

Original Article

Spinal Tuberculosis Presentations Among Adults: Findings from A Federal Tertiary Health Facility in South-East Nigeria

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ABSTRACT

Tuberculosis, an antique disease with modern relevance, continues to increase in prevalence. Spinal tuberculosis is a common extrapulmonary form of the disease. We retrospectively studied adult (≥ 18 years) patients diagnosed with Pott's disease at the Federal Medical Centre, Owerri between January 2015 and December 2019. Their demographic data, clinical profiles and outcomes are reported. A total of 18 patients were studied comprising an equal number of males and females with an age range of 20 to 64 years and a mean (standard error of the mean) age of 38.5 ± 4.4 years. Majority (38.9%, n=7) of the participants were students. Two-thirds of the patients had spinal disease only and in another one-third combined pulmonary and spinal with, chest radiograph demonstrated radiographic features of pulmonary tuberculosis. A gibbus was present in 5 (27.8%) of the patients and commonest radiographic abnormality was lumbar collapse (76.9%, n=10). The mean (SEM) erythrocyte sedimentation rate of the patients was 81 ± 28.9 mm/1st hr Westergren. All patients underwent a 12-month combination therapy (regimen 2 months of isoniazid, rifampicin, pyrazinamide and ethambutol/10 months of isoniazid and rifampicin) with good outcomes. Spinal tuberculosis remains a prevalent presentation of tuberculosis in the developing world and poses a serious risk of neurological sequelae, if detected and/or treated late. A high index of suspicion alongside early diagnosis, initiation and completion of treatment are imperative to achieving good outcomes.

Keywords: Adult, Pott's, Spine, Tuberculosis, Nigeria

INTRODUCTION

Tuberculosis (TB) has remained a topical disease demonstrating increasing incidence and prevalence despite its antiquity. Spinal tuberculosis is the commonest extrapulmonary form of TB affecting the bone and joints, making up about 1 – 2% of all forms of TB and approximately half of all forms of osteoarticular extrapulmonary TB.^{1,2} The driving factors for the persistence of TB globally include poverty, malnutrition, extremes of age, smoking,

alcoholism, immunosuppressive states including that from HIV, drugs and diabetes, as well as multidrug resistance.¹⁻⁴

The burden of TB remains significant, especially in the developing countries of the world. In 2019, an estimated 10 million persons were diagnosed with TB, two-thirds of which were from 8 countries (India, Indonesia, China, Philippines, Pakistan, Nigeria, Bangladesh and South Africa).⁵ An estimated 1.4 million deaths comprising 1.2 million

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HIV-negative and about 0.2 million HIV-positive TB related deaths were reported in that same year. Also, about 3.3% of new cases of TB and 17.7% of previously treated TB were found to be multidrug-resistant (MDR-TB) or rifampicin-resistant (RR-TB) in 2019.⁵ The diagnosis of spinal TB hinges on the recognition of typical clinical and neuroimaging features which should lead to treatment as soon as possible to avoid the neurological sequela of paraplegia.^{3,6}

Pott's disease is one of the oldest diseases known to man, having been described in archaeological Egyptian art and mummies as early as almost 6 millennia ago.⁷ It is more popularly known by its eponymous moniker *Pott's disease* after Sir Percival Pott who, in his 1776 monograph, described the classical destruction of disc space and contiguous vertebral bodies that characterizes spinal tuberculosis.⁷

We present a retrospective study of 18 patients with diagnosis of Pott's disease managed in our facility between 2015 and 2019 (5-year period).

MATERIALS AND METHODS

This was a hospital-based, retrospective review of 18 patients who were admitted to the Chest Unit of the Federal Medical Centre, Owerri between January 2015 and December 2019 for Spinal TB. Federal Medical Centre, Owerri is one of the tertiary health institutions in Imo state, Nigeria and serves as a referral centre for the state and parts of other neighbouring states. The hospital also serves as a treatment centre for the national TB program studied.

Case notes of these patients were retrieved from the Medical Records Unit of the hospital and reviewed. The sociodemographic characteristics of the patients including age, sex and occupation and their clinical presentations such as low back pain, paraparesis, neck pain, gibbus and abnormal chest findings were documented. Results of the haematological, biochemical and radiological tests they carried out in the course of their evaluation and follow up were also documented. Patients below the age of 18 as well as those whose diagnosis was not clear were excluded from this study.

Data were transferred from the hard copy to a Microsoft Excel® sheet, coded, and cleaned up. Afterwards, data was exported to the IBM Statistical Product and Service Solutions (IBM SPSS) version 22.0 (Armonk, NY: IBM Corp.) for Windows. Descriptive analysis was employed and presented in tables while categorical variables were expressed in total numbers and proportions.

RESULTS

A total of 18 patients were studied. This consisted of 9(50%) male and 9(50%) females whose ages ranged between 20 and 64 years (mean (SEM) = 38.5 ± 4.4 years).

Majority of the study participants were students – 7 (38.9%), while 3 (16.7%), 2 (11.1%), 3 (16.7%) and 2 (11.1%) were civil servants, teachers, farmers and traders, respectively.

Twelve (66.7%) of the patients had symptoms suggestive of TB spine alone. All 12 patients had complaints of low back pain while 1(5.6%) patient complained of neck pain. On the other hand, six (33.3%) of the studied patients had symptoms suggestive of concomitant spinal and pulmonary TB. The commonest finding on physical examination was gibbus which was present in 5 (27.8%) of the patients (Table 1). Other physical findings elicited included spastic paraparesis and scoliosis, which were found among 3(16.6%) and 2(11.1%) of the patients, respectively (table 1).

Among the 6 (33.3%) patients with symptoms suggestive of both spinal and chest TB, five (83.3%) had abnormal findings on chest examination while all 3(100%) patients who had chest radiography done had features suggestive of pulmonary TB (table 2).

However, lumbar collapse and sacralisation were found in 10 (76.9%) out of 13 patients who underwent spine radiography. Other radiological findings present included thoracic (T9 – T12) spinal collapse (4; 30.8%) and cervical (C3 – C7) anterior/marginal osteophytes (1; 7.7%) Granuloma, vertebral and paravertebral abscesses, as well as cord compression were seen in all three (3) patients

who underwent magnetic resonance imaging (MRI) of the spine (table 2).

Mantoux test was significant (>10mm) among 2(33.3%) of the 6 patients tested, while Xpert MTB/RIF test was negative in the two patients who underwent the test. Two (13.3%) out of 15 patients screened for HIV were reactive. The mean (standard error of the mean) erythrocyte sedimentation rate (ESR) of the patients was $81 \pm 28.9\text{mm/1}^{\text{st}}\text{hr}$ Westergren.

All the patients underwent combination chemotherapy comprising 2 months intensive phase of a fixed drug combination of Isoniazid (5mg/kg), Rifampicin (10mg/kg), Pyrazinamide (25mg/kg) and Ethambutol (20mg/kg) (2HRZE) and 10 months continuation phase of combination Isoniazid and

site, usually the lungs or lymph nodes or intrabdominal viscera, and may remain dormant for a while.^{1,6} A shared blood supply of adjacent vertebrae and the subligamentous route of spread leads to involvement of contiguous vertebrae.^{1,2,4} The vertebral discs appear to be more involved in earlier life compared to later on when they have lost their vascularity.⁴ This, coupled with the non-proteolytic nature of *Mycobacterium tuberculosis* infections compared to other pyogenic bacteria, explains the tendency for an absence of ligament involvement and discitis in older populations.^{3,4} Disc involvement is usually late and a paradiscal vertebral body collapse gives rise to the characteristic gibbus.^{3,4} Although any region of the spine may be involved, the thoracolumbar vertebrae are the commonest site of involvement while the atlantoaxial region is rarely involved (<1%).^{1-4,6}

This study demonstrated an equal gender involvement. While this may be due to the number of patients studied, it is in contrast to several studies that have reported majorly male⁹⁻¹¹ or slightly female^{14,15} predominance. The affected demographic in this study was predominantly young to middle aged adults, indicating a significant economic impact of the disease on the society from the man-hours lost. Our study reported a higher student proportion (38.9%) than that reported by Njoku et al (9.8%).⁹ This might not be unconnected to the pattern of schooling habits in the regions the studies were carried out, viz Southeast and Northwest Nigeria, respectively. Unsurprisingly, studies with a substantial proportion of children may buck this trend and report a higher proportion of patients in the younger age groups.^{8,13,14}

Back pain was the commonest reported symptom in our series, a finding consistent with most earlier reports.^{9,13,15} Owolabi *et al*¹¹ reported a higher prevalence of paraplegia/paraparesis (100%) than in this study (16.6%) as in the studies by Njoku *et al*⁹ (46.7%) and Ikem *et al*¹⁵ (47.1%). This may reflect the delay in presentation to the hospital and invariably affects the expected prognosis. It is an index of the health seeking behaviour of the affected individuals, the insidious nature of the disease process and the relative unavailability of the

Table 1: The pattern of clinical presnetation among the patients

Clinical features	Frequency (%)
Low Back Pain	12 (66.6)
Paraparesis	3 (16.7)
Neck Pain	1 (5.6)
Gibbus	5 (27.8)
Abnormal Chest Examination Findings	15 (83.3)

Table 2: Radiological findings among the patients

Imaging Modality	Finding	Frequency (%)
Chest x-ray (n = 3)	Apical fibrosis/cavitation	3 (100)
Spine x-ray (n = 13)	Lumbar collapse	10 (76.9)
	Thoracic collapse	4 (30.8)
	Cervical osteophyte	1 (7.7)
Spine MRI (n = 3)	Granuloma, abscess, cord compression	3 (100)

DISCUSSION

This study characterised 18 patients who were treated for Pott's disease over a five-year period in a south-eastern tertiary facility. The patients were relatively young with low back pain as a major presentation. While a majority of the participants had predominantly spinal disease, a third had concomitant pulmonary disease. Lumbar collapse was a frequent presentation on spinal radiography while paravertebral abscesses with cord compression was present on magnetic resonance imaging in those who were imaged. Spinal tuberculosis infection follows haematogenous or lymphatic spread from a primary

necessary diagnostic tools.⁹

A third of the patients had concomitant pulmonary disease which was evident radiologically but not by sputum testing. Owolabi *et al*¹¹ and Sholagberuet *al*¹⁴ both reported relatively lower proportions (11.5% and 11.1%, respectively) of coexistent pulmonary TB in their series on Pott's disease. The possibility of the coexistence of these two states of the disease is sufficient to warrant a routine search for pulmonary TB in all cases of suspected Pott's disease as it has implications for infection control.¹⁷

The lumbar region demonstrated the most abnormalities (lumbar collapse and sacralisation) on radiography in our series, followed by the lower thoracic region and lastly, the cervical spine. This finding is consistent with what has been reported in literature.^{4,6,8,10,12} Imaging is a cornerstone in the diagnosis and management of spinal tuberculosis. Plain radiography may delineate earlier changes to the disc such as haziness long before the characteristic destruction of the vertebral bodies sets in.^{3,4} Magnetic resonance imaging is a more sensitive test than either plain radiography or spinal CT and is mandatory in the setting of neurological impairment.^{3,4} Its utility is limited in resource poor contexts, however.^{9,11,12}

Supportive imaging of the lungs may assist in the differential diagnosis of spinal tuberculosis. It might be difficult to differentiate metastatic spinal disease from spinal TB even on MRI.^{4,17} Attempts to defuse this tension have led to the generation of algorithms to distinguish spinal TB from spinal metastases. One of such has shown that scores of ≥ 7.5 from a composite of night pain, inflammatory markers, tumour marker levels, presence of skip lesions and intervertebral space destruction favoured a diagnosis of spinal TB over spinal metastases.¹⁸

Elevated inflammatory markers characterised the patients in our series and was higher than those reported by Sholagberuet *al*.¹⁴ Modest diagnostic characteristics have been reported of the polymerase chain reaction-based tests such as GeneXpert (Xpert MTB/RIF, Cepheid, Sunnyvale, California) on tissue samples in osteoarticular tuberculosis.^{1,3,4} The tuberculin skin test tends to be elevated in one- to two-thirds of cases of Pott's disease.^{9,11} The utility of these

tests, including the more sensitive blood-based interferon gamma release assay, is significantly hampered in endemic areas where latent TB is prevalent.³

CONCLUSION

Tuberculosis of the spine remains a significant cause of morbidity. Poverty drives the late presentation of most sufferers, despite apparently improving access to care. Multidisciplinary management underlies successful treatment and rehabilitation of spinal TB underpinned by effective combination chemotherapy once it is started early.

Recommendations

A high index of suspicion in diagnosing spinal tuberculosis and initiation of early treatment of the condition with prompt neurorehabilitation is necessary to curb the morbidity and mortality associated with Pott's disease specifically, and tuberculosis, in general.

Conflict(s) of interest(s)

The authors have no conflict of interest to declare.

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