Singapore Med J 1997; Vol 38(5):226-230

Clinics In Diagnostic Imaging (25)

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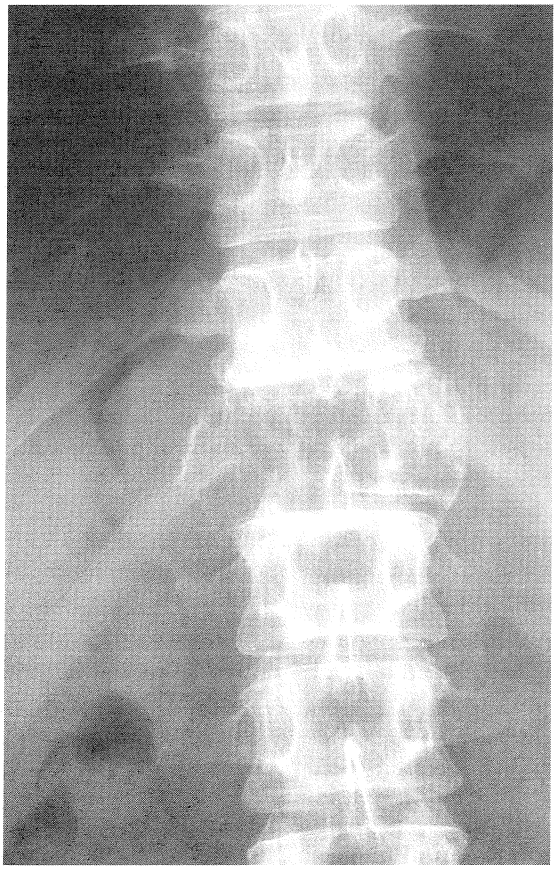

Fig 1 - Frontal radiograph of the thoraco-lumbar region.

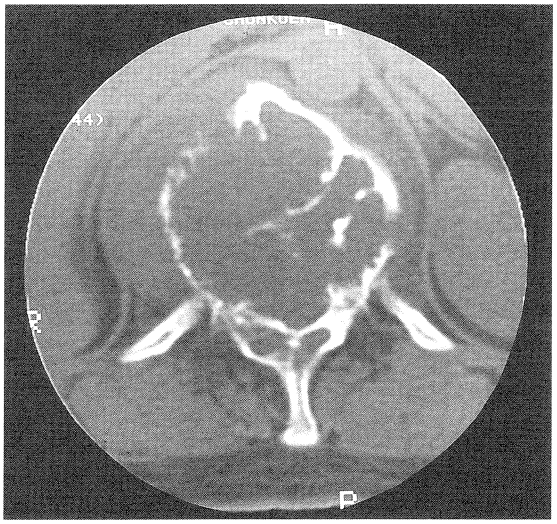

Fig 2 - Plain CT (bone window) of the T12 vertebra.

CASE PRESENTATION

A 30-year-old female, previously well, presented with a complaint of worsening back pain over a three-month period. There was no history of trauma. No neurological deficit was present. What do plain radiographs (Fig 1) and computed tomography (CT) (Fig 2) show?. What other imaging test will help confirm the diagnosis?.

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IMAGE INTERPRETATION

Radiography (Fig 1) shows expansion and partial collapse of T12 vertebral body with thickening of the remaining trabeculae ("honeycomb pattern"). The pedicular outlines are not visible, indicating involvement of the posterior elements bilaterally. There is a suggestion of a large paravertebral soft tissue component. CT (Fig 2) demonstrates extension of the vertebral body lesion to both pedicles and the anterior neural arch with a large intraspinal and paravertebral soft tissue mass. Magnetic resonance imaging (MRI) shows a T1 hypointense and T2 hyperintense lesion which enhances markedly post-Gadolinium injection. The degree of thecal sac distortion and spinal cord compression is clearly demonstrated (Figs 3 & 4).

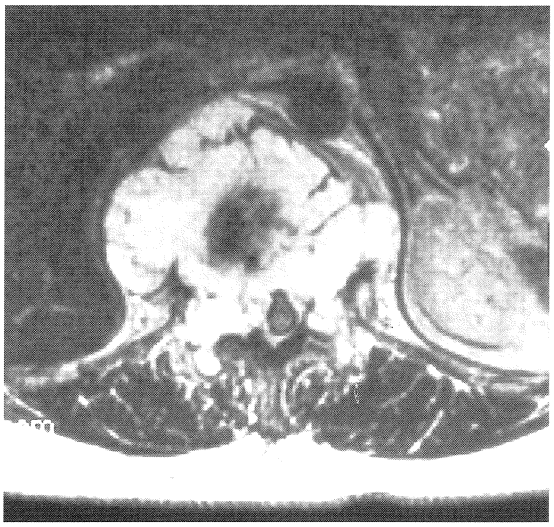

Fig 3 - MRI scan of T12 vertebra taken at the same level as Fig 2. T2-weighted axial image shows a large expansile lesion arising from the T12 vertebral body. Note compression and moulding of the spinal cord. The extent of the lesion is more clearly delineated than on CT. The areas of liner signal void represent thickened trabeculae.

DIAGNOSIS

Aggressive vertebral haemangioma.

CLINICAL COURSE

The diagnosis of a T12 vertebral haemangioma was confirmed by a typical increasing pattern of isotope uptake in the delayed phase of red blood cell (RBC) scintigram (Fig 5). Embolisation of the lesion was performed prior to surgery (Fig 6). At surgery, a transthoracic anterolateral approach accompanied by a transpedicular decompression gave excellent exposure of the T12 vertebra and neural canal. A partially cystic vascular lesion replacing the vertebral body and extending into the paravertebral gutters was found. A large part of the lesion was thrombosed. Intralesional curettage was performed and the spinal canal decompressed. The spinal segment was stabilised by an anterior bone graft. Blood loss was less than 900 mL. Post-operative recovery was uneventful. The patient was ambulatory one week after surgery. Histology of the excision demonstrated an intraosseous vascular lesion composed of cavernous vascular channels with focal areas of papillary endothelial hyperplasia consistent with a cavernous haemangioma. Follow-up radiographs at 4 months showed good anterior fusion at T11/T12 levels.

DISCUSSION

Most vertebral haemangiomas are cavernous in type, consisting of a mesh of thin-walled vessels packed with red blood cells[1], which lie between the thickened vertebral trabeculae within a fatty marrow matrix. Vertebral haemangiomas tend to occur most commonly in the lower dorsal and upper lumbar vertebrae, particularly in young and middle-aged women[2]. When most or all of the vertebral body is involved without collapse, the typical "corduroy"

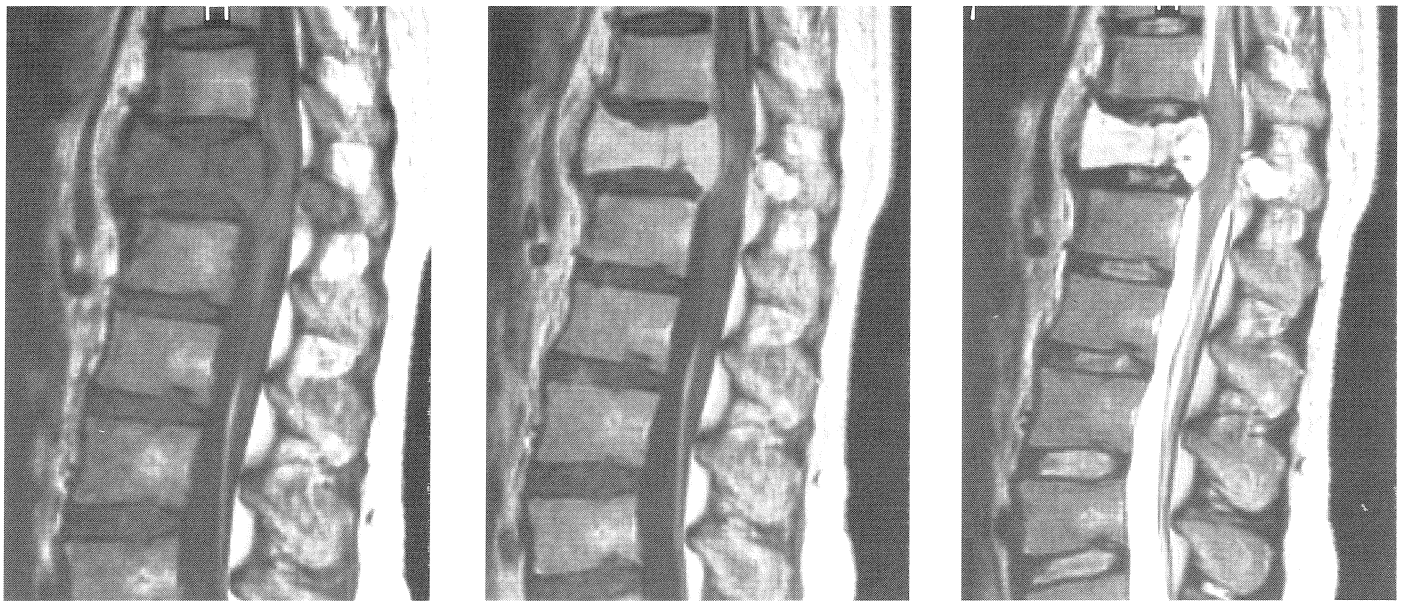

Fig 4a Fig 4b Fig 4c

Fig 4 - (a) T1-weighted, (b) T1-weighted post contrast (c) T2-weighted, sagittal images: The lesion is hypointense on T1, hyperintense on T2 and demonstrates marked contrast enhancement. Note extension to the posterior elements.

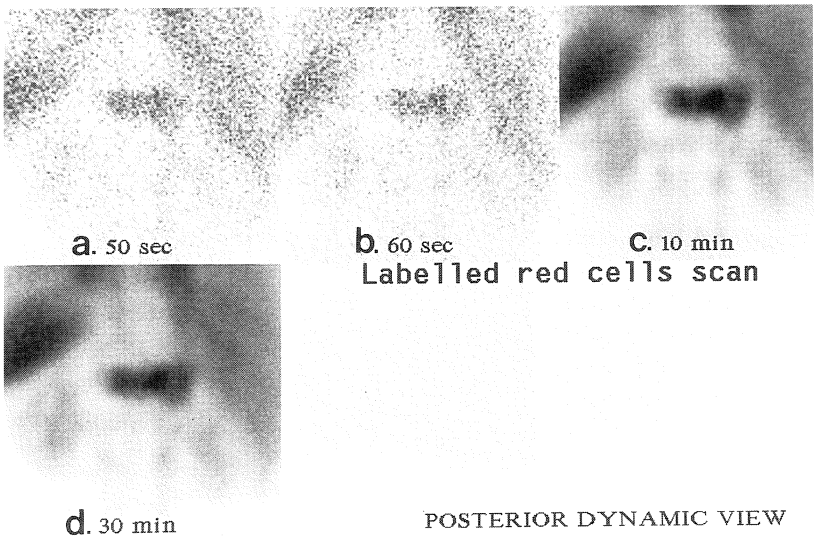

Fig 5 - RBC scan. Serial scans taken at (a) 50 seconds (b) 60 seconds (c) 10 minutes and (d) 30 minutes show progressively increasing T12 vertebral body uptake.

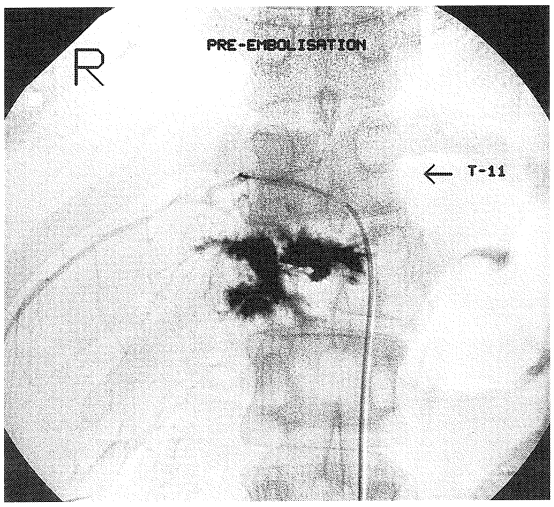

Fig 6a

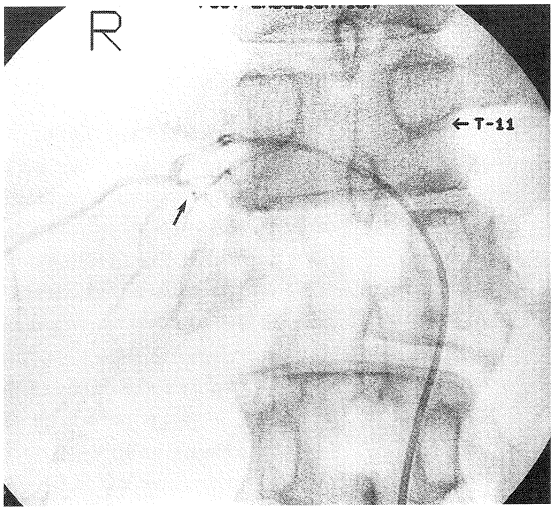

Fig 6b

Fig 6 - (a) Spinal angiogram with selective injection into right T11 intercostal artery demonstrates hypervascularity of the T12 haemangioma. The lesion was also supplied via the left T11 intercostal artery and both T12 intercostal arterial branches. (b) Post embolization angiogram of the right T11 supply. Note how the tip of the microcatheter (arrow) has been placed so as to occlude only those arteries supplying the haemangioma.

appearance is seen on radiograph (Fig 7) and a "polka-dot" appearance on CT, (the dots representing thickened vertically orientated trabeculae). Whilst the typical appearances are not seen in this case, radiography and CT are helpful in providing clues to the diagnosis. Other vertebral destructive lesions (eg secondary deposits, giant cell tumours, myeloma, tuberculosis) are not associated with this degree of residual trabecular thickening and vertebral expansion. Trabecular thickening, representing an attempt at repair, indicates the chronic nature of this lesion.

Nowadays, small asymptomatic vertebral haemangiomas are a very common incidental finding on MR examinations of the spine (Figs 8a & b). These are usually too small to be depicted on radiographs. A small number of larger lesions may result in pain ("symptomatic") and a further small number may result in vertebral collapse, cord compression and neurological deficit ("compressive")[1,2]. In this case, the vertebral haemangioma is of the aggressive compressive variety. Laredo has documented six radiographic and/or CT features which predict the aggressiveness of haemangiomas[2]. These are: (i) a lesion occurring between T3 and T9; (ii) involvement of all the vertebral body; (iii) involvement of the neural arch; (iv) a "honeycomb" trabecular pattern (v) vertebral body compression, and (vi) paravertebral extension[2]. The more of these features that are present on radiography or CT, the more likely the haemangioma is going to be aggressive in nature[2].

MRI is useful in demonstrating the exact extent of the lesion, especially its soft tissue component, and clearly delineates the degree of cord distortion and compression (Fig 3). MR also provides additional information as to the aggressiveness of the haemangioma[1]. Whilst asymptomatic haemangiomas have a large fatty component (high signal intensity on both T1- and T2-weighted images) (Figs 8a & b, 9a & b), compressive haemangiomas are relatively fat-depleted (low signal intensity on T1-weighted images) (Fig 4a)[1]. The signal characteristics of aggressive vertebral haemangiomas are thus similar to those of vertebral metastases (Fig 4a, b & c). Symptomatic non-compressive haemangiomas have a variable fat

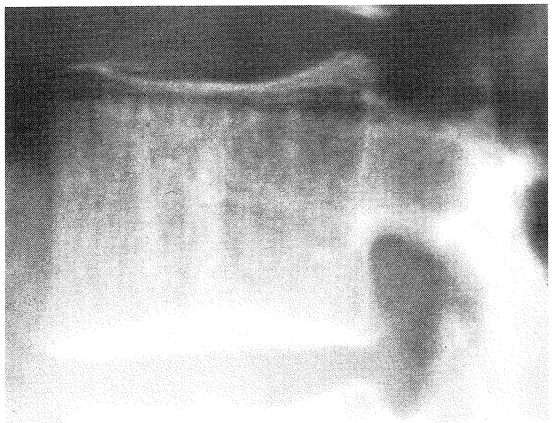

Fig 7 - Radiograph showing the typical "corduroy" appearance of non-aggressive vertebral haemangioma.

content. Moreover, the fat content of a haemangioma varies inversely with its vascularity, and vice versa[1]. Therefore, asymptomatic haemangiomas are fatty and hypovascular whereas compressive haemangiomas are relatively non-fatty and hypervascular. Symptomatic non-compressive haemangiomas have intermediate fat content and vascularity[1].

Red-blood cell (RBC) scintigraphy involves the in-vivo or in-vitro reduction of Technetium 99^m with stannous chloride. Reduced Technetium 99^m will then bind to RBCs tagged with pyrophosphate ("tagged RBCs"). Three-phase scanning allows identification of haemangioma. Hypervascular tumours produce high uptake in the dynamic phase whereas haemangiomas show relatively high uptake in the late static phase as seen in this case (Fig 5).

Careful assessment of the clinical and imaging features of any bone lesion is necessary prior to biopsy. This is particularly so in haemangiomas where biopsy may result in severe blood loss. In our case, a biopsy was not considered as all preliminary investigations were compatible with a vertebral haemangioma. Spinal embolisation (Figs 6a & b), which involves selectively occluding the arterial supply of the tumour, is a helpful therapeutic option prior to surgery[3]. There are four potential benefits of spinal embolisation in hypervascular spinal tumours, namely: (i) it reduces blood loss at surgery; (ii) it results in a relatively avascular operative field and thus lessens the risk of complications and increases the likelihood of a good technical result; (iii) it lessens operation time and, (iv) it alone can be curative in some cases (eg symptomatic haemangioma, spinal AVM) and reduce symptoms in others (eg haemangioblastoma)[3]. However, therapeutic embolisation is time consuming and carries a significant risk of permanent cord infarction due to embolic material occluding arteries supplying the spinal cord.

These risks can be minimised by: (i) the technique being performed by a radiologist skilled in interventional vascular procedures; (ii) careful identification of the regional vessels supplying the cord, in particular the artery of Adamkiewicz which usually arises on the left dorso-lumbar region and, (iii) use of a highly selective technique to embolise only arteries supplying the tumour[3]. Other hypervascular tumours of the vertebrae such as renal metastases are also amenable to pre-operative embolisation[3,4]. Surgery should be undertaken within days of embolisation before any benefits are lost due to the development of collateral pathways.

Fig 8a

Fig 8b

Fig 8 - MR image of small incidental intraosseous haemangioma. (a) T1-weighted and (b) T2-weighted sagittal images.

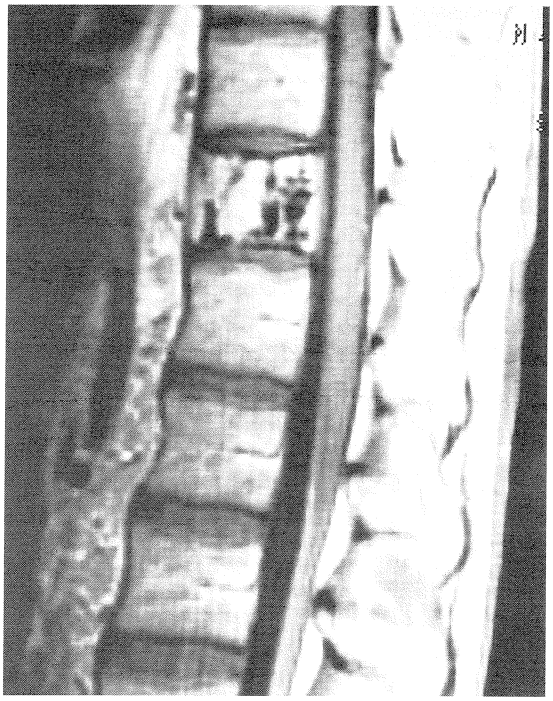

Fig 9a

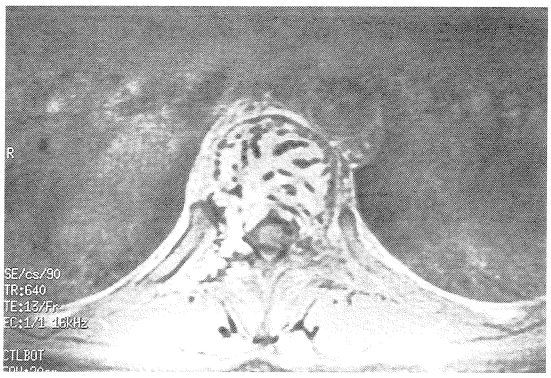

Fig 9b

Fig 9 - MR image of non-aggressive haemangioma depicted in Fig 7. (a) T1-weighted sagittal, (b) T2-weighted axial images. The high signal intensities indicate fat.

REFERENCES

1. Laredo JD, Assouline E, Gelbert F, Wybier M, Merland JJ, Tubiana JM. Vertebral haemangiomas: fat content as a sign of aggressiveness. Radiology 1990; 177:467-72.
2. Laredo JD, Reizine D, Bard M, Merland JJ. Vertebral haemangiomas; radiologic evaluation. Radiology 1986; 161:183-9.
3. Sundaresan N, Choi IS, Hughes JEO, Sachdev VP, Berenstein A:Treatment of spinal metastases from kidney cancer by surgical embolisation and resection. J Neurosurg 1990; 73:548-54.
4. Choi IS, Berenstein A. Surgical neuroangiography of the spine and spinal cord. Radiol Clin North Am 1983; 26:1131-41.

ABSTRACT

A 30-year-old female presented with a three month history of back pain. Radiographs and computed tomography indicated an aggressive haemangioma of T12 which was confirmed on red cell scintigraphy. The varying imaging appearances of non-aggressive and aggressive vertebral haemangiomas are described, emphasizing the ability of aggressive haemangiomas to mimic metastases on magnetic resonance imaging. The therapeutic role of embolisation as an adjunct ro surgery is stressed.

Keywords: haemangioma, vertebral, radiography, red cell scintigraphy, magnetic resonance imaging, embolisation

DRAFT GUIDELINE ON CASE MANAGEMENT BY SMA ETHICS COMMITTEE

The SMA Ethics Committee handles complaints on any doctors, whether they are SMA members or not. The following draft guidelines on case management by the Committee is for your feedback.

1. Screening

The Chairman of the Ethics Committee or, in his absence, the Deputy Chairman, will screen through all cases on ethical matters or complaints directed to the SMA.

Matters obviously outside its purview would be:

i Cases in which police reports have been made or which are the subject of judicial or solicitor's proceedings.

ii Cases that do not concern medical ethics.

The complainant would be informed as such with advice to write to other authorities, if appropriate. Complaints concerning solely practice matters and fees without ethical implications will be referred to the Private Practice Committee.

2. Preliminary Enquiries

a. After verification of the basic information of the complainant and the doctor(s) and written authorisation (if the complainant is not the patient), the Chairman may assign a case to a Member of the Ethics Committee, who would be designated the PEC Manager (Preliminary Enquiries Case Manager). The PEC Manager would communicate with the complainant, the patients and other sources of information and sign all such correspondence as the PEC Manager, for Chairman of Ethics Committee.

b. If the doctor refuses to reply or does not cooperate by providing adequate input within the time given, the PECM shall submit the case to the Ethics Committee for consideration. The Ethics Committee may decide to refer the complainant elsewhere or it may consider the case based on the information available.

c. The preliminary information gathered should be completed by the next Ethics Committee Meeting. The PECM would present the case to the Ethics Committee with a draft reply.

In the event that the PECM is unable to be present at the Ethics Meeting, he should inform the Chairman who will then present the cases on his behalf.

3. Outcomes of deliberations of Ethics Committee

The Chairman or Hon Secretary would communicate the Committee's decision to the parties involved.

The possible outcomes are:

a. To facilitate understanding by providing appropriate information gathered from various sources
b. To provide a professional perspective
c. To mediate a solution by suggesting options that could lead to amicable settlement
d. To communicate to the complainant that case is outside the Committee's purview with suggestion to bring it up with other authorities, if appropriate
e. To give advice on acceptable practice and/or ethical behaviour to the doctor
f. To request doctor to give undertaking not to repeat unacceptable and/or unethical practice or behaviour
g. To recommend to the SMA Council to lodge a formal complaint to SMC or to other external authorities
h. To communicate trends to the Secretary, SMC