A CASE SERIES OF TB SPINE PRESENTING WITH DISSEMINATION: CHALLENGES IN THE DIAGNOSIS AND MANAGEMENT

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ABSTRACT

Disseminated tuberculosis is defined as tubercular disease involving two or more non-contiguous sites due to lympho-hematogenous dissemination of Mycobacterium tuberculosis and can affect any organ system including the spine. The exact global incidence of disseminated TB is not clear. Spinal involvement in disseminated TB commonly affects the dorsolumbar spine which can be attributed to the differential spinal blood flow distribution, higher percentage of which received by the thoracic cord. The diagnosis of disseminated TB with spinal involvement is challenging as the clinical presentation may be non-specific, diagnostic tools for microbiological confirmation may not always be present. These factors contribute to delay in diagnosis and subsequent neurological complications. Hence, we hereby report a case series of three patients with TB spine who were found to have disseminated TB with coexisting pulmonary TB and challenges faced during diagnosis and management.

Key Words: Disseminated TB, Spinal TB, Challenges, Neurological complications
INTRODUCTION

Disseminated TB can result from a progressive primary infection, reactivation of latent TB with subsequent spread and rarely as an iatrogenic cause. It is usually seen in individuals with immunocompromised states like HIV, diabetes mellitus, post solid organ or bone marrow transplant and patients on long term immunosuppressants. The reported incidence in immunocompetent adults is <2% and up to 20% of all extrapulmonary tuberculosis[1]. Skeletal tuberculosis constitutes about 1-3% of extrapulmonary TB with spinal TB accounting for around 40-50% of skeletal TB[2,3]. The most frequent site of infection being the dorsolumbar spine followed by weight bearing joints of lower extremity[4]. TB spine was first discovered by Pott in 1779 which is caused by the haematogenous or lymphatic spread of Mycobacterium tuberculosis[5]. Involvement of the spine can result in significant instability and deformity, mandating the importance of prompt diagnosis and treatment in order to prevent permanent neurologic damage like paraplegia. The incidence of neurologic sequelae in spinal TB has been reported to vary from as low as 10% to as high as 76% [6]. It can involve the vertebral body, paravertebral soft tissues, intervertebral disc and epidural space. The manifestations can range from tuberculous spondylitis, intraosseous and paraspinal abscess formation, subligamentous spread of infection, vertebral body destruction and collapse, extension into the spinal epidural space and intramedullary tuberculoma. The diagnosis of Pott’s spine requires a high index of clinical suspicion and neuroimaging as microbiological evidence may be lacking due to pauci-bacillary nature of the disease. Hence, clinico-radiological features play a major role in the diagnosis of disseminated and spinal TB. We report the following case series of spinal TB with dissemination in view of the diagnostic challenges, modifications in antitubercular therapy and the need for surgical intervention in all the cases.

CASE NO-1

A 29 years old male who is a software engineer presented with the complaints of painful swelling below the nape of the neck associated with constitutional symptoms of loss of weight and loss of appetite for 1 month duration. He had no respiratory complaints and underlying comorbidities. He does not consumes alcohol and was a non-smoker. On examination his BMI was 16.6 kg/m^2 and local examination showed a tender, fluctuant cystic swelling of 4x4 cm below the nape of the neck suggestive of an abscess as depicted in Figure:1(a,b). Systemic examination was normal.
FIGURE 1:

Laboratory investigations were within normal limits. He was found to be HbsAg-positive during the serological workup. After surgical opinion non-dependent incision and drainage of the abscess was performed. Microbiological investigation of pus culture showed coagulase negative staphylococcus (CoNS), AFB smear-no AFB bacilli, GeneXpert- MTB not detected.

After one week of treatment with sensitive antibiotic therapy, he developed an ulcer and swelling adjacent to the wound site [Figure: 1(c)]. In view of the cold abscess and the possibility of cervical spine involvement, MRI of the spine with screening of thorax was done. MRI was suggestive of 1) Lytic lesions noted C6 through T3 vertebral levels with the disease process extending to involve the right 3rd, left 3rd and 4th ribs associated with soft tissue component - prevertebral, posterior subcutaneous space and bilateral apical extra pleural spaces. 2) Nodular infiltrates with linear branching opacities with tree in bud appearance noted in superior segment of left lower lobe [Figure: 2(a, b, c)]
Though microbiologically not proven, anti tuberculous therapy (ATT) with (Isoniazid, Rifampicin, Pyrazinamide, Ethambutol) was started, on the clinico-radiological basis. Orthopedic surgeon opinion was sought and advised for posterior decompression with stabilization of spine along with abscess debridement. Patient was not willing for surgical procedure and was managed conservatively. During follow up visit patient had complaints of swaying while walking and persistent neck pain with deranged LFT (AST-294, ALT-242, ALP-107, GGT-59). As per medical gastroenterologist advice work up for HBsAg positivity showed reactive anti-HBe-Ab and Hep B envelope Ag. Due to the elevated liver enzymes he was switched to modified ATT regimen (Levofloxacin, Ethambutol, Amikacin) and also underwent surgical stabilisation of the cervical spine [Figure:3(a,b)].

Figure 2(a,b): MRI cervical spine - Lytic lesions noted C6 through T3 vertebral levels extending into prevertebral, posterior subcutaneous space.  
Figure 2(c): CT chest - Nodular infiltrates with linear branching opacities with tree in bud appearance noted in superior segment of left lower lobe.
FIGURE 3:

Post operative specimen of pus and tissue was sent for histopathological and microbiological investigation (AFB smear, GeneXpert and MGIT). Despite extensive investigation there was no microbiological confirmation of Mycobacterium tuberculosis. After 2 weeks of modified ATT, his LFT parameters returned to baseline. Initially he was restarted on (Isoniazid-150mg, Rifampicin-300mg, Ethambutol-800mg, Levofloxacin-500mg) followed by (Isoniazid-150mg, Rifampicin-300mg, Ethambutol-800mg, Pyrazinamide-750mg) and finally with full weight based dosage (Isoniazid-300mg, Rifampicin-450mg, Ethambutol-800mg, Pyrazinamide-1250mg with serial monitoring of LFT. The patient showed good clinical response to ATT in the form of weight gain and healing of the skin ulceration [Figure:3(c)].

CASE NO-2

A 22 years old student presented with complaints of cough with expectoration, loss of weight, loss of appetite, evening rise of temperature for the past two weeks and severe back pain, numbness in the legs.
for one week duration. He had no other comorbidities. He was a non smoker and non alcoholic. Neurological examination revealed a right SLR+ 30 degrees and left SLR+ 70 degrees, extensor hallucis longus(EHL) weakness ,sensory loss in dorsum of bilateral foot. MRI spine showed infective spondylodiscitis involving L4-L5 level with left paraspinal abscess[Figure:4(a,b)]. Chest xray showed right upper zone non homogenous opacity[Figure:4(c)]. Sputum AFB smear was positive(2+) and Genexpert-rifampicin sensitive. All baseline investigations were within normal limits. ATT was started followed by L4-L5 disc clearance with Transforaminal Lumbar Interbody Fusion(TLIF-Cage/Bone graft) and posterior stabilization from L4-S1 as depicted [Figure:4(d,e)] as per the orthopaedic surgeon advice. Post surgery he recovered from the neurological deficit.

FIGURE 4:

**Figure 4(a,b): MRI LS spine** - infective spondylodiscitis involving L5-L5 level with left paraspinal abscess.

**Figure 4(c): Chest Xray** - right upper zone non homogenous opacity

**Figure 4(d,e): Post-op Xray LS spine AP and Lateral** - L4-L5 disc clearance with posterior stabilization From L4-S1 with implant in situ
CASE NO-3

A 70 years old male presented with the complaints of difficulty in walking associated with numbness in the cervical area, neck pain, difficulty in grasping and holding objects, blurring of vision and urinary incontinence with no respiratory complaints. He was a known diabetic, hypertensive and hypothyroid on medications. He was a non smoker/non alcoholic. Physical examination showed reduction of wrist extension, forearm flexion, range of movements of neck. CT/MRI of cervical spine showed 1)Spondylodiscitis at C6-C7 level with epidural soft tissue component causing spinal cord stenosis[Figure:6(a,b)] 2)Synovitis of bilateral shoulder joints 3) Nodules and tree in bud appearance noted in bilateral lung fields. Subsequently CT chest showed diffuse 1-3mm nodules with tree in bud appearance in the bilateral lung fields and consolidation in the apical segment of right upper lobe with few mediastinal lymph nodes measuring 8mm[Figure:6(c)].He had no sputum for investigation despite extensive lung involvement. All other investigations were within normal limits except for elevated blood sugar levels. Orthopedic surgeon opinion was sought and advised for decompression and stabilization of C6-C7 vertebra. Since patient refused for any form of interventional procedures, patient was treated conservatively with ATT(Isoniazid,Rifampicin,Pyrazinamide,Ethambutol) based on clinico-radiological features. During follow up there was isolated hyperbilirubinemia(Total Bilirubin-11.18, Direct bilirubin-9.16).Medical gastroenterologist opinion was sought and advised for modified ATT, however patient was lost to follow up.

Figure 6:
DISCUSSION

Tuberculosis, referred to as “Captain of all these men of death” still continues to be the leading cause of death from a single infectious agent worldwide. TB can manifest as pulmonary or extra pulmonary. Disseminated TB though rare can occur in immunocompromised states and can be life threatening. The duration and clinical presentation of disseminated TB is highly variable which results in delay in diagnosis. Disseminated TB may involve organs such as liver, spleen, bones and joints, kidney, adrenals, eyes, and thyroid, spine with or without pulmonary involvement. The clinical presentation of spinal TB may include back pain, stiffness, kyphosis, muscle spasm, weakness/sensory loss, cold abscess and symptoms of cord compression[7]. Delayed diagnosis of TB spine especially with associated dissemination leads to poor prognosis and complications requiring surgical intervention.

MRI is the modality of choice and offers excellent visualization of the bone and soft tissue components of spinal TB including epidural extension as compared to computed tomography. Microbiological evidence for confirmation of diagnosis and to rule out drug resistance should be preferred wherever feasible. Antituberculous therapy (ATT) is the mainstay of treatment. As per the Index TB guidelines for EPTB, the recommend duration of treatment is 12 months of ATT which may be extended to 18 months on case by case basis. Indications for surgery includes imminent cord compression, spinal deformity, resistant to medical therapy, neurological deficit, paravertebral abscess[8,9]. Early surgical intervention is recommended to avoid further instability and neurologic complications. According to GATA(Gulhane Askeri Tip Akademisi) Type IB,II,III patients with or without neurological deficit are indicated for surgical intervention[10]. Surgical management includes anterior decompression and fusion, followed by sequential posterior fusion with instrumentation and posterior fusion with instrumentation, followed by sequential anterior decompression and fusion[11].

In our case series, though EPTB commonly occurs in immunocompromised individuals, two patients were young and immunocompetent. All three patients had disseminated form of tuberculosis involving the spine and lung, though only one patient had respiratory symptoms. The diagnostic confirmation of tuberculosis by microbiology was possible in case-2 (sputum positive for AFB). However in case-1 and
case-3 despite pulmonary lesions in CT chest, there was no microbiological confirmation of TB. Hence the diagnosis was based on the clinico-radiological features. All three patients were initiated on ATT (Isoniazide, Rifampicin, Pyrazinamide, Ethambutol) according to the body weight. After initiating ATT within a month, case-1 and case-3 had deranged LFT and were switched over to modified ATT with regular monitoring of LFT. All three cases needed surgical interventions in view of the neurological complications. Case 1 and 2 underwent decompression/stabilization of the spine following which there was improvement in the neurological status.

Hence from the above case series the diagnosis of disseminated TB with spinal involvement needs a high degree of clinical suspicion, as microbiological confirmation might not be possible in all patients. Therefore early diagnosis based on clinico-radiological features and initiation of ATT is necessary to prevent complications.

CONCLUSION
This case series highlights the importance of considering disseminated TB in all cases of extrapulmonary TB. Due to the slow disease progression and subtle clinical presentation in spinal TB diagnosis is often delayed which results in neurological deficits. Though anti tuberculous therapy is the mainstay of treatment early surgical intervention may prevent permanent neurological sequelae.

REFERENCES


