Case 11961

Solitary plasmacytoma involving C5 and C6 vertebrae with "Mini brain" appearance
Published on 16.07.2014

DOI: 10.1594/EURORAD/CASE.11961
ISSN: 1563-4086
Section: Musculoskeletal system
Area of Interest: Spine
Procedure: Diagnostic procedure
Procedure: Contrast agent-intravenous
Imaging Technique: CT
Imaging Technique: MR
Special Focus: Neoplasia Case Type: Clinical Cases
Authors: Chirag Kanjibhai Ghodasara, Nisha Satishkumar Doshi
Patient: 55 years, male

Clinical History:

55-years-old male patient presented with quadriparesis and neck pain after trivial trauma.

Imaging Findings:

MRI cervical spine revealed altered signal intensity lesion involving vertebral body, right articular process, right transverse process, right pedicle of C5 and C6 vertebra, right lamina of C6 vertebra and right-sided facet joint between C5 and C6 vertebrae.
The lesion appeared hyperintense on T2/STIR sequences and hypointense on T1 sequence. The lesion showed intense homogeneous enhancement on post-contrast study.
The lesion extended into the right-sided prevertebral and paravertebral region at C5 and C6 vertebral level. The lesion was encasing the right vertebral artery, extending into the epidural region on the right side and causing compression and left side displacement of the cervical spinal cord at C5 and C6 vertebral level.
There were thick cortical struts in the C6 vertebral body predominantly on the left side. These struts were hypointense on T2/T1 images and the surrounding lesion hyperintense on T2 images. These struts resembled sulci of brain and the lesion looked like gyri of brain, showing a "Mini brain" sign in the axial images.

Discussion:

A plasmacytoma is a discrete, solitary mass of neoplastic monoclonal plasma cells in either bone or soft tissue (extramedullary). It can be considered as a singular counterpart of multiple myeloma. [1]
Solitary plasmacytomas can be divided into two groups according to location: plasmacytoma of the skeletal system / solitary bone plasmacytoma and extramedullary plasmacytoma. [2]
A solitary bone plasmacytoma may involve any bone, but it has a predisposition for the red marrow-containing axial skeleton, mainly spine, rib, sternum, clavicle, skull or scapula. [2, 3]
Diagnostic criteria for solitary bone plasmacytoma are: single area of destruction due to clonal plasma cells, bone marrow plasma cell infiltration <5% of all nucleated cells, absence of osteolytic bone lesions or other tissue involvement, absence of anaemia, hypercalcaemia or renal impairment, low or absent serum / urine monoclonal protein, preserved levels of uninvolved immunoglobulins. [4]
X-ray and CT show expansile lytic lesions. MRI shows expansile soft tissue intensity lesions, which appear
hyperintense on T2 / STIR and hypointense on T1 images. On post-contrast study, plasmacytoma shows variable moderate to intense enhancement. [3]

In solitary vertebral body plasmacytoma, thick cortical struts form in the vertebral body. The characteristic appearance of thickened cortical struts is probably a result of a stress phenomenon from the lytic process of the plasmacytoma forcing the remainder of the bone to increase thickness as a compensatory response to weakening bone. Perhaps an explanation of this appearance, which is not seen in other primary bone or metastatic spine lesions, concerns the less aggressive nature of plasmacytoma compared with other tumours that destroy bone. The cortical thickening in the arrangement of plasmacytoma appears to be unique in this tumour. This appearance can also be seen on CT of plasmacytoma. [3]

In our case, biopsy was performed and plasmacytoma could be confirmed.
Teaching point: A “mini brain” appearance in an expansile lesion of the vertebral body is pathognomonic of solitary plasmacytoma. It is important to appreciate this finding because it may help radiologists recommend appropriate laboratory studies and facilitate early and appropriate treatment. For the patient, an early diagnosis on MR imaging may obviate biopsy. [3]

Differential Diagnosis List: Solitary plasmacytoma involving C5 and C6 vertebrae with "Mini brain"appearance, Metastasis, Giant cell tumour, Aneurysmal bone cyst

Final Diagnosis: Solitary plasmacytoma involving C5 and C6 vertebrae with "Mini brain"appearance

References:
Description: Sagittal post-contrast T1 image of cervical spine revealed hypointense thick cortical struts in left side of the C6 vertebral body with adjacent enhancing lesion. Origin: sanya diagnostics, rajkot, gujarat, india
**Description:** Sagittal post-contrast T1 image of cervical spine revealed enhancing lesion in C5 and C6 vertebral body with destruction of C5-6 disc. The lesion was extending into the epidural region and right paravertebral region. **Origin:** sanya diagnostics, rajkot, gujarat, india
Description: Sagittal post-contrast T1 image of cervical spine revealed enhancing lesion in C5 and C6 vertebrae, extending into the right paravertebral region. Origin: sanya diagnostics, rajkot, gujarat, india
Description: Sagittal post-contrast T1 image of cervical spine revealed enhancing lesion in the right-sided articular and transverse process of C5 and C6 vertebrae with right vertebral artery encasement.
Origin: sanya diagnostics, rajkot, gujarat, india
Description: Coronal post-contrast T1 image of cervical spine revealed enhancing lesion in C5 and C6 vertebrae, extending into the right paravertebral region. Origin: Sanya Diagnostics, Rajkot, Gujarat, India
Description: Coronal post-contrast T1 image of cervical spine revealed enhancing lesion in C5 and C6 vertebrae, extending into the right paravertebral region and encasing the right vertebral artery. Origin: Sanya Diagnostics, Rajkot, Gujarat, India
Description: Axial post-contrast T1 image revealed homogeneous enhancing lesion involving vertebral body, right transverse process and right articular facet of C5 vertebrae. Origin: sanya diagnostics, rajkot, gujarat, india
Description: Axial post-contrast T1 image revealed enhancing lesion involving C6 vertebrae and extending into the right paravertebral region and epidural region. The lesion was causing compression of the cervical spinal cord. Origin: sanya diagnostics, rajkot, gujarat, india
Description: Axial post-contrast T1 image revealed hypointense thick cortical struts in C6 vertebral body and an enhancing lesion between struts, showing a "Mini Brain" appearance. Origin: sanya diagnostics, rajkot, gujarat, india
Description: Axial post-contrast T1 image revealed enhancing lesion involving C6 vertebrae and extending into the right paravertebral region and epidural region, encasing the right vertebral artery.

Origin: Sanya Diagnostics, Rajkot, Gujarat, India
Figure 4

Description: Sagittal T2 image of cervical spine revealed hypointense thick cortical struts in left side of C6 vertebral body with adjacent hyperintense lesion. Origin: Sanya Diagnostics, Rajkot, Gujarat, India
Description: Sagittal T2 image of cervical spine revealed hypointense lesion in C5 and C6 vertebral body. The lesion was extending into the epidural region, causing compression of the cervical spinal cord. Origin: Sanya Diagnostics, Rajkot, Gujarat, India
Description: Sagittal T2 image of cervical spine revealed hypointense lesion in C5 and C6 vertebral body with destruction of C5-6 disc. The lesion was extending into the epidural region and right paravertebral region. Origin: sanya diagnostics, rajkot, gujarat, india
Description: Sagittal T2 image of cervical spine revealed hypointense lesion in right-sided articular process of C5 and C6 vertebrae. Origin: sanya diagnostics, rajkot, gujarat, india
Description: Axial GRE image revealed homogeneous hyperintense lesion involving vertebral body, right transverse process and right articular facet of C5 vertebrae. Origin: sanya diagnostics, rajkot, gujarat, india
Description: Axial GRE image revealed hyperintense lesion involving C6 vertebrae and extending into the right paravertebral region and epidural region. The lesion was causing compression of the cervical spinal cord. Origin: sanya diagnostics, rajkot, gujarat, india
Description: Axial GRE image revealed hypointense thick cortical struts in C6 vertebral body and hyperintense lesion between struts, showing a "Mini Brain" appearance. Origin: Sanya Diagnostics, Rajkot, Gujarat, India
**Description:** Axial GRE image revealed a lesion encasing the right vertebral artery. **Origin:** sanya diagnostics, rajkot, gujarat, india
Description: Axial T1 image revealed hypointense lesion involving the vertebral body, right transverse process and right articular facet of C5 vertebra. The lesion was encasing the right vertebral artery.

Origin: Sanya Diagnostics, Rajkot, Gujarat, India
**Description:** Axial T1 image revealed hypointense thick cortical struts in C6 vertebral body and hypo to isointense lesion between struts, showing a "Mini Brain" appearance. **Origin:** sanya diagnostics, rajkot, gujarat, india
Description: Sagittal reformatted image of the cervical spine revealed thick cortical struts in the left side of the C6 vertebral body. Origin: Sanya Diagnostics, Rajkot, Gujarat, India.
Description: Sagittal reformatted image of the cervical spine revealed an expansile lytic lesion in C5 and C6 vertebrae. Origin: sanya diagnostics, rajkot, gujarat, india
Description: Axial reformatted image of cervical spine revealed expansile lytic lesion in C6 vertebrae with thick cortical struts in the vertebral body. Origin: sanya diagnostics, rajkot, gujarat, india
Description: Coronal reformatted image of cervical spine revealed expansile lytic lesion in C5 and C6 vertebrae. Origin: sanya diagnostics, rajkot, gujarat, india