to December 2006; twelve patients were omitted because of poor image quality due to movement artifact. Apart from the indication of the MRI request and findings, they were looked concisely for the presence of vertebral hemangioma. Standard axial and sagittal images with T_1-W and T_2-W protocols without contrast injection were obtained (1.5 tesla GE imager). There were 514(66%) lumbar MRI, 229(29%) cervical MRI and 39(5%) thoracic MRI. If any hemangioma was found, extra data including their size, count and vertebral level was recorded. Data was collected and analyzed with SPSS v. 13.

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RESULTS

The age distribution of the enrolled 782 cases ranged from two month to 87 years (mean: 43 years), 448 (57.3%) being females.

Hemangioma was found in 210 (26.9%) cases. It was seen more common in females (n = 133; 30%) than males (n = 77; 23%). The incidence of hemangioma increased with age of the cases (Fig. 1) and about half (49%) of the cases older than 70 years had at least one hemangioma. In this study, the lumbar region was the most common involved region and the occurrence of hemangioma in the lumbar, thoracic and cervical spine were 29, 26 and 6%, respectively. Multiple hemangiomas were found in 33%, most of them having two-three lesions and in six patients more than six hemangiomas were found

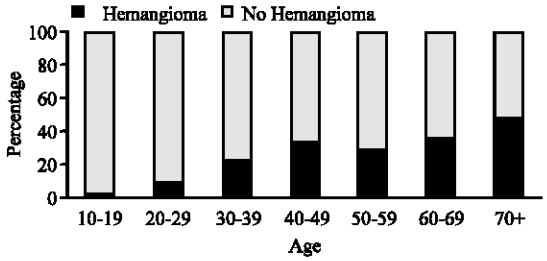

Fig. 1: Age distribution (percentile) of spinal hemangioma in Northern Iran, 2006

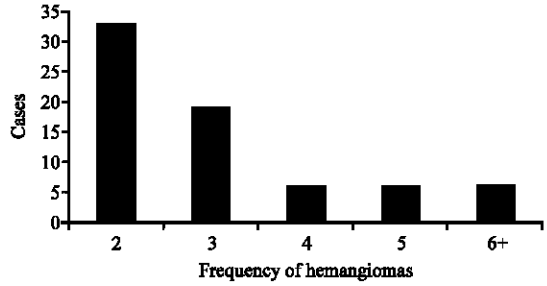

Fig. 2: Hemangioma count distribution in cases having multiple hemangiomas in Northern Iran, 2006

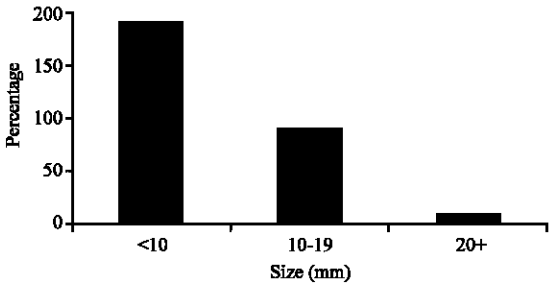

Fig. 3: Size distribution of hemangiomas in Northern Iran, 2006

(Fig. 2). Most of the hemangiomas were small sized (less than 10 mm) and only 10 hemangiomas were larger than 20 mm (Fig. 3).

DISCUSSION

Vertebral hemangioma is extra ordinarily common, the reported incidences ranged from 10-27% in adults (Chasi and Hide, 2008; Bandiera *et al*., 2002; Templin *et al*., 2004; Murugan *et al*., 2002; Ross, 2004). The incidence varies depending on the diagnostic modality used; 10.7% in one large autopsy report (Schmorl and Junghanns, 1971), 10-12% in a large population based study using plain X-ray (Dagi and Schmidek, 1990; Lang and Peserico, 1960; Reizine *et al*., 1986) and 27% in a cross sectional study using MRI as the diagnostic tool (Hiari *et al*., 1998).

The characteristic radiographic appearance is of a sclerotic or ivory vertebra with course thickened vertical trabeculae having a corduroy appearance. On CT scan the thickened trabeculae are seen in cross section as small punctuate areas of sclerosis often called the polka-dot appearance (Chasi and Hide, 2008; Ross *et al*., 1987; Caragaine *et al*., 2002). On MR imaging most of the hemangiomas are high signal on T_1 weighted (T_1-W) or T_2 weighted (T_2-W) images and areas of trabecular thickening have low signal, regardless of the pulse sequences used. The presence of high signal intensity on T_1-W or T_2-W images of vertebral hemangioma is related to the amount of adipocytes or vessels and interstitial edema respectively (Baudrez *et al*., 2001). The T_2 hyperintensity is typically greater than of fat, thereby differentiating hemangiomas from focal fat deposition. These signal characteristics also differ from those of metastatic lesions which have decreased signal intensity on T_1-W images and increased signal intensity on T_2-W images (Chasi and Hide, 2008; Ross *et al*., 1987; Baudrez *et al*., 2001; Hajek *et al*., 1987). The signal intensities of typical hemangiomas sometimes could be indeterminate, but the morphology of the lesion including the presence of coarse trabeculae, can be used to make the diagnosis (Ross, 1987).

The increased use of MR imaging as a whole body diagnostic tool allows more frequent detection of hemangiomas, either incidentally or as a clinical indication to characterize a tumor or to document the extent of the anomaly (Vilanova *et al*., 2004). MRI is also the imaging modality of choice when evaluating a complicated hemangioma with neurologic abnormality (Rich *et al*., 2005).

Incidence of vertebral hemangioma in this cases was 26.9%, which was similar to Hiari *et al*. (1998), who also had used MRI as the diagnostic tool, but was different

from other studies, which were based on autopsy or X-ray. The difference in the incidence could either be due to the sensitivity of the tools or the geographic and genetic base of the population. Both studies using MRI have been done in eastern population, while the other two studies were in western countries. To solve this conflict a large study using spinal MRI is recommended.

In this study, spinal hemangiomas were found more common in the lumbar spine, which was similar to Hiari *et al*. (1998). In some other reports thoracic or thoraco-lumbar spine was the dominant site of vertebral hemangioma (Chasi and Hide, 2008; Murugan *et al*., 2002; Bandiera *et al*., 2002; Ross, 2004; Caragine *et al*., 2002).

The other findings in present study like the increased incidence of spinal hemangiomas in the elderly and female cases and the multiplicity of the lesions are similar to the literature (Murugan *et al*., 2002; Ross, 2004; Heiss *et al*., 1994).

It seems wise to recommend studying the incidence of vertebral hemangioma using MRI in multiple geographic areas to find out the real worldwide burden of the lesion.

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