Case 3756

Spine Giant Cell tumor. Intraarterial preoperative embolization
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Authors: MD Ferrer-Puchol, E Llopis-Sanjuan, E Esteban-Hernández
Patient: 24 years, male

Clinical History:

We present a 24-year-old men complaining about back pain since two months.

Imaging Findings:

Clinical examination revealed a limited range of spine motion. Neurologic examination was normal. CT-scan study (figure 1) revealed a D8 geographic lytic lesion with destruction of the internal cortex. The diagnosis of giant cell tumor was confirmed by biopsy. MRI study showed in sagittal T1 marrow replacement with soft tissue mass and extension to the superior pedicle (figure 2), axial-gradient echo T2 showed a high-signal intensity mass arising from the pedicle and extending into the spinal canal and an extradural intraspinal mass effect to the medulla with market left displacement (figure 3). Contrast enhancement fat-suppression showed homogeneous enhancement within the tumor spread to the vertebral posterior elements (figure 4). Due to important risk of intraoperative bleeding, the intraarterial embolization of the tumor was decided two days before the surgical intervention. The embolization procedure was performed via femoral with intravenous sedation. After thoracic aortography, selective catheterization with a Cobra 2 catheter of segmental dorsal arteries was performed. Feeding arteries of tumor (D6, D7 and D8) were catheterized using a coaxial system (Tracker-18) for embolization with PVA particles of 150-200 mm diameter (Figure 5). Post-embolization angiogram showed total occlusion of the feeding artery (figure 6). Gadolinium enhanced MRI study, 24 hours later demonstrated necrosis areas within the central portion of the tumor (figure 7). The patient was operated with vertebral resection of D8 and posterior elements of D7, and the tumor was removed. Blood loss during the surgical procedure was 200 cc. After an 18 months follow-up the patient remains asymptomatic.

Discussion:

Giant cell tumor (GCT) is a relatively common skeletal tumor, accounting for 4 % - 9.5 % of all primary osseous neoplasms, is a locally aggressive tumor, consisting of a vascularised network of spindleshaped stromal cells surrounding multinucleated giant cells. The most common specific location of GCT is around the knee (50-65 % of cases). The single most common site is the distal femur (20-30 % of cases) followed by the proximal tibia (20-25 %). In the thoracic spine this tumor is infrequent and usually affects the vertebral body. MR images provide more information on both the tumour location and extension that CT or plain films. GCT usually has low to intermediate signal on T1-wi and predominantly high signal on T2-wi (1). The case that we present involves the dorsal posterior elements with destruction of pedicle, extending to the adjacent vertebral bodies. There is a higher recurrence rate for tumors that involve posterior elements in comparison with lesions residing in only anterior elements (2). GCT is a hypervascularized lesion and the surgery in patients with hyper vascular tumours is frequently complicated by excessive intraoperative blood loss. Preoperative tumour embolization facilitates surgical resection primarily by reducing intraoperative bleeding, ensuring an unimpeded view of the surgical field and making complete tumor
resection more likely (3,4). The estimation of intraoperative hemorrhage showed a median value of 5000 ml in patients affected with hypervascular spinal tumours and it was recommended preoperative embolization to reduce bleeding complications (5). In this case we decided embolize the distal vessels. During the embolization procedure it is very important the occlusion of smaller tumour vessels by means of small-particles, most frequently, such as polyvinyl alcohol (PVA) is used to occlude the tumour vessels. The effect of proximal embolization with coils alone is moderated and it is not sufficient to ensure a safe operation of hypervascular lesions, the reason is early revascularization of the tumour through intersegmental collaterals. In these cases is very important a careful interpretation of high-quality spinal angiograms, superselective catheterization and flow control during embolization to avoid neurologic complications. Radiculomedullary and radiculopial arteries are part of anterior or posterior spinal cord circulation, and therefore must be identified; and embolization of such segments should be avoided. Small-sized particles with diameters below 150 mm should not be used because they may cause blockage of the arterial input to the spinal cord at the level where collateral supply is either inadequate or does not exit (6). In conclusion, preoperative embolization of these tumours with medium size particles is an effective tool to reduce intraoperative blood loss and it helps to increase technical feasibility and safety of surgical procedure.

**Differential Diagnosis List:** Spine Giant Cell Tumor

**Final Diagnosis:** Spine Giant Cell Tumor

**References:**


Figure 1

Description: D8 geographic lytic lesion Origin:
Description: Marrow replacement with soft tissue mass and extension to the superior pedicle
Description: Soft tissue mass arising from the pedicle and extending into the spinal canal

Origin:
Figure 4

Description: Homogeneous enhancement within the tumor spread to the posterior elements

Origin:
Figure 5

Description: Feeding arteries of tumor

Origin:
**Figure 6**

*a*

*Description*: Total occlusion of the feeding artery

*Origin*: [Image of the vessel with a total occlusion]
Description: MRI study 24 hours later demonstrated hypoenhancement areas corresponding to necrosis areas. Origin: