Vertebral abnormality in a patient with suspected malignancy

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A 52-year-old man presented to the emergency department because of nausea and back pain. A computed tomography (CT) scan demonstrated biliary tract and pancreatic duct obstruction secondary to a mass 3 cm in diameter in the head of the pancreas. There was also a liver mass 2 cm in diameter and an indeterminate lesion in the T12 vertebral body. Diagnostic studies are shown below (*Figures 1–4*).

For diagnosis and discussion, see the following page.

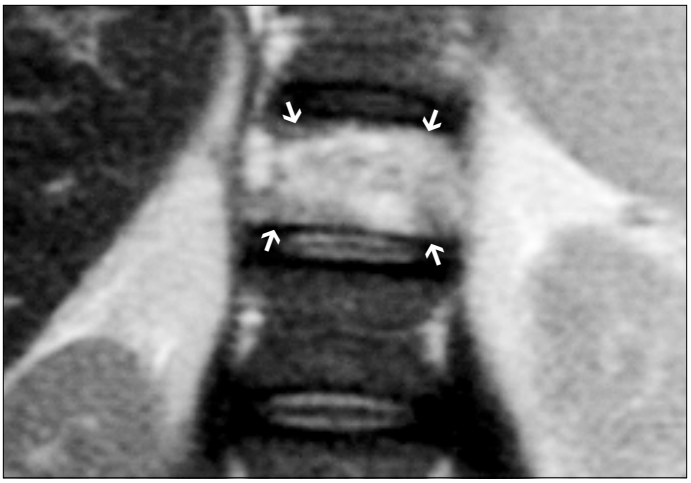

Figure 1. Coronal T2-weighted magnetic resonance (MR) image shows increased signal intensity in the T12 vertebral body (arrows).

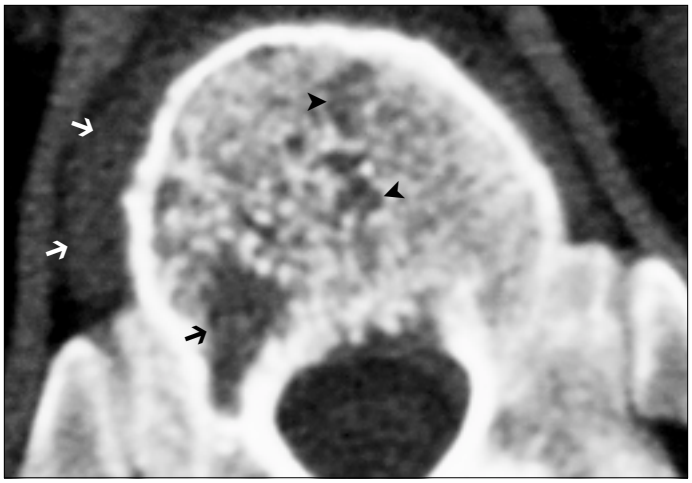

Figure 2. Axial CT image demonstrates an abnormal area in the right side of the T12 vertebral body (black arrow) and smaller abnormal areas (arrowheads) in the more central portion of the vertebral body. There is also an associated right paravertebral mass (white arrows).

Figure 3. Sagittal reformatted CT image shows an abnormal area (arrows) in the posterior aspect of the T12 vertebral body and smaller abnormal areas (arrowheads) anteriorly.

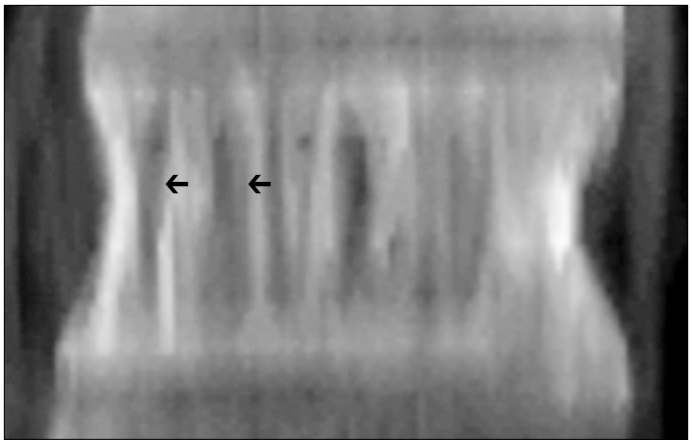

Figure 4. Coronal reformatted CT image of T12 demonstrates vertically oriented radiolucent areas (arrows) adjacent to thickened trabecular struts.

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DIAGNOSIS: Vertebral hemangioma.

DISCUSSION

Vertebral hemangiomas are the most common benign neoplasms of the spine. Although they can occur in any bone, almost 75% of osseous hemangiomas occur in the vertebrae, where they represent 2% to 3% of all radiographically detected spinal tumors (1, 2).

Hemangiomas are benign primary neoplasms of capillary, cavernous, or venous origin. The most common type is the cavernous hemangioma, composed of mature thin-walled vessels and sinuses lined by endothelial cells. The dilated blood vessels are interspersed among longitudinally oriented trabeculae and fatty matrix (1). These vessels cause resorption of the underlying bone and thickening of the remaining trabeculae.

Vertebral hemangiomas are found in approximately 10% to 12% of all autopsy cases. They are twice as common in women, with most lesions occurring in the lower thoracic and lumbar vertebrae. Hemangiomas are usually solitary, but multiple lesions are seen in 25% to 30% of cases. They can be discrete, round masses. However, in 10% to 15% of cases, the hemangiomas are extensive lesions that replace the entire vertebral body and involve the pedicles, lamina, and spinous process (1). Vertebral hemangiomas may also extend into the epidural space.

Hemangiomas are usually asymptomatic and are discovered incidentally on imaging studies. Asymptomatic lesions are generally lesions that do not expand or extend beyond the vertebral body (3). Less commonly, vertebral hemangiomas may be associated with pain and other neurological findings. Pain is the presenting complaint in 20% of patients with vertebral hemangiomas (1). However, patients who are imaged for back pain may have other etiologies for their pain, including degenerative joint disease, spondylosis, disc herniation, or other musculoskeletal disorders (3). Symptomatic hemangiomas are those lesions that are complicated by compression fracture, hematoma, osseous expansion, or epidural extension compromising the spinal canal or neural foramen. Characteristics seen more often in symptomatic lesions include location between the T3 and T9 vertebral bodies, involvement of the entire vertebral body, involvement of the posterior elements, irregular trabeculation, expanded and indistinct cortex, and presence of a soft-tissue mass (4). A painful lesion may have the potential for future spinal cord compression if it involves a thoracic vertebra, especially in a young woman, and includes posterior element disease or soft-tissue extension (3).

Twenty percent of patients with vertebral hemangiomas present with progressive neurological deficits or spinal cord compression (1). The clinical onset of spinal cord compression is often progressive over many months but may be acute. The thoracic spine is the site of predilection in patients with neurological symptoms, and thoracic myelopathy is the most common presenting syndrome (3). Progression of an asymptomatic or painful lesion to a neurologically symptomatic one is rare, occurring in <5% of cases (1). Pregnancy is a risk factor for development of neurological symptoms in an asymptomatic hemangioma (3).

Plain films of spinal hemangioma demonstrate thick trabecular struts coursing vertically through the vertebral body. Between these coarsened trabeculae are the lucent vascular channels, giving the lesion a striated appearance. This radiographic finding has been described as the "corduroy cloth" or "honeycomb" appearance. One third of the vertebral body must be involved for the classic findings to be apparent (3). Compression fractures are an uncommon complication and radiographic finding. Paravertebral soft-tissue involvement can be seen (as in the current case) and may be due to either hematoma or extraosseous tumor extension (3).

A CT scan is the diagnostic procedure of choice. It shows a lucent lesion with the characteristic "polka dot" appearance, which represents the axial cuts through the thickened vertical trabeculae. CT can be utilized to determine the extent of vertebral involvement and any site of spinal cord compression (3). Hemangiomas enhance with intravenous contrast, which is helpful in determining whether there is an intravertebral, epidural, or paravertebral tumor component. Myelography or CT-myelography may show an extradural mass if there is extraosseous extension.

T1-weighted and T2-weighted MR images of hemangiomas reveal high signal intensity because the lesions contain fat and water. The degree of intensity on both images depends upon the adipose content within the stroma. It has been suggested that hemangiomas predominantly composed of fat are usually clinically inactive, whereas those with more vascular stroma have a propensity to produce symptoms and cause spinal cord compression (5).

Arteriography is useful in determining the vascularity of the osseous and extraosseous components of the lesion. It can also be used to identify feeding and draining vessels and to identify the blood supply to the spinal cord. Asymptomatic lesions often show a normal or slight increase in vascularity, while symptomatic hemangiomas are associated with moderate to intense hypervascularity. If the feeding vessel does not supply the anterior spinal artery, preoperative embolization or ligation at the time of surgery can be performed (3).

Patients with pain can be followed up with neurological and radiological examinations. Radiation therapy and embolization therapy can be performed for medically refractory pain. The management of spinal cord compression secondary to a vertebral hemangioma consists of total or partial excision of the hemangioma. The need for adjuvant preoperative embolization and postoperative radiation depends on many factors, including the spinal level(s) involved, location of the lesion within the vertebra, extent of spinal cord involvement, and clinical condition of the patient (3).

In the current case, the mass in the pancreas was secondary to chronic pancreatitis, and the liver mass was an abscess.

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