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Pyogenic Spondylitis: Case Report on Cervical Pyogenic Spondylitis

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Pyogenic spondylitis involves a broad spectrum of structures around the spine including the vertebra (vertebral osteomyelitis), discs (septic discitis) and epidural abscess. Symptoms may include fever, pain, sensory-motor deficits, and obtundation. Fever is a symptom, however, may not be common as it occurs in less than of patients. It may affect any aspect of the spine, with the cervical spine been the least affected. Magnetic resonance imaging (MRI) is critical for early diagnosis and extensively used for diagnosis. Our case presents a lady who was referred for an MRI of the neck following neck pain for over 3 months.

Keywords: Spondylitis; neurological condition; spinal epidural; MRI.

1. INTRODUCTION

Pyogenic spondylitis is an infection of the spine. It involves a broad spectrum of structures around the spine including the vertebra (vertebral osteomyelitis), discs (septic discitis) and epidural abscess [1]. It is uncommon but the prevalence is said to be increased despite advances in

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antimicrobial therapy [2,3]. Pyogenic spondylitis accounts for 2-7% of all musculoskeletal infections with an annual prevalence of 0.4-2.4 per 100,000 [1,2]. The exact prevalence of spinal infections in most parts of the world is unknown [4]. However, a study done in southern Nigeria showed that the prevalence of pyogenic spondylitis was 1.7% [5]. identified causative organisms for pyogenic spondylitis include Staphylococcus, Enterobacter, Salmonella, Pseudomonas and viruses like cytomegalovirus with Staphylococcus aureus accounting for about 62% of all infectious agents [6,3,6–9]. Inncoulaton with organism can be through septic foci, iatrogenic, direct or hematogenic. Spread commonly arises from hematogenous spread. The arterial route is commoner than the venous route, however, direct invasion is commoner in the cervical region[10]. The usual involvement of the vertebral bodies is due to the arterial supply by the segmental arteries. The arteries typically supply the lower pole of the superior vertebrae and the upper pole of the inferior vertebrae. Thus pyogenic spondylitis typically affects two adjoining vertebrae as well as the intervening intervertebral disc. [11]. Major symptoms include neck pain, sensory-motor deficits and/or fever[12,13]. Sensory-motor deficit is usually from compression on the spinal cord or nerve roots[14]. It is predominantly seen in the fifth decade of life with a 2:1 ratio of affection in males compared to females [1,15]. Laboratory tests like erythrocyte sedimentation rate (ESR) and C-reactive protein (ESR) are sensitive laboratory indicators of pyogenic spondylitis but however, have low specificity. CRP is more useful than ESR in postsurgical treatment as reduction of infective process would lead to a decline in CRP in affected patients[9]. White cell count is not useful in diagnostic workup as it may not be elevated, but it is a useful test to monitor treatment response[16]. As a result of variability of the disease, tests like blood culture, urinalysis, throat swab and urine for culture, may be requested to pin point the causative organism. Blood cultures have been noted to demonstrate the causative organism in up to 59% of cases[17]. Plain radiographs are usually the first choice of modality to access the spine when the patient presents with neck or back pain, however, magnetic resonance imaging is the modality of choice to evaluate for pyogenic spondylitis especially due to soft tissue detail it gives[3,18]. Biopsy is the investigation that is used to definitively make diagnosis of pyogenic spondylitis. This can be either done as endoscopic, computed tomography or fluoroscopic guided, or as an open biopsy procedure. Open biopsy is usually done following failed computed tomography or fluoroscopic guided procedures [9]. Our case presents a lady who was referred for Magnetic resonance imaging (MRI) of the cervical spine following neck pain for over 3 months.

2. CASE PRESENTATION

A case of a 48-year-old referred for magnetic resonance imaging of the cervical spine following worsening neck pain for 3 months radiating to both hands and associated bilateral paresthesia. There is no history of fever and the use of immunosuppressive medications. She was managed in the outpatient clinic as a case of cervical disc disorder with radiculopathy.

Magnetic resonance imaging done with a 1.5T MRI machine (using T1, T2, STIR and T1+C sequences) revealed reversal of the cervical lordosis angle secondary to posterior angulation centred at the level of C6 vertebra (gibbus deformity).

There was spurring of the anteroinferior margins of C3, C4 and C5 vertebrae. MODIC type II changes are seen in the endplate of C5 and MODIC Type I change is seen in C4. The vertebral bodies as well as the endplates of C6 and C7 showed heterogeneous intensity. They appeared hypointense on T1, hyperintense on T2 and STIR (indicative of oedema) and show enhancement on T1 +C weighted images (indicative of inflammation). There is an associated irregularity of the endplates of C6 and C7. There was the destruction of the C6/C7 intervertebral disc with high signal intensity on T2 and STIR weighted images indicative of fluid collection.

Enhancing epidural collection centred at C6/C7 spanning through C4 to C7 with associated marked compression of the spinal cord with cord signal changes. Significant dural enhancement up to the C2 vertebra is also noted. There was also significant prevertebral and paravertebral collection as well as an affectation of the soft tissue around the C6 and C7 vertebra. Associated mass effect on the oesophagus and slight airway narrowing is also noted. An impression of pyogenic cervical spondylitis with vertebral body osteomyelitis C6 and C7 with intravertebral abscess collection, Gibbus deformity at C6, prevertebral and paravertebral abscess collection, retropharyngeal abscess with

mild airway narrowing, spinal epidural abscess with arachnoiditis and significant spinal canal stenosis with spinal cord compression at multiple levels but centred at C6/C7 level was made.

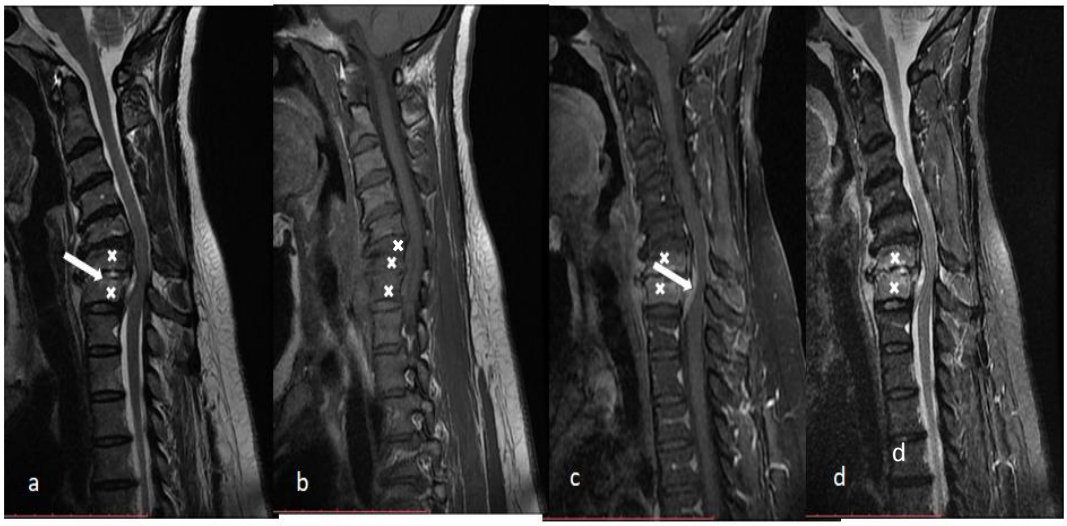

Fig. 1. Pyogenic spondylodiscitis with epidural extension; (a) Sagittal T2WI of the cervical spine shows high signal intensity of the disc C6–C7 with narrowing of the disc space (white arrow). (b) Affected discs and vertebral bodies appear hypointense on T1WI with irregularity of the subchondral regions of the vertebral bodies. (c) After gadolinium injection, the extent of the infection is evident with an enhancement of C6 and C7 vertebral bodies (x). Epidural extension of the infection is delineated on postcontrast images with the enhancement of the epidural phlegmon in the anterior epidural space (white arrow) (d) Hyperintensity of the vertebral bodies is most prominent on sagittal short tau inversion recovery (STIR) image representing inflammatory bone marrow oedema

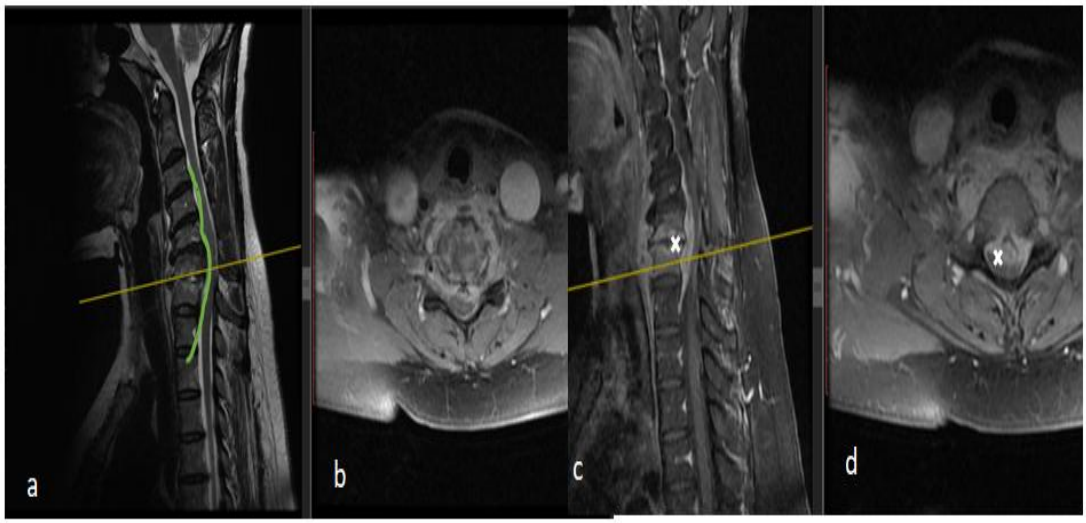

Fig. 2. (a-b) Sagittal and axial T2WI of the cervical spine showing gibbus formation (green line) of the cervical spine with associated cord compression and severe irregularity of the C6 endplate. (c-d) Sagittal and axial T1WI+C of the spine shows enhancement of the vertebral bodies of C6 and C7 with epidural extension of infection, enhancement of the epidural, phlegmon formation (x) and arachnoiditis causing severe cord compression

3. DISCUSSION

Pyogenic spondylitis is a serious neurologic condition. It has an annual prevalence of 0.4-2.4 per 100,000, however, there are recent documentations of an increase of prevalence to 5.8 per 100,000[19]. Pyogenic spondylitis has a higher male predominance and it has been reported to be more common amongst individuals within the age groups of 50-70 years and less than 17 [1,19,20]. Aside from age as a risk factor, immunosuppressive states like chronic corticosteroid use, immunosuppressive drugs, and immunosuppressive diseases (HIV), intravenous drug abusers, broad-spectrum antibiotic use and parenteral nutrition are risk factors[3]. Other documented risk factors include genitourinary tract and intra-abdominal infections[21]. Pyogenic spondylitis affects any part of the spine but cervical spondylitis is the least common of them[1,22].

Pathogens involved are spread via several means viz (a) the arterial hematogenous route from distant septic foci; (b) the venous hematogenous route; (c) from septic foci of adjacent soft tissue; and (d) direct inoculation from surgery or interventional procedures like spinal anaesthesia [3,23,24]. Iatrogenic spinal infections constitute 2.5% of all spinal infections[3]. The hematogenous route however is the most common route of pathogen spread[1]. Symptoms may include fever, sensory-motor deficits, and obtundation. Fever is a symptom, however, may not be common as it occurs in less than of patients[25–27]. Body temperature may be normal in chronic infection. Other symptoms experienced can include constitutional symptoms anorexia, weight loss, confusion and lethargy. Difficulty in swallowing can be experienced in patients with pyogenic spondylitis with retropharyngeal abscess[1]. Functional comprise of the spinal cord is commonly caused by mechanical compression usually as a result of kyphotic deformity resulting from vertebral destruction[1,3]. Deterioration of the spinal cord due to ischemic comprise is often seen. The gold standard of diagnosis is magnetic resonance imaging with high specificity, sensitivity and accuracy of 92, 96 and 94% respectively [3]. The MR imaging protocol includes unenhanced T1-weighted images (WI), short tau inversion recovery (STIR) T2WI, and contrast-enhanced T1WI. The most detailed information is provided by contrast-enhanced T1WI with fat suppression[3]. Diagnosis is usually made three to twelve weeks after the onset of symptoms[1]. This may be as a result that MRI is expensive and poorly assessed in Nigeria, also, it may be a result of the nature of symptom experienced which may just be neck pain with or without fever. Other ancillary investigations like full blood count, erythrocyte sedimentation rate (ESR) and C- reactive protein (CRP) may be done. ESR, however, is elevated in 50% of patients which is in keeping with the “rules of 50%” as 50% of patients have elevated ESR, 50% present 3 months after onset of symptoms and 50% of patients have fever[3]. CRP on the other is elevated in 90% of patients[28–30]. it is, however, alongside ESR elevated in both acute infection and immediate post-surgical intervention but declines faster compared to ESR[1]. Blood culture is positive in 25-50% of cases but bone biopsy reveals positivity in 50-90% of cases. Blood culture and bone biopsy help identify causative organisms which could be Staphylococcus, Enterobacter, Salmonella, Pseudomonas and viruses like cytomegalovirus[6–8]. Staphylococcus aureus has been commonly implicated, accounting for about 62% of all cases [3]. As a result of variations in these ancillary investigations, they are not pathognomonic in diagnosis but investigations like ESR and most especially CRP are helpful in surveillance of treatment response[1].

4. CONCLUSION

In conclusion, cervical pyogenic spondylitis is a rare, serious neurological condition that may be life-threatening. In the diagnosis of patients who present with persistent neck pain and fever, it is important to consider pyogenic spondylitis and to look for high signals on T1W+C and T2WI. Other ancillary investigations are not sensitive as MRI but can be used in surveillance of treatment progression.

5. RECOMMENDATIONS

It is recommended that patients with persistent neck pain despite therapy should have an MRI done. It would help in early diagnosis and prompt therapy.

6. LIMITATION OF STUDY

The limitation of this study was other imaging modalities like neck radiographs were not acquired and also a bone biopsy was not done to fully confirm the diagnosis.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline Patient's consent and ethical approval has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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