Tuberculosis Of The Spine In Nigeria: Has Anything Changed?
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Citation

Abstract
Background: Tuberculosis of the spine remains a major health problem in developing countries. Despite its prevalence there have been few reports of its presentation and prognosis in Nigeria.

Objective: To review the patterns of presentation, available treatment methods and outcome of tuberculosis of the spine at our centre.

Methods: A retrospective review of all patients with tuberculosis of the spine seen at Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife from 1st January 1999 to 31st December, 2005 was carried out. The clinical features, laboratory test results, radiologic features, treatment methods and outcome were analyzed.

Results: A total of 62 patients with Tuberculosis of the spine were seen and treated during the study period out of which 49 had complete information suitable for analysis. These consisted of 24 males (49%) and 25 females (51%) with a mean age of 32.8 + SD. Students (30.6%) and traders (26.5%) were the most affected groups. Back pain (85.7%) and weakness of the lower limbs (87.7%) were the commonest presenting complaints. The most commonly involved region of the spine was the lumbar spine (49%) with 37 patients (75.5%) having multiple consecutive vertebral involvement. The commonest radiographic pattern was wedge collapse of the vertebral bodies and destruction of the intervertebral disc (63.3%). Human Immunodeficiency Virus (HIV) screening was confirmed positive in 2 (7.4%) out of 27 patients that had the test. Only 24 patients (49%) had satisfactory healing with no persisting spine deformity or paraplegia.

Conclusion: The incidence of tuberculosis of the spine continues to rise. The outcome of the modalities of management presently available is unsatisfactory. There is need to improve the facilities for spinal surgery so that our patients can maximally benefit from a combination of surgery and chemotherapy.

INTRODUCTION
Tuberculosis is an ancient infection that has plagued humans throughout recorded and archeologic history. It is still very much with us today. The infection remains the cause of a higher morbidity and mortality than any other infection in the world, especially in the densely populated developing countries. At least 80 per cent of the approximately 3 million that die annually are in the developing countries. Tuberculosis is therefore a major health problem and it will be difficult to eradicate so long as poverty, overpopulation and malnutrition remain with us. The prevalence of tuberculosis is also rising in the industrialized world like the United States of America. Factors that have been blamed for the rise include an increase in the number of people who have immunosuppression from HIV/AIDS and the development of drug resistant strains of mycobacteria. This rise has been associated with a concomitant rise in the number of adults and children with bone and joint tuberculosis. In developing countries tuberculosis of the spine remains a major health problem. It is the most common and most dangerous form of musculoskeletal tuberculosis. Delay in establishing diagnosis and management cause spinal cord compression and spinal deformity. Tuberculosis is the most frequent cause of nontraumatic paraplegia in most parts of Africa. Early diagnosis is therefore essential to avoid its devastating complications especially paraplegia.

After the early reports of spine tuberculosis in Nigeria by
Konstam, and later by Dickson, there have been few reports on its presentation and prognosis despite its prevalence in Nigeria. The scant attention paid to this disease in the literature is potentially dangerous.

Since the last report from our centre, some diagnostic facilities like the Computerized Axial Tomography Scan have been acquired. This review has been carried out to determine if anything has changed in the presentation, available modalities of management and outcome of spine tuberculosis at our centre.

PATIENTS AND METHODS

The records of all patients with spinal tuberculosis seen and treated in the Department of Orthopaedic Surgery and Traumatology of Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria from 1st January 1999 to 31st December 2005 were retrospectively analyzed. The hospital is located in Ile-Ife, an urban town in the South Western Nigeria, and serves a population of about 2 million. Apart from being a University town, most of the inhabitants are farmers and traders.

The data were extracted from the Orthopaedic wards, Medical Records Library and Radiology Department. The data included age, sex, occupation, presenting clinical features and duration, features on plain radiograph and Computerized Tomography scan (CT scan) of the spine level affected, number of vertebrae and pattern of destruction. Others were Erythrocyte Sedimentation Rate (ESR), Mantoux test and Human Immunodeficiency Virus (HIV) screening. The modality, duration and outcome of treatment were documented. The diagnosis was based on the clinical presentation, imaging features, and histology of biopsy specimen. All the patients were treated with a combination of antituberculous drugs which included streptomycin, Rifampicin, Isoniazid (INH), Ethambutol and Pyrazinamide. A combination of at least 3 of these drugs was used for each patient. When indicated, spinal support (with scotch cast), hospitalization with traction and Physiotherapy were other modalities of treatment. All patients with paraplegia were admitted while those without were treated as ambulatory outpatients. Patients with Para spinal swellings had CT or ultrasound guided drainage of the abscesses.

The patients were monitored and followed up using clinical features (disappearance of back pain and fever, neurologic status of the limbs and sphincteric function, correction or disappearance of spinal deformity or paraspinal swelling), Serial ESR measurement and x-ray of the spine. We regard healing as disappearance of all systemic features of spinal tuberculosis, disappearance of back pain, absence of local tenderness, resolution of abscesses, healed sinuses and return of painless motion of the spine. This also included return of erythrocyte sedimentation rate to normal level and remineralization and return of bony trabeculae on plain radiograph of the affected vertebrae. Patients with incomplete data in their records were excluded from this study.

RESULTS

A total of 62 patients with Tuberculosis of the spine were seen and treated during the study period. Forty-nine patients had complete information suitable for analysis in their clinical notes representing 79%. These consisted of 24 males (49%) and 25 females (51%). This was about 7 patients per year. The age range was 3 months to 70 years (mean = 32.8 years ± SD). Fig.1 shows the age and sex distribution of the patients.

Figure 1

Figure 1: Age and Sex Distribution of Tuberculosis of the spine patients

The youngest patient, who was the first perinatal spinal tuberculosis from our centre, also had pulmonary tuberculosis. The occupations of the affected patients are shown in Figure 2.
Figure 2
Figure 2: Occupation of Patients with Tuberculosis of the Spine (N =49)

1. Students 15 (30.6%)
2. Trading 13 (26.5%)
3. Farming 9 (18.4%)
4. Teaching 5 (10.2%)
5. Driving 3 (6.1%)
6. House wife 2 (4.1%)
7. Clergy 2 (4.1%)

Students (30.6%), traders (26.5%) and farmers (18.4%) were most commonly affected. Back pain (85.7%) and weakness of lower limbs (83.7%) were the commonest presenting complaints. Twenty one patients (42.9%) had spastic paraplegia, 20 (40.8%) had flaccid paraplegia while 8 (16.3%) had no neurologic deficit.

Eighteen patients (36.7%) presented with deformity of the back (mainly a gibbus) while 13 (26.5%) had fever. Three patients (6.1%) had concurrent pulmonary tuberculosis (Table I).

Figure 3
Table 1: Clinical Presentation of TB Spine

<table>
<thead>
<tr>
<th>Complaint</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back pain</td>
<td>42</td>
</tr>
<tr>
<td>Weakness of lower limbs</td>
<td>41</td>
</tr>
<tr>
<td>Back Deformity</td>
<td>18</td>
</tr>
<tr>
<td>Fever</td>
<td>13</td>
</tr>
<tr>
<td>Weight loss</td>
<td>10</td>
</tr>
<tr>
<td>Faecal/Urinary incontinence</td>
<td>3</td>
</tr>
<tr>
<td>Associated Pulmonary Tuberculosis</td>
<td>3</td>
</tr>
</tbody>
</table>

The duration of symptoms before presentation ranged from 4 weeks to 5 years (mean = 14.4 weeks). The lumbar spine was the most commonly affected region (49%), followed by the thoracic spine (30.6%). Multiple consecutive vertebrae were affected in 37 patients (75.5%) – Table II.

Figure 4
Table 2: Radiologic Features of TB Spine

A. Vertebral level of lesion

<table>
<thead>
<tr>
<th>Level</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical</td>
<td>4</td>
</tr>
<tr>
<td>Thoracic</td>
<td>15</td>
</tr>
<tr>
<td>Thoracolumbar</td>
<td>5</td>
</tr>
<tr>
<td>Lumbar</td>
<td>24</td>
</tr>
<tr>
<td>Sacral</td>
<td>1</td>
</tr>
<tr>
<td>Multiple Vertebral involvement</td>
<td>37</td>
</tr>
</tbody>
</table>

B. Radiologic Findings

<table>
<thead>
<tr>
<th>Finding</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wedge Collapse of body</td>
<td>31</td>
</tr>
<tr>
<td>Destruction of Disc only</td>
<td>8</td>
</tr>
<tr>
<td>Complete destruction of body</td>
<td>5</td>
</tr>
<tr>
<td>Osteopenia of body</td>
<td>5</td>
</tr>
<tr>
<td>Destruction of Pedicle</td>
<td>0</td>
</tr>
</tbody>
</table>

Thirty eight patients had plain x-rays of the spine only while eleven patients had both plain x-rays and CT myelography. The commonest x-ray finding was wedge collapse of the vertebral bodies and destruction of the intervertebral disc (63.3%) - Fig. 3 and (Table IIb). Other findings were destruction of the disc only (16.3%) – Fig.3b, complete destruction of the bodies of vertebrae (10.2%) – Fig.3c and Osteopenia of the vertebral bodies (10.2%).
Figure 5
Table 3: Modalities and Outcome of Treatment

<table>
<thead>
<tr>
<th>Treatment Modalities</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antituberculosis drugs only</td>
<td>5</td>
</tr>
<tr>
<td>Antituberculosis drugs with traction, spinal support and Physiotherapy</td>
<td>23</td>
</tr>
<tr>
<td>Antituberculosis drugs with spinal support</td>
<td>9</td>
</tr>
<tr>
<td>Antituberculosis drugs with Surgery</td>
<td>4</td>
</tr>
<tr>
<td>Discharged against medical advice</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome of Treatment</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfactory healing</td>
<td>24</td>
</tr>
<tr>
<td>Healed with persisting deformity</td>
<td>9</td>
</tr>
<tr>
<td>Healed with persisting paraplegia</td>
<td>3</td>
</tr>
<tr>
<td>Lost to follow up</td>
<td>11</td>
</tr>
<tr>
<td>Died</td>
<td>2</td>
</tr>
</tbody>
</table>

Figure 6
Figure 3a: X-ray of the thoracolumbar spine (Lateral view) showing wedge collapse of L1 and L2 vertebral bodies.

Figure 7
Figure 3b: X-ray of the thoracolumbar spine showing destruction of the disc between D11 and D12.
Figure 8
Figure 3c: X-ray of the spine in a child showing complete destruction of D12 and L1 vertebral bodies leaving only the pedicles.

There was extensive vertebral body destruction and spinal cord compression on CT myelography (Fig.4). There was no patient with destruction of the pedicles.

Figure 9
Figure 4a: CT Scan showing destruction of the vertebral body and intraspinal extension
The Erythrocyte sedimentation Rate (Westergreen method) ranged from 24mm/hr to 153mm/hr (mean 75.5± SD). Mantoux test was done for 32 patients. Only 23 (71.9%) had a reaction of 10mm and above. Human Immunodeficiency Virus (HIV) Screening was done for 27 patients out of which only 2 (7.4%) were positive. The modalities of treatment and outcome are shown in Table III. The duration of treatment ranged from 2 months to 3 years (mean 16.4months). Twenty four patients (49%) had satisfactory healing. Three patients (6.1%) healed with persisting paraplegia and are confined to wheel chair. Nine patients (18.4%) healed with persisting spinal deformity while 11 (22.4%) were lost to follow up. Two patients who also had HIV/AIDS died before completing their treatment.

**DISCUSSION**

The increasing prevalence of tuberculosis of the spine is obvious from this study. In a previous review from this centre 34 patients were reported over a 15year period (a yearly average of 2.3 patients) 10. Forty-nine patients were seen over a 7-year period in the present study (about 7 patients per year). Although these are hospital based figures, with all the shortcomings, it generally shows a rise. Another reason could be improved diagnostic yield with the availability of Computerized Axial Tomography Scan at this centre. There was a slight female preponderance in this study. This is similar to the findings of many workers on tuberculosis in Africa 10, 11, 12 This may not be unconnected with a higher preponderance of females in tuberculosis in general 12, 13. About 70 percent of the patients were below 40years of age with peak prevalence in the first two decades of life. Our youngest patient was a 3-month old female child who had a presumed congenital tuberculosis with pulmonary and spine involvement (a rare presentation). Most studies showed that spine tuberculosis is most common in the first three decades of life 10, 11, 12.

Students and traders were the most affected group in this study. This is consistent with the high prevalence in children below 20years and females since most traders in our environment are females.

The commonest presenting features were back pain (85.7%) and weakness of the lower limbs (83.7%). Back pain is the most common complaint in most studies 2, 15, 16. Therefore tuberculosis should always be considered in every patient complaining of back pain even if he/she looks well. This is buttressed by this study in which only 26.5 percent had fever and 20.4 percent complained of weight loss.

Neurologic complication is the most dreaded and crippling aspect of spinal tuberculosis. It is the commonest cause of nontraumatic paraplegia in most developing countries where tuberculosis is still common 3, 6, 7. About 83.7 percent of our patients presented with weakness of both lower limbs. This is similar to the experience of Turgut 3 in Turkey. The incidence of paraplegia appears to be rising at our centre as an earlier report showed the prevalence to be about 47.1% percent 10.

Earlier reports on tuberculosis of the spine classified this complication into paraplegia of early onset and paraplegia of late onset 17. The former was said to occur in the first 2 years of the evolution of the disease while the latter occurred after two years when the tuberculous activity was of low grade or had healed. This distinction is no longer valid. Based on recent advances in investigative modalities and results of medical and surgical treatment Pott's paraplegia is now classified into that occurring in active disease and that in healed disease. The causes of paraplegia in active disease are pus (intra and extradural), sequestra, sloughed intervertebral discs, caseous material and granulation tissue. This usually responds well to chemotherapy, especially with the highly effective drugs available today and surgical decompression 6. Paraplegia arising in healed disease is much more difficult.
to treat. It may result from stretching of the cord over the ridge that commonly develops at the back of the vertebral bodies at the apex of the kyphosis. Paraplegia may therefore arise many years after the bone disease is healed. Though removal of the ridge at the back of the vertebral bodies may relieve the paraplegia this is not always the cases.

The mean duration of symptoms in our patients was 14.4 weeks. This delay in presentation may not be unconnected with the attitude of our people to back pain. Most patients in Nigeria purchase drugs across the counter to treat back pain. They only present when there is associated back swelling or deformity or weakness of the lower limbs. There may also be delay in diagnosis even in patients who present early to physicians. This is usually due to failure to consider tuberculosis as a possible cause of back pain. Spinal tuberculosis has often been regarded as the great imitator of our time because of its protein clinical manifestations and similar radiographic appearance to other pathological conditions of the spine. Declining incidence in some parts of the world and thus declining awareness may also explain delay in diagnosis. This usual long delay in diagnosis of tuberculosis of the spine will be avoided if physicians are more aware of its presentation. Early diagnosis is essential as this guarantees maximum potential for healing and recovery of neurologic function.

The lumbar spine was the most commonly affected region of the spine (49%). This was followed by the thoracic spine (30.6%). Majority of the patients (75.5%) had multiple vertebral involvement. This pattern of vertebral involvement is similar to the report of Solagberu et al. in Ilorin, Nigeria and Sinan et al. in Kuwait. The thoracic spine was the commonest site of involvement in Turkey, Malaysia, and Ibadan, Nigeria. The thoracicolumbar region is the most commonly involved part of the spine in Tanzania. The reason for this geographic variation is not known at present.

Plain radiography and Computerized Tomography Scan combined with contrast myelography were the main radiologic investigative modalities used in our patients. Wedge Collapse of the bodies of contiguous vertebrae with destruction of the intervertebral disc was the commonest feature. There was evidence of spinal cord compression in the eleven patients that had CT myelography. Some workers are of the opinion that plain radiography provides most of the information necessary for diagnosis and treatment. They claim that the main value of CT and MRI is in the preoperative evaluation of the small proportion of patients who require surgical treatment for paraplegia. Moreover there are no pathognomonic CT and MRI features of spine tuberculosis. However CT scan has been found to improve the diagnosis and early initiation of treatment in spine tuberculosis. This is especially so in patients with nonspecific or ambiguous presentations. Availability of CT scan has increased the accuracy of diagnosis of spine tuberculosis at our centre and as enabled us to determine early those that needed surgery.

It is interesting to note that only 7.4% of the patients with spine tuberculosis in this study tested positive for HIV. Though the rising incidence of tuberculosis has been attributed to the increasing number of people with HIV/AIDS, poor socio-economic factors and inadequate health facilities rather than HIV/AIDS appear to be more important factors in Tuberculosis of the spine in Nigeria. Furthermore, in reports of bone and joint tuberculosis from developed parts of the world the disease is more prevalent among the immigrants from developing countries.

The treatment of bone and joint tuberculosis is primarily medical. The use of modern antitubercular drugs has changed the outcome of the treatment of this disease. There is abundant evidence to show that an early case of bone and joint tuberculosis in any part of the body can be cured by chemotherapy. Medical treatment requires the use of a combination of at least 3 antitubercular drugs at least one of which must be bactericidal. This is to discourage the emergence of resistance and thus treatment failure which may occur with monotherapy. The optimum duration of treatment of spine tuberculosis is controversial. The concept of a short course regime of six months that has been successful in the treatment of pulmonary tuberculosis has been found inadequate in bone and joint tuberculosis. A minimum of 12 to 18 months chemotherapy is therefore the accepted practice. The mean duration of treatment in our patients was 16.4 months though some defaulted as early as 2 months.

Most of them had a combination of chemotherapy, spinal jacket with scotch cast or traction and physiotherapy. With the availability of CT scan an increasing number of our patients now have surgery in addition to medical treatment. These vary from drainage of paraspinal abscesses to decompression. However, lack of appropriate facilities and trained personnel for spinal surgery presently prevents our paraplegic patients from maximally benefiting from a combination of chemotherapy and surgery. Therefore most
of our patients were treated conservatively. This is unfortunate because in selected patients surgery gives faster relief of pain and neurologic recovery. Some workers have however recorded good results from conservative treatment of spine tuberculosis.

The outcome of treatment of spine tuberculosis patients shows that about fifty percent of our patients had satisfactory healing while 10.2% had persisting spinal deformity. About 6.1% are wheelchair bound while the fate of the 16.3% that did not complete their treatment is not known.

The outcome of spine tuberculosis in Nigeria is still unsatisfactory. Many factors are responsible for this poor outcome. There is increasing poverty in Nigeria leading to a high rate of default due to difficulties in financing their treatment. Despite the prevalence of tuberculosis in Nigeria there is still unacceptable laxity in control measures. Those with paraplegia and spinal deformity that do not respond to medical treatment alone cannot be helped due to lack of facilities for the appropriate spinal surgery in most of Nigerian centres.

There is need to intensify tuberculosis control measures in developing countries. Treatment of spine tuberculosis should be free to reduce default rate. Spinal centres should be established in most of our teaching hospitals so that patients can maximally benefit from the value added by the state of the art diagnostic facilities now being acquired by these centres.

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