Computed tomographic evaluation of TB spine in Ibadan

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Summary

Background:- **Tuberculosis still remains a major problem in the developing countries. The involvement of the spine is also of increasing importance, because of the resurgence of TB in association with AIDS. This paper is designed to evaluate the applicability of CT in the diagnosis and definition of tuberculosis of the spine in Ibadan.**

Method:- **A restrospective study of the Computed Tomographic examination of 22 cases of spinal tuberculosis (Pott's disease) over a four-year period at the Radiology Department of the University College Hospital, Ibadan.**

Results:- **There was a male prevalence in the study. The mean age of respondents was 41.2 years. Neurological symptoms and back pain were the most common presentations. The thoracic spine was mostly involved while the cervical spine was least involved. Most lesions 77.3% were demonstrated in two contiguous vertebral bodies. The vertebral bodies were destroyed in all the patients while the posterior elements were involved in 59%. The other CT findings were paravertebral soft tissue shadow in 40.9%, narrowed irregular disc spaces in 27.3% and fusion of vertebral bodies in 13.6%. The frequent bony destruction was osteolytic in nature, and was present in 64% of patients.**

Conclusion:- **CT is an adequate modality for thorough imaging and diagnosis of Pott's disease especially in patients with non specific or ambiguous presentations.**

It offers a unique opportunity of demonstrating clearly the various component of the spine, it also defines the pattern and extent of the destructive process.

Keywords: ***Computed tomography, TB spine, Ibadan.***

Résumé

Introduction:- La tuberculose reste encore un problème majeur dans les pays en voie développement, la complexité de l'épine dorsale est également en hausse, à cause de la réapparition de TB associée au SIDA. L'objet de cette étude est d'évaluer l'applicabilité de CT plans de diagnostic et la définition de la tuberculose de la colonne vertébrale à Ibadan.

Méthodes:- Une étude rétrospective d'examen de la Tomographie par emission de positions de 22 cas des tuberculose de l'épine dorsale (maladie de POTT) au cours d'une période de 4 ans au Departement de la Radiologie du Centre Hospitalier Universitaire, Ibadan.

Résultats:- Il y avait la prévalence du sexe masculin dans cette étude. L'âge moyen des sondés était 41,2 ans. Symptômes neurologiques et le mal de dos sont des présentations impliquées tandis que l'epine cervicale était le moins impliqué. La plupart des lésions 77,3% étaient demontrées dans deux corps vertebraux contigus. Les corps vertebraux ont été detruits chez tous les patients tandis que les éléments postérieurs ont été impliqués dans 59% des cas. Des autres résultats de CT sont les suivants: tissu mou paravertébral dans 40,9%, disque espace irrégulier et étroit dans 27,3% et la fusion des corps vertébraux en 13,6%. La fréquence de la destruction squelettique était ostéolytique de nature était présente dans 64% des patients.

Conclusion:- La CT est une modalité adéquate pour l'imagerie médicale bien approfondie et un diagnostic de la maladie du POTT en particulier chez des patients atteints des maladies non spécifiques ou ambiqus. Elle donne une occasion bien unique de démontrer clairement les composantes diverses de l'épine dorsale, elle également determine la tendance et le degré de la destruction.

Introduction

Tuberculosis still remains a major problem in the developing countries [1,2]. Tuberculous infection of the spine (Pott's disease), the most common form of skeletal involvement is increasing in prevalence because of the resurgence of tuberculosis in patients with AIDS[3,4]. Plain radiography has been very useful in the diagnosis in recent past but newer cross- sectional modalities such as computed tomography (CT) and Magnetic Resonance Imaging (MRI) have become more useful tools in the diagnosis and demonstration of disc, vertebral and spinal cord diseases and these modern imaging modalities are becoming increasingly valuable in early and accurate diagnosis.

In Nigeria, the radiographic findings in Pott's disease have been described by Obisesan et al [5,2] but the role of CT is yet to be highlighted. The dependency of CT imaging on attenuation numbers is an advantage in the diagnosis of pathologies, as it will enhance differentiation between soft tissue and bony abnormalities, thereby outlining the extent of the disease. The non-specific initial symptoms of Pott's disease and the fact that it can mimic other disease processes in advanced stage make early diagnosis a challenge and CT is of tremendous help in this regard.

We therefore present the CT findings in 22 cases of proven Pott's disease who had CT examination done, with reference to the types of bone destruction.

Materials and Methods

The CT findings of 22 patients referred for CT examination on account of Pott's disease over a four-year period were reviewed.

The examination was performed using a GE 9000 machine. Four millimeters contiguous slices in the region of interest including two vertebrae above and below this area were made. Intra-thecal injection was not administered in the majority of patients and only those with neurological signs had intrathecal injection of contrast media (8-10mls of Iopamiro).

The hospital records of patients were also reviewed with particular attention to age, sex and the presenting symptoms. The CT scans were evaluated for the following:

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i) Presence, and extent of vertebral destruction
ii) Destruction of the body or posterior elements of the vertebra
iii) Type of bone destruction
iv) Presence of paravertebral soft tissue mass
v) Involvement of spinal canal or epidural space
vi) Presence of calcification in the soft tissue mass
vii) Fusion of vertebral bodies

Results

Of the twenty-two patients reviewed, 14 were males and eight females giving a 1.8:1 male to female ratio.
Their ages ranged between 9-70 years with a mean of 41.2years. (Table1).

Table 1 Age distribution of patients

Age in Years	No of Patients (%)
0-9	1 (4.5)
10-19	1 (4.5)
20-29	3 (13.7)
30-39	7 (31.8)
40-49	3 (13.7)
50-59	2 (9.1)
60-69	4 (18.2)
70-79	1 (4.5)
Total	22 (100%)

Table 2 Clinical presentation and percentage incidence

Clinical presentation		Number (%)
1. Inability to walk		16 (73)
2. Low back pain		12 (54.5)
3. Paraparesis		10 (45.5)
4. Paraplegia		6 (27.3)
Flaccid	4(18.2)	
Spastic	2 (9.1)	
5. Kyphoscoliosis		3 (13.6)
6. Quadriparesis		3 (13.6)
7. Urinary Incontinence		2 (9.0)
8. Faecal Incontinence		2 (9.0)
9. Double Incontinence		1 (9.0)
10. Soft Tissue Overlying the Spine		2 (9.00)

Table 3 CT findings in patients

CT findings and frequency	No (%)
1. Vertebral Involvement	22(100)
2. Associated Cord Compression	12 (54.5)
3. Paraspinal Soft Tissue Mass	9 (40.9)
4. Reduced Height of Vertebral Body	8 (36.4)
5. Narrowed Disc Space	6 (27.3)
6. Destruction of Spinous Process	6 (27.3)
7. Destruction of Laminae	5 (22.7)
8. Osteophytic growth	5 (22.7)
9. Straightening of Vertebral Curvature	4 (18.2)
10. Fusion of Vertebral Bodies	3 (13.6)
11. Destruction of Pedicles	2 (9.1)
12. Destruction of Transverse process	1 (4.5)

Table 2 shows the presenting complaints. Seventy-three percent (73 %) of the patients presented with inability to walk while back pain occurred in 54.5%. Soft tissue swelling was seen in only 2 patients.

Fig 1, shows the thoracic (dorsal) spine as the most common site of involvement 54.5% (12 patients), followed by the lumbar 31.8% (7patients) and cervical vertebrae was involved in only 13.6%(3 patients).

Table 4 Pattern of bone destruction

Type of bone destruction	No (%)
Osteolytic	14(64)
Fragmented	3(13.5)
Focal Lytic / sclerosis	2(9)
Mixed Lesion	3(13.5)

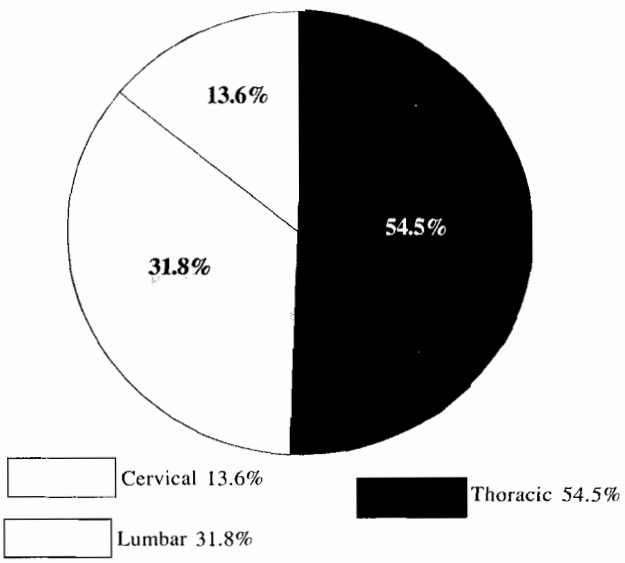

Fig. 1 *Pie Chart showing vertebral involvement*

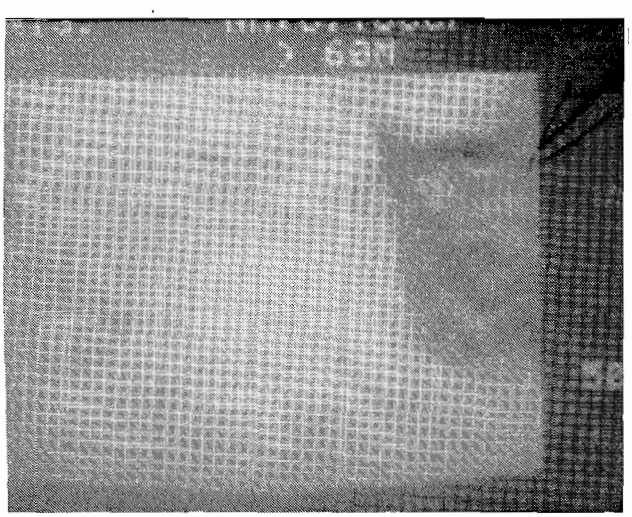

Fig. 2 *CT Dorsal spine showing lytic destruction of vertebral body and paravertebral soft tissue mass anteriorly*

Most lesions involved two contiguous vertebral bodies and the intervening disc spaces (17patients) with two patients having skip lesions. Single vertebra was involved in one patient, three adjacent vertebrae in three patients, one patient had 4 vertebral involvement with severe kyphosis as a result of marked bone destruction.

Table 3 shows the CT findings in the patients. Destruction of the vertebral body was present in all the patients, while destruction of the posterior elements was found in 13 (59%). Associated destruction in the transverse process was

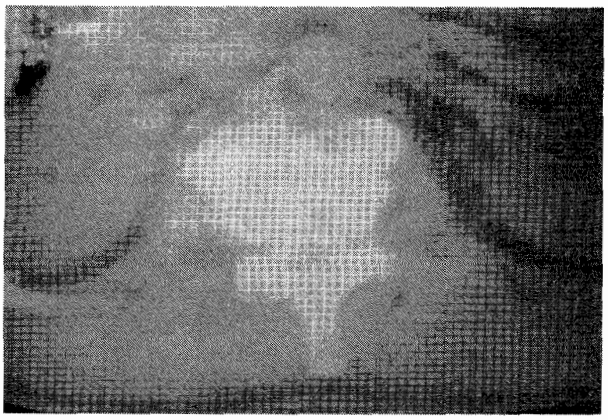

Fig. 3 *CT Lumbar spine showing sclerotic destruction of the vertebral body and anterior soft tissue*

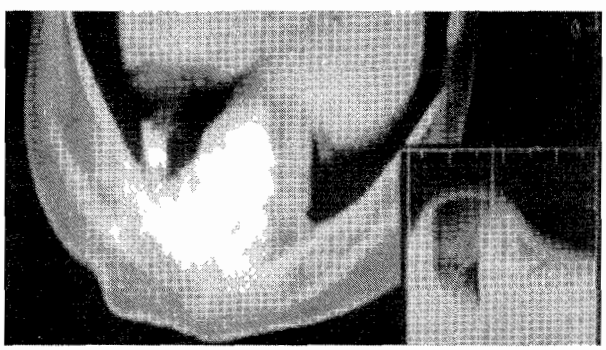

Fig. 4a *CT showing fragmented destruction of vertebral body with severe kyphosis.*

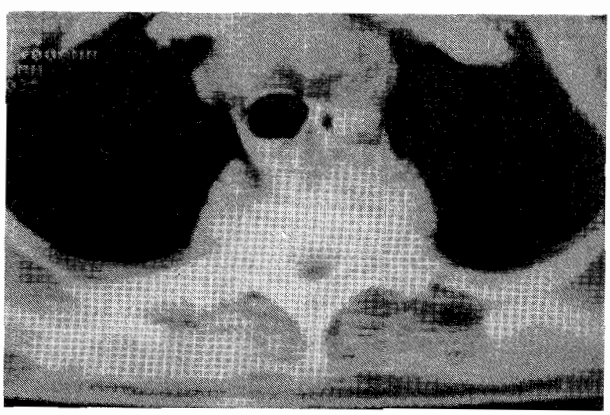

Fig. 4b *CT showing fragmented destruction with paravertebral soft tissue.*

Fig. 5 *CT Lumbar spine showing focal lytic destruction of the vertebral body*

noted in 1patient (4.5%) while paravertebral soft tissue mass was reported in 9 (41%) patients and this was bilateral in 2(9%) patients.

Table 3B shows the pattern of bone destruction. The most common type of destruction was the osteolytic (hypodense lesion) seen in 14 patients (64%) Fig 2. Mixed lesions were present in 3 patients (27 %) while fragmented destruction was present in 3 patients (13.6%) and focal lytic lesion with sclerotic margin was seen in 2 patients (9%) Figs. 3,4 & 5

Discussion

Skeletal tuberculosis occurs in approximately 1% of patients with Tuberculosis and TB of the spine accounts for more than 50% of musculo-skeletal TB [4,6] and it is still a common disease in Nigeria [2]. Spread to the spine is thought to be haematogenous in most cases.

The disease commonly affects children and young adults [2,7,8] and 45% of our patients are young adults (Table1). The most common presenting symptoms were backache and neurological symptoms, the latter is however less common in children. The disease may be aggressive leading to abscess formation and spinal deformities. Neurological symptoms and back pain were the most common presentation in our series (Table 2).

The most frequent site of involvement of spinal TB is the thoraco-lumbar region [2,4,8]

The thoracic spine was the most common site of involvement in this series too (Fig1) with involvement of a single level of contiguous vertebra similar to what has been described by other workers[9]. Multilevel and skip lesions can also occur[10]. Skip lesions were seen in only two of our patients.

The primary focus of infection in the spine can be in the vertebral bodies or around the disc[8] leading to narrowing of the disc space or fusion of adjacent bodies. Narrowed disc space was seen in 30% of our patients. Disc space narrowing is a secondary phenomenon occurring when destruction of the cancellous bone permits herniation of the disc into the affected vertebral body.

Isolated disease of the vertebral arch and its process is an uncommon presentation, this occurs in less than 2% of cases of tuberculous spondylitis [11,12]. It was seen in only 5 of our 22 patients but not as an isolated lesion. Involvement of the vertebral appendages and ribs is usually due to direct spread of the disease from the vertebral body as seen in our patients. Reduction in the height or collapse of the vertebra occurs as a result of direct destruction of the vertebral body in centrally occurring lesions. This can be mistaken for a compression fracture [13]

Tissue necrosis and breakdown of inflammatory cells result in para-vertebral abscess, which was seen in 45% of our patients. Para-vertebral abscess can spread above or below the level of the involved vertebrae [5,9] and is larger in tuberculous spondylitis than pyogenic spondylitis [14]. The associated soft tissue masses had been characterized by the CT attenuation into granulation tissue or frank abscess; granulation tissue having higher Hounsfield value than frank abscess[15, 16].

The abscess can tract intraspinally into the canal causing an extradural compression of the cord. The incidence of cord compression was high in our series (54.5%) being due largely to tracking of the paraspinal abscess into the extradural space rather than the presence of bone fragments as reported by Jain et al[7] as no bone fragment was seen in the intraspinal space in our series.

The most common type of bone destruction in our series was the osteolytic bone destruction (Fig 2) occurring in 14 patients (64%), while fragmented lesions (fig 3) were seen in 3 patients (13.6)%. The fragmented type of destruction was the most common in other series [7,10] and osteolytic was the least type described by them. This may be due to late presentation and more extensive involvement of the spine in their patients as the initial lesion in Pott's disease is purely lytic[6].

Flattening of the vertebra body, (plana appearance), with preservation of the disc space has also been described by Resnick[8]. This appearance is indistinguishable from lymphoma or metastasis. It was not seen in our series.

Conclusion

The thoracic spine is the most common site of involvement in our series and isolated involvement of posterior elements was uncommon. Osteolytic destruction of bone was more common than the fragmentary type that has been reported by others.

Computed tomography is a most thorough modality for imaging the extent of tuberculous disease of the spine especially when patients presents with neurological symptoms and it has to be differentiated from other causes of cord compression. It gives a clear picture of the underlying bone destruction, extent of associated para-vertebral soft tissue and its extension into spinal canal. It can locate the exact site for tissue biopsy when necessary.

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