

CASE REPORT

Paediatric Cervical Spine Tuberculosis: A Diagnostic Dilemma!

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DISCLOSURE

Conflict of interest: None

ABSTRACT

Tuberculosis (TB) is still a problem in Paediatrics practice. Diagnosis of extra-pulmonary tuberculosis in children has remained difficult despite the gains made by newer TB diagnostic investigations. We report a twelve-year-old female, with a history of neck pain, fever, headache and weakness of all the limbs. The results of TB diagnostic investigations were all negative and the child was treated for meningitis with no clinical response. However, she responded only to a therapeutic trial of anti-TB drugs with improvement of motor function of all the limbs. The child had completed 12 months anti-TB chemotherapy for extra-pulmonary tuberculosis with full recovery of all the neurological deficits. Currently she is on follow up.

A high index of suspicion is needed for diagnosis and care of rare/emerging extra-pulmonary tuberculosis in childhood.

Keywords: Cervical spine, Tuberculosis, Quadriplegia, Child, Nnewi

INTRODUCTION

Early reports of spinal tuberculosis (TB) in Nigeria dates back to 1963 and 1967 by Konstam and Dickson respectively.^{1,2} There have been few case reports of spinal TB in Nigeria in recent times.^{3,4} Most of the reported spinal TB cases occurred in thoraco-lumbar region which is the most common site of

spinal TB.⁵ Most of the reported cases occurred in adults and very few were reported among Nigerian children.⁶

TB of cervical spine is very rare and comprises about 2-3% of spinal TB.⁷ Cervical spine TB in children is very rare worldwide, few reports of cervical spine TB in children were noted in

medical literature in recent times,^{8,9} and very rare in Nigeria. Cervical spine TB is the most dangerous spinal TB with consequent neurological complications associated with delayed diagnosis. Here we presented a case report of cervical spine TB with quadriplegia, in a twelve-year-old Nigerian female, posing a diagnostic dilemma on presentation!

CASE REPORT

The patient is a twelve-year-old female from a low socio-economic class home in a rural community in South-East Nigeria. She presented with a history of neck pain of 4 weeks, fever and headache of 3 weeks and weakness of all the limbs with inability to walk of 2 days prior to presentation.

On examination, she was pale, weak, had normal muscle bulk but hypotonic in both upper and lower limbs. Her muscle power was grade one in all the limbs. There was restricted neck movement because of neck pain. She was initially managed as a case of meningitis with sequelae.

The results of TB diagnostic investigations like Manteaux test, sputum Acid Fast Bacilli (AFB), GeneXpert test for Tuberculosis were all negative. Complete blood count done showed increased white blood cell count, neutrophilia and toxic granulation with left shift; mild hypochromia, microcytosis and anisocytosis of the red blood cells. Erythrocyte Sedimentation Rate (ESR) was high. HIV I and II screening were non-reactive. Histologic findings of cervical spine bone/marrow biopsy were normal; chest-x ray was normal but cervical spine x-ray revealed anterior wedge collapse of cervical spine vertebral bodies with reversal

of cervical lordosis and increased pre-vertebral soft tissue shadows.

The child being anaemic was transfused with one unit of cross-matched whole blood. He was also placed on Gardner-Wells' tong traction connected to 2kg weight. She received meningitic dose of intravenous (IV) ceftriaxone, IV gentamicin and IV metronidazole for 2 weeks without any clinical response. She responded only to a therapeutic trial of anti-TB drugs using adequate doses of Isoniazid, Rifampicin, Pyrazinamide and Ethambutol with pyridoxine as an adjunct.

Figure 1. X-ray showing wedge collapse of cervical spines vertebrae bodies before Anti-TB Therapy



Figure 2. Cervical spine X-ray after Anti-TB Therapy with significant cervical spine vertebral body regeneration.



Three weeks after the commencement of the anti-TB drugs, there was marked improvement of motor functions in all the limbs as muscle tone became normal and muscle power improved from grade one to grade three. Later, child had full power (grade 5) in all the limbs with continuation of anti TB therapy. He had completed 12 months anti-TB therapy for extra-pulmonary tuberculosis with full recovery of all the neurological deficits. Repeat complete blood count results at full recovery were normal. There was significant regeneration of the body of cervical spines on repeat cervical spine x-ray at recovery (Figures 1&2). She has been on follow-up for about 3 years with normalization of repeat ESR results. The child had commenced school with full social integration.

DISCUSSION

Spinal tuberculosis occurs following hematogenous spread of *Mycobacterium tuberculosis* via the intraosseous venous system, paravertebral venous process and arterial plexuses. One or more vertebrae can be involved with or without the involvement of intervertebral disc, depending on the degree of affectation and the potency of the individuals' immune system. Characteristically there is destruction of the adjacent vertebral bodies, collapse of the spinal elements and intervertebral disc space distorting the spinal column, causing spinal deformities that can impinge on the neural tissue with neurological sequelae as a late complication.¹⁰ Similar findings were seen in the index case as the child presented with weakness of all the limbs and inability to walk.

The early clinical presentations of spinal tuberculosis include local pain as seen in the

index case, stiffness and spasm of the surrounding muscles. There could be gibbus and cold abscess which can track down to present as a soft tissue swelling which could be retropharyngeal in cervical spine affectation and psoas abscess in thoraco-lumbar spine affectation. In cervical spine tuberculosis, the earliest signs are that of spinal cord and/or spinal nerve root compression like pain, numbness, weakness and later, neurological complications like quadriplegia and /or quadriparesis. Similar findings were noted in the index case; hence high index of clinical suspicion is needed to make early clinical diagnosis of cervical spine tuberculosis in the absence of supportive diagnostic laboratory results as noted in the index case.

Cervical spine TB is rare with incidence ranges of between 2% to 12% in a patient with primary TB infection.¹¹ Forty-six percent of cervical spine TB occurs in the cervico-thoracic junction making it the commonest site of cervical spine TB, while 33% and 21% occurs in the Atlanto-axial complex and mid-cervical spine, respectively.¹² Most patients with spinal TB present late with neurological complications and features of spinal deformity with poorer prognosis. Hence, clinicians need a high index of suspicion to make a clinical diagnosis of cervical spine tuberculosis (CSTB) because of the non-specific nature of the early features of the disease.

Most diagnoses of CSTB are made late when the patient had developed neurological sequelae or cold abscess formation and/or spinal deformity. Research has shown that neurological complications following spinal TB varies from 10% to 43% of the cases.¹³ So,

prompt clinical diagnosis demands high index of suspicion.

Spinal TB can be suspected depending on characteristic spinal neuroimaging finding using x-ray, Computed-Tomography (CT) scan and/ or Magnetic Resonance Imaging (MRI) of the spine as seen in the index case spinal x-ray.¹⁴ Aetiological diagnosis is made by demonstration of acid- fast bacilli on microscopy or culture of the biopsy lesion. This was not demonstrated in the index case as the TB diagnostic test done were all negative. The negative results of TB diagnostic tests may be caused by immunosuppressive state of TB, as the child could not mount enough immunological response to respond positive to the TB diagnostic tests.

Other tests that may enhance diagnosis include Polymerase Chain Reaction (PCR), Manteaux test, GeneXpert and ESR. Chest x-ray is also advocated as there could be concomitant pulmonary TB in 67% of patient with spinal TB.¹⁵

The World Health Organization (WHO) protocol for treatment of spinal TB includes the use of standard dose of anti-TB drugs for 12 months, using rifampicin, isoniazid, ethambutol and pyrazinamide. This was the protocol used for the index case. Surgical decompression and spinal stabilization should be considered in cases with major vertebrae body destruction.

Prognosis of spinal TB is generally good for patient that did not have neurological deficit nor deformity. Studies have shown that only 82-95% of spinal TB had pain relief with improvement of neurologic deficit and spinal deformity with medical treatment alone.

About 8% of the patient will need spinal surgery as well as the medical treatment. Luckily, the index case did well without spinal stabilization surgery.

CONCLUSION

Clinicians should be armed with high index of suspicion for possibility of TB spine in any patient with history of chronic pain in the spine even in the absence of neurological deficit and signs of spinal cord compression. TB screening test results may also be negative in a patient with TB spine as seen in the index case especially in paediatric patients.

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