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Original Research

SPINAL TUBERCULOSIS AND ROLE OF CBNAAT IN DIAGNOSIS

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ABSTRACT

Aim And Background: Spinal involvement occurs in less than 1% of patients with TB but the increasing frequency of TB in both developed and developing countries continues to make spinal TB a health problem. Spinal TB (Pott's disease) is the most common as well as most dangerous form of skeletal TB and accounts for 50% of all cases of skeletal TB. This study aims to study the prevalence of spinal tuberculosis and the effect of ATT based on clinical and radiological improvement.
Methods: Observational study was done on patients who were started on AKT for spinal tuberculosis in Sir Takhtasinhji Hospital Bhavnagar, Gujarat during the period of 14 months (from January 2022 to February 2023).
Results: Out of 439 patients with Extra pulmonary tuberculosis (EPTB) 39 (8.8%) patients were of spinal tuberculosis out of which 22 were female and 17 were male patients. The highest prevalence in the age group 21-40 (33%). CBNAAT was performed on pus aspirates and tissue samples from 32 patients. Mycobacterium tuberculosis (Mtb) was detected in 14 patients (36%), and rifampicin resistance was detected in 4 patients (10%) [1 patient was resistant to fluoroquinolones in single-lineage probe assay (SLPA)].35 patients started on DSTB, 4 started on all oral longer regimen, 1 containing Delaminid. A total of 15 patients were cured, 23 were still on treatment and 1 expired.
Conclusion: In our study, we found that spinal tuberculosis accounted for 8.8% of all cases of EPTB. CBNAAT was positive in 36% of patients with spinal tuberculosis, and 10% of patients were resistant to Rifampicin. It can also detect resistance to Rifampicin, which is an important first-line anti-tuberculosis drug. If any sample like tissue, histopathology specimen, pus that is aspirable or approachable, then it should be obtained for CBNAAT testing. This will allow clinicians to start the patient on the most appropriate treatment regimen as soon as possible.

Keywords- Spinal Tuberculosis, CBNAAT, Rifampicin resistance.

Abbreviations- ATT- Anti-tuberculosis treatment, CBNAAT- Cartridge Based Nucleic Acid Amplification Test, DSTB- Drug Sensitive Tuberculosis, EPTB- Extra-Pulmonary Tuberculosis, FNAC- Fine Needle Aspiration Cytology, MDR-TB- Multidrug-Resistant Tuberculosis, Mtb- Mycobacterium tuberculosis, PLHA-People Living With HIV-AIDS, RIF- Rifampicin.

INTRODUCTION:

Spinal Tuberculosis occurs in 6-8% of extrapulmonary tuberculosis (EPTB) and it accounts for 50% of skeletal tuberculosis. Characteristically, there is the destruction of the intervertebral disc space and the adjacent vertebral bodies, collapse of the spinal elements, and anterior wedging leading to

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kyphosis and gibbus formation. The thoracic region of the vertebral column is most frequently affected. The common clinical manifestations include constitutional symptoms of back pain, spinal tenderness, paraplegia, and spinal deformities. [1]
For the diagnosis of spinal tuberculosis MRI is a more sensitive imaging technique than X-RAY and more specific than CT scan. [3]
Rapid diagnosis of tuberculosis and detection of rifampicin (Rif) resistance are essential for effective disease management. Imaging guided needle aspiration or biopsy from the affected site can provide material for CBNAAT (Cartridge Based Nucleic Acid Amplification Test) also known as GENE-XPERT/RIF Assay which is a novel integrated diagnostic device for the diagnosis of tuberculosis and rapid detection of rifampicin resistance in clinical specimens.[1]

MATERIALS AND METHODS:

This is a retrospective observational study of 39 patients of spinal tuberculosis who were started on anti-tubercular treatment during the period of 14 months (From January 2022 to February 2023).
The data for the total prevalence of extra-pulmonary tuberculosis, gender prevalence, CBNAAT results for the pus aspirate/biopsy samples, and outcome of treatment was obtained from District Tuberculosis Centre, Bhavnagar.

RESULTS:

Out of 439 patients with EPTB 39 (8.8%) patients had spinal tuberculosis, 22 female and 17 male patients, the highest prevalence in age group 21-40 (33%).

AGE	GENDER		TOTAL
	MALE	FEMALE	
0-20 YEARS	3	5	**8**
21-40 YEARS	7	6	**13**
41-60 YEARS	5	9	**14**
61-80 YEARS	2	2	**4**
TOTAL	**17**	**22**	**39**

Comorbidities (4 hypertensive, 2 diabetic,2 PLHA)

Lesions included psoas abscess (16 patients, 41%), paravertebral abscess (6 patients), and spondylodiscitis at L3-L4 (9 patients) and L2-L3 (8 patients).

LESION	TOTAL NUMBER OF PATIENTS	PERCENTAGE
Psoas abscess	**16**	**41%**
Paravertebral abscess	**6**	**15%**
Spondylodiscitis in L3-L4	**9**	**23%**
Spondylodiscitis in L2-L3	**8**	**20%**

Figure 1- Bar graph showing number of patients having different sites of lesion

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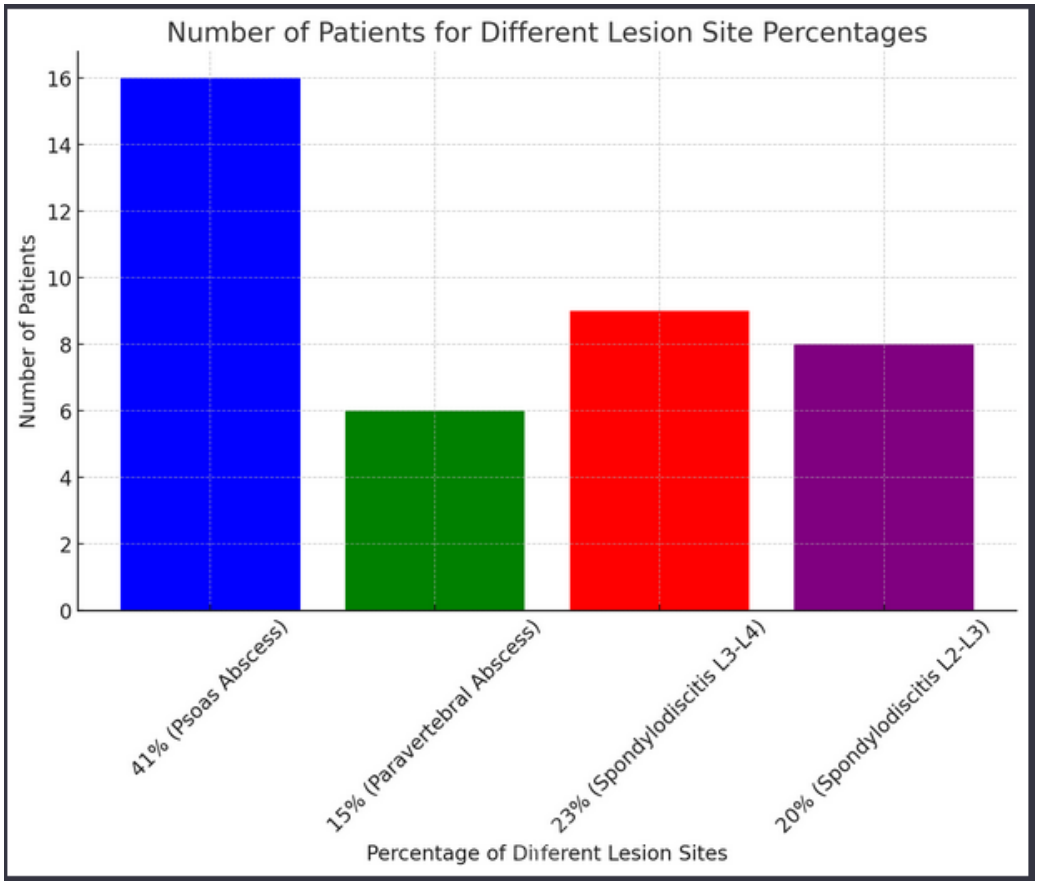
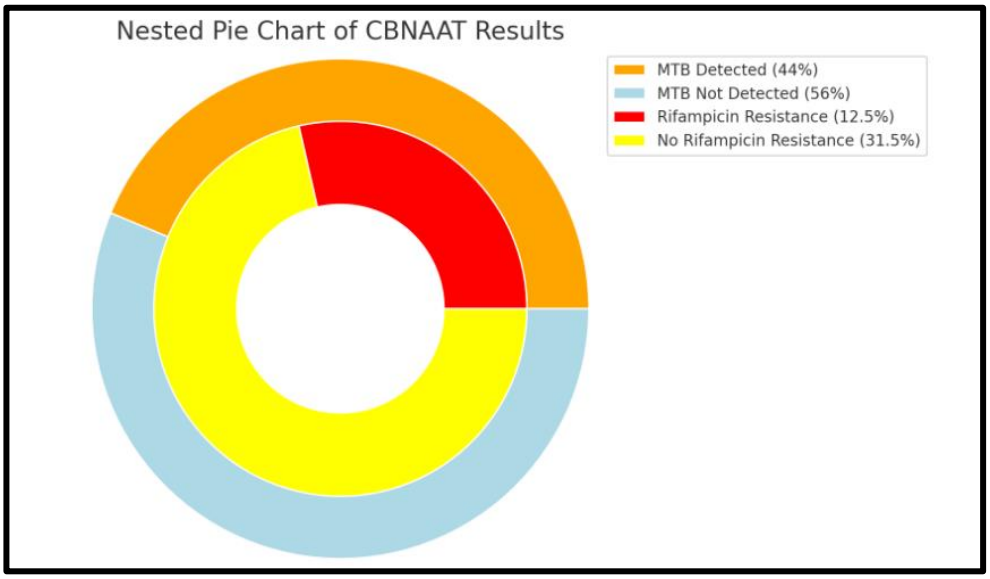


CBNAAT was performed on pus aspirates and tissue samples from 32 patients of of which Mycobacterium tuberculosis (Mtb) was detected in 14 patients (36%), and rifampicin resistance was detected in 4 patients of Mtb detected samples (10%) [1 patient was resistant to fluoroquinolones in single-lineage probe assay (SLPA)]

	CBNAAT DONE IN	MTB NOT DETECTED IN	MTB DETECTED IN	RIFAMPICIN RESISITANCE IN
No of patients	32	18	14	4

Figure 2- A nested pie chart showing CBNAAT performed and results obtained



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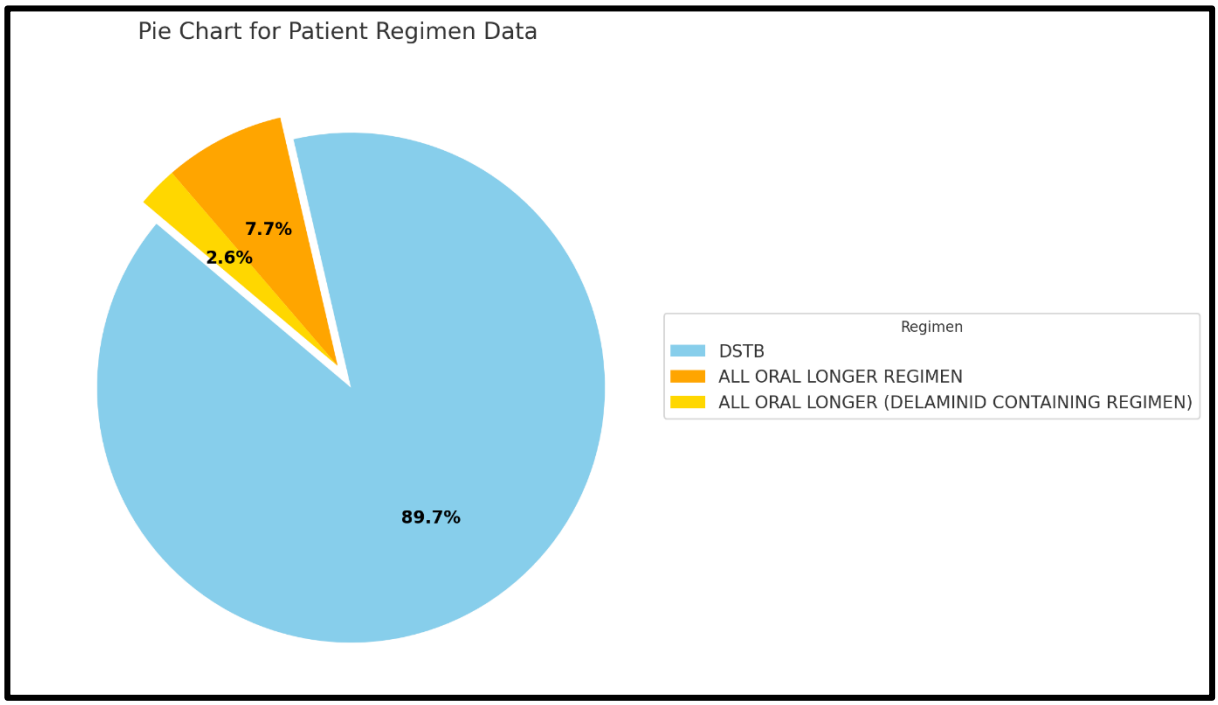
35 patients started on DSTB regimen, 4 started on all oral longer regimens, 1 containing Delaminid. A total of 15 patients were cured, 23 on treatment and 1 expired.

REGIMEN	TOTAL NUMBER OF PATIENTS	PERCENTAGE
DSTB	35	89%
ALL ORAL LONGER REGIMEN	3	9%
ALL ORAL LONGER (DELAMINID CONTAINING REGIMEN)	1	2%

Figure 3- Pie chart showing different regimens started in patients of spinal tb



DISCUSSION:

There is an increasing incidence of MDR-TB. Early identification can lead to prompt modification of the treatment regimen so that neurologic deficits and spine deformities can be prevented. Tissue diagnosis, CBNAAT, and imaging should form part of the diagnostic workup of spinal tuberculosis. [4]

Neurological complications due to Pott's disease seem to be relatively benign if early adequate medical and surgical management are employed [3]. Younger age and radical surgery in conjunction with anti-tuberculosis chemotherapy have been suggested as favorable prognostic factors [2].

Here are some of the benefits of using CBNAAT for the diagnosis of spinal tuberculosis:

- It is a rapid test, with results available in less than two hours.
- It is a sensitive test, with a high probability of detecting Mycobacterium tuberculosis even in samples with a low bacillary load.
- It can detect resistance to Rifampicin, which is an important first-line anti-tuberculosis drug.
- It is a relatively easy-to-use test and can be performed in most clinical laboratories.

CONCLUSION:

In our study, we found that spinal tuberculosis accounted for 8.8% of all cases of EPTB. CBNAAT was positive in 36% of patients with spinal tuberculosis, and 10% of patients were resistant to Rifampicin.

We also concluded that CBNAAT is a rapid and sensitive diagnostic test for spinal tuberculosis that can be used to identify patients who need urgent treatment. It can also detect resistance to Rifampicin, which is an important first-line anti-tuberculosis drug.

If any sample like tissue, histopathology specimen, or pus that is aspirable or approachable, then it should be obtained for CBNAAT testing. This will allow clinicians to start the patient on the most appropriate treatment regimen as soon as possible.

CBNAAT is a valuable tool for the diagnosis of spinal tuberculosis and should be used whenever possible.

CLINICAL SIGNIFICANCE:

To eliminate tuberculosis as a public health problem (because the incidence of tuberculosis is less than one million people worldwide) by 2050. No single intervention will help achieve this enormous goal, so new diagnostic tests that are more sensitive, specific, and easier to use could make a big difference. Worldwide adoption of nucleic acid amplification tests is estimated to reduce the incidence of tuberculosis by 28% by 2050. This ensures early treatment of the sick and prevents further spread of the disease. TB programs must adapt their systems to use this technology, which increases patient access by focusing on the basics of curative TB care so that caseloads lead to better patient outcomes. In addition, there is a critical need to increase the capacity to diagnose MDR-TB to match the increased capacity to effectively treat and cure diagnosed cases. Patient advocates and advocates must hold everyone accountable and increase demand for better TB programs that include the use of new tools such as the CBNAAT MTB/RIF assay. WHO guidelines recommended the use of the CBNAAT MTB/RIF assay in FNAC specimens as an additional test to routine smear microscopy, culture, and cytology. [5]

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