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Osteolytic mass bridging two cervical vertebrae: Unusual presentation of a vertebral body hemangioma

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Vertebral hemangioma is the most common spinal axis tumor. This rare presentation of a vertebral hemangioma extended contiguously from one cervical vertebra to another, encasing the vertebral artery, and thereby mimicking other tumors of the spine. We discuss the differential diagnosis of bridging vertebral masses.

Introduction

The most common spinal-axis tumor is the vertebral hemangioma (VH), a benign vascular tumor that involves the vertebral body. Originating from capillary or venous structures, this is a slow-growing neoplasm and is found incidentally at imaging in 10-12% of the adult population. When symptomatic, it is termed aggressive, classically presenting as new thoracic spine pain in a female patient in the fourth to sixth decade of life. Aggressive VHs have higher vascular-to-fat-stroma ratios (1). Though the VH does occasionally involve the posterior elements, extension beyond the native vertebral body is considered uncommon.

Case report

A 70-year-old with complex medical history underwent contrast-enhanced CT of the neck and chest for respiratory insufficiency. A markedly enlarged and heterogeneous right thyroid lobe was seen. A relatively hypodense mass encased the right vertebral artery at C3, and extended contiguously from the C3 to C4 vertebral bodies with a medial rim of corticated bone (Figs. 1A-D). On MR (Figs. 2A and 2B), the osteolytic lesion was hyperintense on T2 and bridged the vertebrae, leading to a working diagnosis of chordoma, which has been reported to extend across disc spaces. Other considerations included metastasis (given the aforementioned suspicious thyroid lesion) and myeloma. Core biopsy of the thyroid gland yielded degenerating nodules without malignancy. Next, eight core biopsy specimens of the osteolytic cervical spine lesion were obtained using an 18-gauge needle, which caused a moderate degree of bleeding. Pathology (Fig. 3) demonstrated a vascular neoplasm composed of dilated vascular spaces and patchy areas of blood, compatible with a cavernous hemangioma, the most common subtype of VH.

Discussion

This case involves a rare presentation of a VH, namely a vertebral lesion bridging two vertebral levels. The combination of bridging behavior, presentation, and anatomic location is considered rare for VH. To our knowledge, the above case is the first reported case of a bridging VH in the cervical spine.

Virchow described the first VH in 1867 (2). VH is an abnormal proliferation of blood vessels, and is the most common spinal axis tumor. VH is characterized on imaging as a slow-growing, well-circumscribed, osteolytic, benign, vertebral-body vascular tumor that is typically identified as an incidental lesion. Classically, this tumor is confined to a

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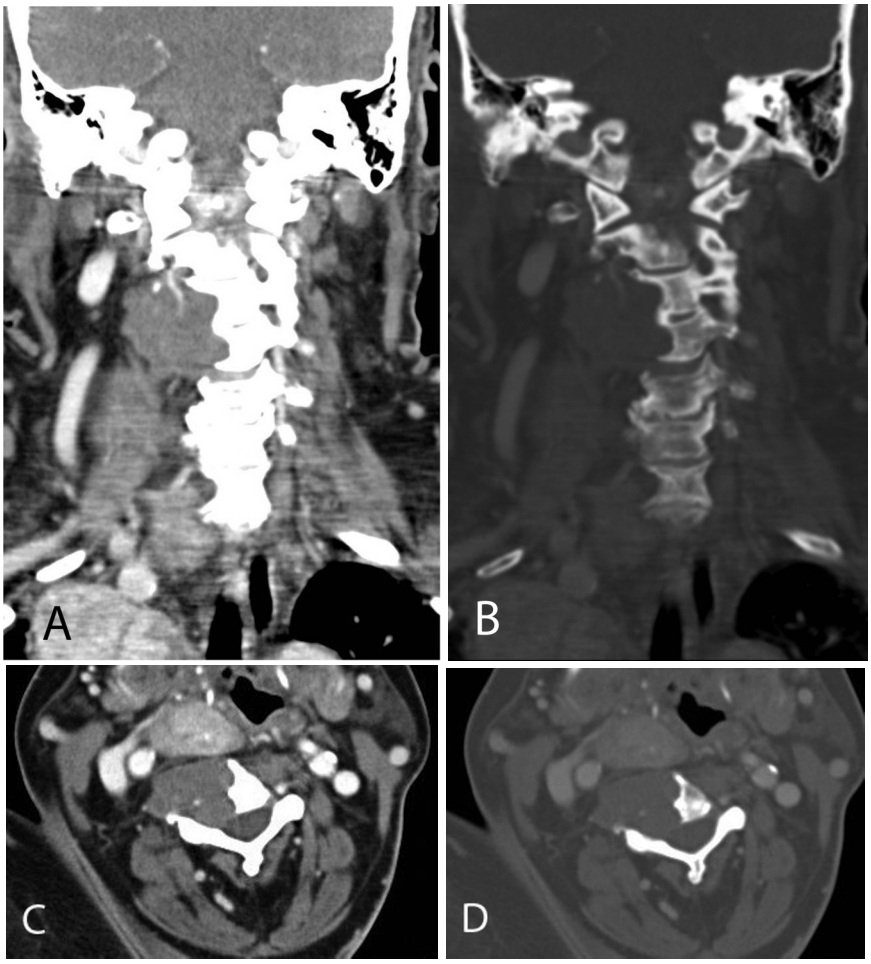

Figure 1, A-D. Coronal and axial contrast-enhanced CT in soft tissue and bone windows. A relatively hypodense mass encases the right vertebral artery at C3, and extends contiguously from the C3 to C4 vertebral bodies with a sclerotic, well-defined medial border in both vertebrae. The mass abuts, but does not invade the central canal, and there is no mass effect on the spinal cord.

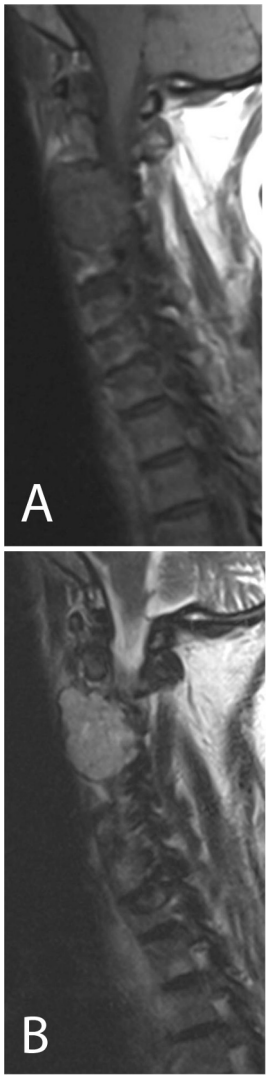

Figure 2, A, B. T1- and T2-weighted sagittal MRI images. A circumscribed lesion is T1-isointense to hypointense and T2-hyperintense. This lesion bridges the C3 and C4 vertebral levels.

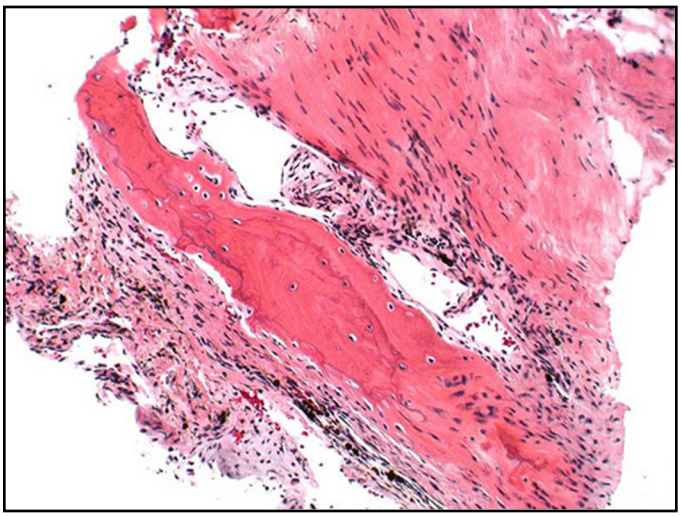

Figure 3. Specimen photomicrograph demonstrates dilated vascular spaces and patchy areas of blood, compatible with the diagnosis of a cavernous hemangioma.

single vertebral body, with gradual replacement of fatty marrow space with vascular tumor; lesions with a greater vascular component are considered more aggressive (1). Though noninvasive followup is sufficient for asymptomatic patients, painful lesions can be treated with a variety of interventions.

Intervertebral bridging is a very atypical finding with VHs. Blankstein et al (3) reported a histologically proven hemangioma that involved three adjacent levels (T8, T9, and T10). A generally accepted mechanism for intervertebral bridging of the VH is not available. These lesions grow slowly on the basis of recurrent hemorrhage, followed sequentially by thrombosis, a process of organization, and

finally recanalization (4). Extradural lumbar hemangiomas have also been reported (5). In 1999, Rovira et al reported three cases of lumbar extradural hemangiomas. It is speculated that the tumor takes a path from the more cranial vertebral level, via gravity, to enter the more inferior vertebral level. This would represent a fairly advanced lesion (as VHs are considered congenital vascular malformations) and could explain the lack of classic CT findings such as "polka dot" or "honeycomb" signs, typically seen in lesions where the osteolysis has not yet destroyed the vertical trabeculae. Other tumors that may involve subjacent vertebral bodies have been described. For example, the finding of interspace bridging is more typically seen in chordomas, with a few reports also of aneurysmal bone cysts (ABC) (6-8).

In addition to the rare intervertebral bridging behavior, the VH in this report encased the vertebral artery, another rare finding for VH. Lesional vertebral artery encasement was described in 2004 by Peraud et al with regards to an aneurysmal bone cyst (9). In 2002, Smith et al discussed lipomatous encasement of the vertebral artery (10). Though arterial encasement is nonspecific, arterial encasement (as opposed to arterial invasion) is compatible with the benign, slow-growing pathophysiology of VH. Lymphoma is another neoplasm that would be expected to encase rather than invade.

The broad classification of vascular tumors of bone and soft tissue, including hemangiomas, is an area of scholarly discussion, where terminology assigned by histopathology, clinical features, and imaging are sometimes inconsistent. Current understanding holds that VH arises from endothelial cells. Recently, Verbeke et al have provided an extensive radiologic-pathologic literature review on this topic (11).

In conclusion, VH should be included in the differential diagnosis of a lesion that bridges vertebral levels.

References

1. Laredo JD, Assouline E, Gelbert F, Wybier M, Merland JJ, Tubiana JM. Vertebral hemangiomas: Fat content as a sign of aggressiveness. *Radiology*. 1990;177:467-72. [PubMed]
2. Vijay K, Shetty AP, Rajasekaran S. Symptomatic vertebral hemangioma in pregnancy treated antepartum. A case report with review of literature. *Eur Spine J*. 2008 September;17(2):299–303. [PubMed]
3. Blankstein A, Spiegelmann R, Shacked I, Schinder E, Chechick A. Hemangioma of the thoracic spine involving multiple adjacent levels: Case report. *Paraplegia*. 1988;26:186- 91. [PubMed]
4. Guthkelch AN. Hemangiomas involving the spinal epidural space. *J Neurol Neurosurg Psychiatry*. 1948;11:199-210. [PubMed]
5. Rovira A, Rovira A, Capellades J, Zauner M, Bella R, Rovira M. Lumbar extradural hemangiomas: report of three cases. *Am J Neuroradiol*. 1999 Jan;20(1):27-31. [PubMed]
6. de Bruïne FT, Kroon HM. Spinal chordoma: radiologic features in 14 cases. *Am J Roentgenol*. 1988 Apr;150(4):861-3. [PubMed]
7. de Kleuver M, van der Heul RO, Veraart BE. Aneurysmal bone cyst of the spine: 31 cases and the importance of the surgical approach. *J Pediatr Orthop B*. 1998 Oct;7(4):286-92. [PubMed]
8. DiCaprio MR, Murphy MJ, Camp RL. Aneurysmal bone cyst of the spine with familial incidence. *Spine*. 2000 Jun 15;25(12):1589-92. [PubMed]
9. Peraud A, Drake JM, Armstrong D, Hedden D, Babyn P, Wilson G. Fatal ethibloc embolization of vertebrobasilar system following percutaneous injection into aneurysmal bone cyst of the second cervical vertebra. *Am J Neuroradiol*. 2004 Jun-Jul;25(6):1116-20. [PubMed]
10. Smith JC, Snyderman CH, Kassam AB, Fukui MB. Giant parapharyngeal space lipoma: case report and surgical approach. *Skull Base*. 2002 Nov;12(4):215-20. [PubMed]
11. Verbeke SL, Bovée JV. Primary vascular tumors of bone: a spectrum of entities? *Int J Clin Exp Pathol*. 2011 Aug 15;4(6):541-51. Epub 2011 Jul 25. [PubMed]