Case Report

Subaxial cervical Castleman's disease: A rare cause of myelopathy

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ABSTRACT

**Background:** Castleman's disease (CD) is a rare lymphoproliferative disease of unknown origin which rarely affects the spine. Here, we present CD involving a lytic, destructive C3 lesion with extension into the spinal canal contributing to upper cervical cord compression. Notably, the lesion mimicked other primary bone lesions, metastatic tumors, and/or lymphoma.

**Case Description:** A 52-year-old male presented with progressive quadripareisis (i.e. weakness, instability of gait) and loss of dexterity in both hands over 2 weeks. The MRI, X-ray, and CT scans revealed a destructive lytic lesion involving the C3 vertebral body (i.e. including both anterior and posterior elements). The patient underwent a C3 total and C4 partial laminectomy followed by a C2-C4/5 instrumented fusion (i.e. included C2 pedicle screws/laminar screws, and C4/C5 lateral mass fixation). Histopathology showed a lymphoproliferative disorder with follicles of different sizes, central abnormal germinal structures, and a Mantle zone (i.e. expanded germinal centre with concentric layering with an "onionskin" appearance). These findings were all consistent with the diagnosis of CD (i.e. hyaline-vascular type).

**Conclusion:** CD, a rare lymphoproliferative disease of unknown origin rarely affects the spine. Here, we presented a 52-year-old male with a C3 lytic lesion resulting in C3/4 cord compression that favorably responded to a C3/4 laminectomy with posterior instrumented fusion.

**Keywords:** Castleman's, Cervical spine, Lymph node, Myelopathy

INTRODUCTION

Castleman's disease (CD) is a rare lymphoproliferative disease of unknown origin that generally affects lymph nodes, rarely the chest, neck, abdomen, pelvis, axilla, sometimes the lung, parotid gland, pancreas, and spine.[10] Other terms for CD include - angiofollicular hyperplasia, localized nodal hyperplasia, giant lymph node hyperplasia, angiomatous lymphoid hamartoma, follicular lymphoreticuloma, and CD.

The differential diagnoses for CD include - infection, malignancy, autoimmune, and/or collagen vascular disease. Eight other cases of spinal CD [Table 1] were identified by the authors; six of them presented as extradural/intracanalicular masses requiring decompression procedures for

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CASE DESCRIPTION

A 52-year-old male presented with 2 weeks of a progressive quadriparesis (i.e. loss of dexterity in both hands and lower extremity weakness) and urinary incontinence. He also had cervical lymphadenopathy (i.e. anterior/posterior and postauricular lymph nodes). On exam, he had 4/5 weakness in both lower extremities, diffuse lower extremity hyper-reflexia with bilateral Babinski responses, and a T2 sensory level (mJOA-10/18).

Radiological studies

The X-rays and CT scan revealed a destructive lytic C2-C4 lesion focused at the C3 level vertebral body (i.e. destructive lytic lesion of anterior/posterior C3, the C2 spinous process, and anterior C4 vertebral body) [Figure 1]. MRI showed multiple enlarged lymph nodes in the neck along with lytic lesions involving C3 (i.e. both anterior and posterior elements). Furthermore, an epidural soft-tissue mass causing spinal cord compression was seen posteriorly at the C3-4 level. Although predominantly dorsal, the lesion wrapped circumferentially around the spinal cord bilaterally. The lesion was isointense to hypointense as compared with the spinal cord on T2 weighted images and hyperintense to cord on the T2-weighted image [Figure 2]. The PET CT confirmed increase uptake at C3 alone [Figure 3]. The predominant differential diagnoses included lymphoma or metastatic tumors or infection.

Surgery

In view of a Spinal Instability Neoplastic Score of 14, the evidence of spinal cord compression and likely instability, the patient underwent a C3-4/laminectomy with C2-4/5 posterior fusion. At surgery, the posterior cervical paraspinal musculature infiltrated by tumor and had to be removed. A novel “three rod construct” fusion was performed that included C2 pedicle screws, laminar screws, a C4 left pedicle screw with lateral mass fixation of C4 and C5 [Figure 4]. The frozen section diagnosis was lymphoma. Postoperatively, the patient had complete neurological recovery except for bladder dysfunction.

Histopathology

Histopathology was consistent with a lymphoproliferative disorder (i.e. with follicles of different size with abnormal germinal structures at their centres with hyaline-vascular or “burnt-out” appearances) [Figure 5]. The Mantle zone was expanded with concentric layering and an “onion skin” appearance. Immunohistochemical stains revealed a normal distribution of B and T cells and intact germinal centres with a normal distribution of dendritic reticulum cells. The final diagnosis was CD of hyaline-vascular type.

Adjuvant therapy

The patient was started on methylprednisolone for the lymphadenopathy, and diagnosis of CD. This was followed by radiotherapy (total dose 3960cGy in 22 fractions).
Follow-up 1 year later

At the last follow-up 1 year later, patient remained asymptomatic without evidence of lesion progression [Figure 6].

DISCUSSION

CD is a rare lymphoproliferative disorder that is histologically categorized as a benign, hyaline-vascular type, representing approximately 80–90% of cases; the remaining 10–20% are aggressive multifocal form - plasma cell type lesions. Our patient had the more common hyaline-vascular form of
Mallepally, et al. Castleman’s disease of the spine

CD. CD lesions on MR typically appear hypointense on T1-weighted images, and hyperintense on T2-weighted studies.[9] In this case, the MR showed CD tumor involving both anterior and posterior elements of C3 vertebrae and also seen epidural soft-tissue mass causing spinal cord compression at C3-4 posteriorly. The lesion was predominantly dorsal and wrapped around the spinal cord bilaterally. On CT, extensive destructive bony-lytic lesions are often better appreciated

Table 1: Literature review of Castleman’s disease involving the spine.

| Author               | Age/sex | Clinical presentation | Location          | Treatment                                                                 | Outcome                                                                 |
|----------------------|---------|-----------------------|-------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Alper et al.         | 10/M    | Myelopathy            | C6-T2             | C5-T1 laminotomy with subtotal resection                               | Residual left-hand weakness and evidence of disease on magnetic resonance imaging at 5 months |
| Eisenstat et al.     | 54/M    | Myelopathy            | T8-T11            | T7-T12 laminectomy with gross total resection                           | No evidence of recurrence                                               |
| Lee et al.           | 34/M    | Myelopathy            | T2-T3             | T2-T3 laminectomy with gross total resection                            | No evidence of recurrence at 1 year                                     |
| Kachur et al.        | 44/F    | Myelopathy            | T3-T5             | T2-T6 laminectomy with gross total resection                            | Myelopathy resolved at 6 months                                          |
| Finn and Schmidt[10]| 19/F    | Bronchitis            | T7-T8 involving neural foramen | Thoracotomy with subtotal resection                                      | Full recovery with no evidence of recurrence at 1 year follow-up         |
| Stevens et al.       | 31/F    | Left midback pain radiating to chest Myelopathy | T3-T4 neural foramen T2-T5 | Thoracotomy and en bloc resection                                       | Full recovery with no evidence of recurrence                            |
| Gupta et al.[5]      | 30/F    | Sacral pain           | Right side S4, S5 and coccyx C2-C4 | Lower sacrectomy and coccyx excision Partial excision C3-4 laminectomy and fixation and radiotherapy | Complete remission and no evidence of recurrence at 24 months           |
| McMillan et al.[6]   | 60/M    | Sacral pain           | Right side S4, S5 and coccyx C2-C4 | Lower sacrectomy and coccyx excision Partial excision C3-4 laminectomy and fixation and radiotherapy | Full recovery with no evidence of recurrence at 1 year follow-up         |
| Present study        | 52/M    | Myelopathy            |                   |                                                                            | Complete recovery of myelopathy with no recurrence                      |

Figure 6: Follow-up T2 weighted (a) and T1 weighted (b) sagittal MR images showing adequate decompression of cord and axial MRI (c) showing adequate resolution of tumour. Coronal (d) and sagittal (e) images showing resolution of tumorous mass and lateral (f) and anteroposterior (g) radiographs showing no signs of implant failure.
involving the posterior elements/vertebral bodies rather than anterior vertebrae.

The treatment modalities for CD include surgical excision for single lymph node involvement. Complete surgical resection generally offers complete cure in those with a localized variant, while those with more extensive diffuse unresectable lesions typically warrant additional chemotherapy, immunotherapy, and/or radiation therapy. Histopathology of CD may resemble other conditions such as lymphoma, autoimmune disorders like rheumatoid arthritis, Sjögren’s syndrome, monoclonal gammopathy, and acquired immunodeficiency syndrome. A definitive diagnosis of CD requires pathological-histological confirmation (i.e. biopsy or tumor resection). Those patients with the localized form may be treated with local resection or radiation therapy as well as systemic chemotherapy. Recent developments suggest a major role of interleukin-6 (IL-6) in the treatment of CD. MCD treatment may include prednisolone or novel human-mouse chimeric immunoglobulin G1κ monoclonal antibody against human IL-6 siltuximab. Sometimes, it may require treatment like lymphoma with R-CHOP regimen (rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone). Radiotherapy may be necessary for rare cases that are not surgically resectable.

CONCLUSION

CD rarely involves the spine. Here, it presented involving the C2-C4 levels (i.e. focused at C3) with cord compression warranting a C3/4 laminectomy and C2-C4/5 posterior fusion.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Publication of this article was made possible by the James I. and Carolyn R. Ausman Educational Foundation

Conflicts of interest

There are no conflicts of interest.

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