Case 8444

Craniovertebral junction tuberculosis
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Patient: 56 years, male

Clinical History:
A 56-year-old man developed pain and stiffness in the neck which was gradually progressive in nature. He was subsequently admitted to the hospital with a 1-month history of gradually increasing quadriparesis.

Imaging Findings:
A 56-year-old man developed gradually progressive pain and stiffness in the neck. He was subsequently admitted to the hospital with a 1-month history of gradually worsening quadriparesis. The patient also complained of pain in the throat for the last few weeks. There was no significant past medical history and no weight loss or fever. Laboratory results showed an elevated erythrocyte sedimentation rate (ESR) of 64mm. His neurologic examination revealed neck stiffness with restricted neck movements. Hyperactive deep tendon reflexes were present with Grade IV-III power in the limbs. He was evaluated further with CT and contrast enhanced MRI of the cervical spine. CT scanogram revealed prevertebral soft tissue widening most pronounced at C1-C2 level (Fig. 1). CT examination revealed subtle osteolytic erosions along the odontoid peg with associated prevertebral soft tissue component (Fig. 2). On soft tissue settings, associated epidural soft tissue was also seen (Fig. 3). An MRI was performed for further evaluation and to assess the spinal cord. MR imaging revealed osseous destruction of C1 & C2 vertebrae with a fairly large prevertebral (retropharyngeal) and epidural soft tissue component (Fig. 4). Prevertebral fluid collection was also seen extending from C2 to C7 vertebral level. Contrast study revealed avid enhancement of the juxta-osseous soft tissue component (Fig. 5, 6). His chest radiograph appeared normal except for a small calcified granuloma in the left mid zone (Fig. 7). In view of these imaging findings, diagnostic possibility of an infective aetiology appeared more likely. Biopsy revealed granulomatous tissue with caseous necrosis. Subsequently antituberculous treatment was started.

Discussion:
Pott's disease continues to be an important health hazard in the developing nations. A rising incidence has been reported in the developed world due to an increase in travel to endemic regions and immigration of people from affected countries. Furthermore, rising incidence of AIDS has increased the number of extra pulmonary and atypical presentations of tuberculosis. Musculoskeletal tuberculosis constitutes 35% of extra pulmonary disease; most commonly involving the dorso-lumbar spine. Cervical spine involvement is relatively less common. The cranio-vertebral junction (CVJ) is definitely a rare site to be involved, constituting 0.3% to 1% of all tuberculous spondylitis cases. Skeletal tuberculosis can affect any age group and has no gender predilection. It is usually secondary to haematogenous spread of Mycobacterium bacilli, often from a primary focus in the lungs. Tuberculous infection of the CVJ causes destruction of both osseous as well as the ligamentous structures. Patients often present with neck pain, stiffness and restriction of neck movements. Odynophagia or dysphagia may be there due to associated retropharyngeal abscess. Advanced stages of disease can lead to severe neurological complications such as
quadriplegia, owing to cervico-medullary cord compression. Patients can develop atlanto-axial or occipitocervical instability which can produce severe morbidity and even death.

Plain radiographs and CT are often the primary imaging modalities which depict osteolytic erosions of the atlas and axis and prevertebral soft tissue swelling. Associated atlanto-axial or occipitocervical subluxation may be seen. MRI owing to its multiplanar imaging capability and higher contrast resolution is the imaging technique of choice. MRI provides critical information about the neural structures and is a useful modality in monitoring response to treatment. MR imaging findings include contiguous vertebral body involvement with or without vertebral collapse or kyphoscoliotic spinal deformity. Intervertebral disc involvement is an important clue to diagnosis. Associated soft tissue oedema, pre and paraspinal collections and epidural abscess are well delineated with MRI. The differential diagnosis includes pyogenic and fungal infections, metastasis, plasmacytoma, lymphoma and sarcoidosis. No pathognomonic imaging signs allow tuberculosis to be readily distinguished from other conditions; however involvement of the intervertebral disc suggests an infective aetiology. A relatively chronic history and slow evolution of symptoms favours tuberculosis. Furthermore, paravertebral collections tend to be larger in tuberculosis than in pyogenic spondylitis. Histopathology is the mainstay of diagnosis. It shows granulomatous tissue with or without caseation necrosis. Smear and culture for acid fast bacilli are found to be positive in less than 50% of cases. The treatment of CVJ tuberculosis has been controversial without well-defined guidelines. The mainstay of management is prolonged antitubercular medication with a rigid external immobilisation. Surgery is usually not necessary even in advanced stages of disease. Surgical debridement/ decompression with or without posterior spinal fixation may be performed in patients with severe cervical myelopathy or instability.

Although CVJ tuberculosis is a rare disease, the radiologist should entertain this possibility especially in a high-risk patient population, thus preventing a delay in diagnosis of this aggressive but curable infectious disease.

**Differential Diagnosis List:** Craniovertebral junction tuberculosis

**Final Diagnosis:** Craniovertebral junction tuberculosis

**References:**


Description: CT scannogram depicts a large prevertebral soft tissue shadow indenting the nasopharyngeal & oropharyngeal air column. Origin:
**Figure 2**

*Description:* Subtle osteolytic erosions of the odontoid peg are visualised (arrows). A fairly large prevertebral soft tissue component and a subtle extradural soft tissue component is seen at the CVJ.

*Origin:*
Description: Subtle osteolytic erosions of the odontoid peg (arrow) can be seen on this coronal image.

Origin:
Description: Widening of the prevertebral (retropharyngeal) soft tissues can be seen ventrally along C1-C2 vertebrae. Associated epidural component is also present (arrow). Origin:
Description: Osseous destruction of C1 and C2 is well visualised with associated prevertebral soft tissue component (red arrow). Prevertebral fluid collection is also seen extending from C2 to C7 vertebral level in a contiguous fashion (blue arrows). Origin:
Description: Epidural soft tissue around the C1, C2 and tip of the clivus is seen causing spinal cord compression. Origin:
Description: Avid enhancement of the juxta-osseous soft tissue component can be seen on these post contrast images. Origin:
Description: The enhancing phlegmonous soft tissue centred around the atlanto-axial vertebrae is seen to extend bilaterally. Origin:
Description: The pre- and paravertebral phlegmonous soft tissue and the epidural soft tissue component shows avid enhancement on the post contrast scan. Inflammatory changes are seen extending widely into the adjacent myo-fascial planes. **Origin:**
Description: A small calcified granuloma is seen in the left mid zone. Origin: