

## Multifocal Non Contagious and Contagious Spinal Tuberculosis in a Immunocompetent Patient

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### Abstract

Spinal tuberculosis, also known as Pott's disease is a common extrapulmonary manifestation of tuberculosis. It commonly involves the dorsal spine as paradiscal lesion with destruction of intervening disc with subligamentous spreading of the pus. Non contagious spinal tuberculosis (TB) involving the cervical, dorsal, lumbar and sacral region are very rare. Till now, only 4 cases have been previously reported in the literature. We report a rare case of skipped multifocal spinal TB involving the whole spine of a 23-year-old immunocompetent male patient. He presented with back pain and walking difficulty for 5 months with some constitutional symptoms. Initial evaluation with plain radiographs showed collapse of D5 vertebrae with localized angulation. Later on, MRI of the dorsal spine with whole spine screening showed multifocal skipped lesion involving whole spine with presence of huge presacral collection. Percutaneous aspiration of the purulent collection done and tuberculous infection confirmed by Gene Xpert. Patient started anti TB therapy and discharged in an improved state both neurologically and in serological parameters. He was advised to continue medication for a total of 18 months. Multifocal non contagious spinal TB involving the whole spine is rarely reported in the literature, which considered as one of the most atypical presentations of spinal TB. As a differential diagnosis of multifocal lesion of spine, TB should be considered in our context.

**Keywords:** Noncontiguous Multisegment; Skip Lesion; Spinal Tuberculosis.

### Introduction

TB can involve both pulmonary and extrapulmonary sites. Among them, incidence of skeletal involvement is reported in 1-5% of all TB patients [1-3]. Tuberculous spondylitis or Pott's disease is a common extra-pulmonary manifestation of tuberculosis (TB), accounting for 50% of skeletal TB [4]. Clinical features depend upon the region and extent of involvement but constitutional symptoms often arouse suspicion about the possibility of the disease. For the pathogenesis of skip lesions, it is considered that organisms spread through the hematogenous route. Frequently reported cases were involvement of non contiguous involvement

of two levels [5,6]. Previously, there were four reported cases in the literature in which there were non contagious involvement of cervical, dorsal, lumbar and sacral region [7-10]. The unique features of our reported case is that there are involvement of four regions with features of both contagious and non contagious involvement of the spine. There is also simultaneous involvement of the spinal cord, presence of prevertebral, paravertebral and epidural abscess- the combination of which is extremely rare.

### Case Report

#### *Clinical history and physical examination*

A 23-year-old man presented with insidious onset of back pain for 6 months and walking difficulty for 2 months. For last 1 month, he developed urinary incontinence. Patient also complained about evening rise of temperature and weight loss of about 5 kg for last 6 months. On query, there was no history of trauma to the back, any systemic illness, cough, hemoptysis, exposure to known TB patient,

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including his family members. He was non smoker, non alcoholic and no history of drug abuse. Physical examination demonstrated presence of gibbus at the level of D5 and spine tenderness at the same level. Neurological examination of the lower limb revealed, power was 4/5 in both sides, jerks were exaggerated, plantar was bilaterally extensor. Pain, touch and temperature sensations were diminished below D7, which was more marked on left side.

#### Laboratory investigations

Complete blood count revealed red blood cells count, hemoglobin level, and white blood cells count were all within a normal range, except high erythrocyte sedimentation rate which was 92 mm in 1<sup>st</sup> hour. Mounoux test was negative. Aspirated pus was sent for biochemical, cytological, microbiological examination and also for GeneXpert. Pus was milky white in colour, total cell count was 60000 cells/cu. mm, neutrophils: 95%, lymphocytes: 05%, protein: 68 gm/L, sugar: 3 mmol/L. Ziehl-Neelsen Staining showed Acid fast bacilli. GeneXpert for pus examination revealed *Mycobacterium tuberculosis*.

#### Radiological investigations

Chest X-ray revealed no pulmonary lesion but presence of abnormal paravertebral soft tissue shadow. Plain x-ray of the dorsolumbar spine revealed collapse of the D5 vertebral body. MRI

of the dorsolumbar spine with screening of whole spine revealed hyperintense signal change in the C7, D4-D8, L4-L5, S1-S3 vertebrae (Figure 1A). There was complete collapse of D5 body with formation of epidural abscess causing compression of the spinal cord. At this level, there was a small intramedullary tuberculoma (Figure 1B). Paravertebral collections were noted around D4-D6 level. There was huge pre-vertebral collection extending from L4-S3 (Figure 1C) with erosion of anterior part of L4-S1 vertebral bodies. After IV contrast, all of the collections showed heterogenous marginal contrast enhancement.

#### Management

From history, physical examination and radiological investigation, patient started anti TB therapy empirically. Shortly thereafter, percutaneous transpedicular aspiration of pus done from lumbosacral region. About 80 ml of milky white pus was aspirated and sent for biochemical, cytological, microbiological examination and GeneXpert. At 1<sup>st</sup> post-operative day, patients backache become significantly reduced. After 2 months, repeat MRI of dorsolumbar spine with screening of whole spine done. It showed marked reduction of signal change within the vertebral body and diminished size of prevertebral, paravertebral and epidural collection. Intramedullary tuberculoma become reduced in size (Figure 2A). There was also marked reduction



**Fig. 1A:** MRI-T2WI with whole spine screening showing hyperintense signal change at the level of C7, D4, D8, L4-S3 (marked by white arrow). **1B** Showing complete collapse of D5 with intramedullary tuberculoma and epidural abscess with heterogenous enhancement. **1C** Showing huge presacral collection on T2WI.



Fig. 2A: size of the tuberculoma become reduced. There is marked reduction of epidural abscess. 2B showing presacral collection is reduced too.

of the size of pre-sacral abscess (Figure 2B). Due to marked clinical, serological and radiological improvement, patient was discharged to home with the advice to continue 18 months regimen of anti TB therapy, mobilization with Taylor brace and regular follow-up with Plain x-ray of dorsolumbar spine, MRI of the dorsolumbar spine with whole spine screening to detect aggravation of kyphotic angle, state of compression over the spinal cord which will necessitate for operative decompression and fixation. During hospital course, patient received anti TB chemotherapy, including rifampicin (450mg/day), isoniazid (300mg/day), ethambutol (750mg/day), pyrazinamide (750mg/day) and Inj. Streptomycin (1 gm)-IM daily. Repeat laboratory test results showing his ESR is reduced to 21mm in 1<sup>st</sup>hour, hemoglobin level 12.2 g/dl and significant improvement of systemic TB symptoms within 2 months of starting anti-tubercular therapy. Our final diagnosis was an atypical presentation of both skipped and contagious multifocal tuberculosis of the spine.

## Discussion

Among the extrapulmonary manifestations of tuberculosis, vertebral body infection accounts for 3% to 5% of the patients. It is the most common form of musculoskeletal TB and accounts for 1% of

all tuberculosis cases, and 50% to 60% of osseous TB affecting the skeletal system [11-14]. Although, thoraco-lumbar junction is the most common site of involvement but any part of the spine can be affected. Involvement of the craniovertebral junction, cervical spine, sacral area, non contagious skipped lesions and intramedullary tuberculoma are considered atypical and rare presentations [7-9]. In case of multiple non contagious lesion the rate of involvement is more in lumbar spine followed by thoracic spine [15].

There is wide diversity of clinical presentation of spine TB which ranges from non specific constitutional symptoms with back pain to severe neurological deficit or even death-if there is involvement of craniovertebral junction [16,17].

In the modern era, due to increased awareness of the people and availability of the modern diagnostic tools like- CT scan and MRI, atypical spinal TB without typical clinical and imaging features can be detected earlier. Incidence of atypical spinal TB ranges from 2.1% to 5% of all spinal TB cases and the skip lesions type was the most common atypical pattern [5,18]. In some centre, routine screening of whole spine was not performed. In that case 16.3% used bone scan scintigraphy before starting anti-TB therapy. Recent studies showed the incidence of multiple levels noncontiguous vertebral TB was 71.4%, which is higher than

previously reported studies when whole spine screening MRI was not done for suspected TB infection [15,18]. The reasons for the high incidence of the noncontiguous skipped lesions may be due to the high prevalence of TB in the specific geographical area, delayed presentation due to lack of awareness, hematogenous dissemination from primary foci, availability of diagnostic tools and routine recommendation of whole spine MRI screening film in some centers [19-22]. It is also reported to be a manifestation of HIV infection and multidrug resistant TB (MDR-TB)[7].

Non contagious lesions involving cervical, dorsal, lumbar and sacral levels is extremely rare. Till date, there have only been 4 reported cases of such extensive involvement (Table 1). All of them showed diverge clinical and radiological presentations but none of their cases had simultaneous presence of intramedullary tuberculoma. Our reported case showed non contagious involvement of all spinal level, all four radiological types of spinal TB(central, paradiscal, anterior and appendicular) and presence

of intamedullary tuberculoma at the level of D4. To our knowledge, this is the 1<sup>st</sup> reported case of having such a wide range of radiological variability in a single patient. For this kind of skipped lesions without the involvement of intervertebral disc, some patients may be misdiagnosed as a case of metastatic tumor, multiple myeloma or lymphoma by the radiologists. Momjian and George [23] demonstrated that this form of multiple levels noncontiguous vertebral TB sometimes associated with extra-spinal skeletal involvement. In that case, careful history taking, physical examinations and related serological examinations will aid the diagnosis. MRI with contrast is widely used investigation tool to differentiate spinal TB from other mimics. On MRI, lymphoma appears as focal or diffuse vertebral lesions which is hypointense on T1WI, mostly hyperintense or variable T2WI, having heterogeneous enhancement after giving I.V contrast. There may be presence of paraspinal mass but there is no extensive cortical bone destruction [23]. In case of spinal metastasis, the disc spaces are

**Table 1:** Previously reported cases of non contagious multifocal spinal tuberculosis involving cervical, thoracic, lumbar and sacral vertebrae.

Author	Year	Age Sex	Clinical features	Site of involvement	Treatment Modality	Follow-up
Emel et al.[7]	2006	17 F	Neck and back pain,dysphagiaspastic paraparesis,sensory level at L1, bilateral cervical lymphadenopathy	Cervical:C2-C4 Thoracic:T1,T2,T7,T8,T12 Lumbar: L1,L2,L3 Sacral: S1,S2	1.corpectomy of T1,T12,abscess drainage,anterior strut grafting&T10-L1 instrumentation 2.T8,T9,L2,L3 posterior instrumentation 3.C4 subtotal corpectomy,c3-4 discectomy & iliac autografting	After 32 months,no new kyphosis and resorption of epidural abscess
Thawani et al.[8]	2011	19 M	Neck &back pain,tender swelling at lumbosacral region,reduced motor power at right lower extremity	Cervical: C5 Thoracic: T6,T8 Lumbar: L5 Sacral: S1,S2 Others: Left iliac bone	Surgical decompression of cervical spine	After 24 months, mobilization without support
Wang et al.[9]	2015	25 M	Neck & back pain,spastic quadriparesis,sensory level at C5	Cervical: C3-C6 Thoracic: T2-T5 Lumbar: L1,L2,L5 Sacral: S1,S2	Surgical decompression,screw fixation and bone graft fusion of cervical spine	After 12 months,circular bone lesions healed &epidural abscess resolved
Wu et al.[33]	2018	33 M	Back pain, tenderness at lower thoracic vertebrae, power normal,no sensory level	Cervical:C5 Thoracic: T1-T5,T7-T12 Lumbar: L1-L5 Sacral: S1	No surgical intervention Anti TB for 12 months	After 18 months,epidural abscess and bone lesions become healed
Present case	2018	23 M	Back pain, spastic paraparesis, sensory level at D7	Cervical:C7 Thoracic: T4-T6,T8-T9 Lumbar: L4-L5 Sacral: S1-S3 Other: intramedullary tuberculoma at the level of D4	Percutaneous transpedicular aspiration of presacral collection Anti TB regimen of 18 months is going on	After 2 months, repeat MRI showed marked resolution of the lesion

usually spared and usually, there is involvement of pedicle [21,24,25]. However, Khattry et al. [26] reported a case of tuberculous spondylitis which was misdiagnosed as a neoplastic disease because of the involvement of multiple non contagious vertebral bodies and pedicles with sparing of the intervertebral discs. According to their statement, absence of paravertebral collection favors a neoplastic lesion while the presence of paravertebral lesion/collection with contrast enhancement favors the possibility of a tuberculosis. Sinan et al. [27] reported that 10% of their cases were radiologically appendicular type where there will be isolated involvement of vertebral arch. In 2011, Zheng et al [28] reported a case of spinal metastasis whose imaging mimics spinal TB. CT scan will reveal condition of the vertebrae and aid diagnosis by facilitating CT guided FNAC from which granulomatous inflammation and TB bacilli can be detected. However, MRI is superior to other radiologic methods because it can detect extent of the spinal involvement, state of cord compression, subligamentous spreading of pus and other soft tissue involvement [15,18,21].

Considering patient's neurological status and imaging features, both operative and conservative measures or only conservative treatment can be given in case of multifocal skipped lesions [Table 1]. Indications for surgery were the presence of definitive spinal cord compression with progressive deterioration of the neurological status, persistent neurological deficits despite anti-TB treatment, spinal instability, severe kyphotic deformity and large paravertebral or retropharyngeal abscess [29-31].

Emel et al. [7] showed both conservative and surgical intervention in different sittings were required for his patient for better outcome. The girl underwent corpectomy of T1 & T12, abscess drainage, anterior strut grafting & T10-L1 instrumentation followed by T8, T9, L2, L3 posterior instrumentation in one sitting. After that, for cervical involvement C4 subtotal corpectomy, c3-4 discectomy & iliac autografting done. There was significant neurological improvement after 32 months follow-up. Huang et al. [32] analyzed 23 cases of multiple noncontiguous spinal TB, all of which received surgical intervention along with standard anti TB regimen. At followup all of the cases were improved neurologically. Patients without neurologic deficit, medical therapy is the treatment of choice, and surgical intervention may be considered for neurological deterioration. Wu et al. [33] showed complete neurological recovery without surgical intervention. Diagnosis

and treatment at early stages would resolve the neurological deficits in about 40% of cases. In summary, only conservative or both conservative and surgical intervention in cases of non contagious skipid lesion showed better outcome in follow-up [7-9,33]. In our case, percutaneous aspiration of presacral abscess done and patient was advised with taylor brace and anti TB for total of 18 months. If there is neurological deterioration, patient will undergo surgical intervention.

## Conclusion

Most of the reported cases of noncontiguous multiple spinal tubercular lesions involve only 2 or 3 levels. Till date, multifocal extensive spinal TB involving the whole spine is rarely reported in the literature. Our case possesses involvement of cervical, dorsal, lumbar and sacral region with presence of intramedullary tuberculoma. There was also presence of all four radiological types of pott's disease which gives this case as unique example of atypical pott's spine. So, proper history taking, careful physical examination, both CT scan and MRI with whole spine screening film helps in diagnosis and proper management of the patient.

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