

## Original Research Article

# Extrapulmonary head and neck tuberculosis: 3 year experience at a tertiary care centre

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## ABSTRACT

**Background:** Tuberculosis (TB) is a disease caused by Mycobacterium group of microbe. Most common manifestation of the disease is pulmonary TB. Involvement of other sites is termed as extrapulmonary TB (EPTB). These extrapulmonary sites are head and neck region, renal system, pleura, central nervous system and bones. This study was to find out the various head and neck manifestations of TB.

**Methods:** All head and neck cases of TB diagnosed during the period 2017-2020 were included in the study. Recurrent cases of TB and those patients with primary pulmonary TB focus having head and neck manifestation were excluded from the study.

**Results:** 63 patients fulfilled the inclusion and exclusion criteria. The disease was found to be more in females (65.07%). The most common EPTB manifestation in head and neck region was the involvement of cervical lymph nodes followed by laryngeal TB. Level II was the most common involved lymph node group. We noted three cases of temporal bone TB and one case of nasal TB.

**Conclusions:** In regions where the disease is endemic, there can be various atypical clinical presentations. Early diagnosis is of utmost importance in initiation of appropriate treatment.

**Keywords:** Tuberculosis, Extrapulmonary tuberculosis, Cervical lymph nodes

## INTRODUCTION

Tuberculosis (TB), a disease caused by the mycobacterium group of bacteria which are acid fast bacilli (AFB) when stained with Zeihl Neelsen acid fast stain.<sup>1</sup> The microbe secretes a wide range of effector proteins confusing the host immune system, there by facilitating its intracellular survival in granulomas which are characteristic of the disease.<sup>2</sup> The disease is one of the leading health care problems in India, causing high morbidity and mortality, mainly because of clusters of overcrowding, poverty, immunocompromised status and smoking.<sup>3</sup> To combat this condition Government of India launched Revised National TB Control Programme (RNTCP) in the year 1997, later

renamed as National Treatment Elimination Programme (NTEP) with an aim to eliminate TB by 2025.

Though pulmonary TB is the most common manifestation, other extrapulmonary manifestations are not uncommon. This fact is highlighted by the introduction of newly diagnosed extra pulmonary TB (EPTB) category in the RNTCP treatment regime. Among extrapulmonary TB, head and neck region is one of the common sites, other sites include pleura, central nervous system, genitourinary system and the bones and joints.<sup>4</sup> The presentation varies from non specific symptoms such as change in voice, swelling in the neck etc to life threatening conditions like deep neck space infection. This diverse clinical

presentation creates confusion among physicians often resulting in late diagnosis and there by loosing significant time in initiation of specific treatment.

**METHODS**

This was a retrospective study done in the department of Surgery and Otorhinolaryngology at a tertiary care centre in southern India over a period of three years, from July, 2017 to June, 2020. After getting clearance from the institutional research ethical committee, all newly diagnosed cases of EPTB during the study period were included in the study. During data collection, apart from the demographic details, personal details related to alcohol consumption, cigarette smoking, chronic co-morbid conditions and other diseases were also included.

**Inclusion criteria**

*Case definitions*

**TB lymph node** – A case of EPTB in which fine needle aspiration cytology (FNAC) or excisional biopsy sample showed histopathological features of TB or positive result on performing Cartridge Based Nucleic Acid Amplification Test (CB-NAAT). The details related to the involvement of lymph node level group were obtained from the ultra sonogram reports of neck or computerised tomography scan of neck.

**TB of nose and paranasal sinuses** – A case of TB with clinical involvement of the region and diagnosis confirmed by tissue specimen showing characteristic features of TB on histopathological examination.

**TB of larynx**- A case of EPTB in which the tissue specimen from the laryngeal site is suggestive of TB on histopathological examination.

**TB of temporal bone**- tissue specimen from the external or middle ear showing features of TB on histopathological examination.

**TB abscess** – the aspirate collected during the drainage of abscess showing positive result with CB-NAAT or abscess wall showing TB features on histopathological examination

The histopathological features of TB include presence of chronic inflammatory background with caseous necrosis, epitheloid cells and langhan giant cells.

**Exclusion criteria**

Cases with previous history of anti tubercular treatment or with concomitant pulmonary TB were excluded from the study.

The data was entered in Microsoft excel software and the analysis of data was done with Statistical package for social sciences (SPSS) version 8.

**RESULTS**

A total of 63 patients were diagnosed with EPTB during the study period. Disease was found to be more common in females (41 out of 63) with a ratio of 1:1.86. Only three patients aged less than 18 years. Two patients were HIV positive. Smoking was not found to be a predisposing factor as among the 22 male patients only three were chronic smokers.

**Table 1: EPTB site distribution in head and neck region.**

Site	Number (%)
<b>Cervical lymph node</b>	50 (79.36)
<b>Larynx</b>	7 (11.11)
<b>Cervical spine</b>	1 (1.58)
<b>Temporal bone</b>	3 (4.76)
<b>Nasal cavity and paranasal sinus</b>	1 (1.58)
<b>Parapharyngeal space</b>	1 (1.58)

**Table 2: Cervical lymph node group involvement distribution.**

Lymph node level	Number (%)
<b>Level I</b>	2 (4)
<b>Level II</b>	23 (46)
<b>Level III</b>	19 (38)
<b>Level IV</b>	3 (6)
<b>Level V</b>	3 (6)
<b>Level VI</b>	0
	N=50

**Table 3: Laryngeal TB symptom distribution.**

Symptom	Number
<b>Dry cough</b>	7
<b>Weakness of voice</b>	4
<b>Change in voice</b>	7
<b>Swallowing difficulty</b>	2
<b>Foreign body sensation</b>	3

The most common EPTB manifestation was the involvement of cervical nodes followed by involvement of larynx (Table 1).

The majority of the lymph node involved TB cases were presented with swelling in the neck and diagnosis was confirmed by fine needle aspiration cytology and CB-NAAT. However three patients presented with suppurative cervical lymphadenopathy. Level II was the most common involved group of nodes followed by level III (Table 2).

**Table 4: Comparison of EPTB sites in head and neck region.**

Site involved	Present study (N=63)	Mong et al <sup>10</sup> (N=48)	Akkara et al <sup>11</sup> (N=211)	Ricciardiello et al <sup>12</sup> (N=304)	Choudhary et al <sup>13</sup> (N=33)
<b>Cervical lymph nodes (%)</b>	50 (79.36)	39 (81.25)	201(95.3)	286 (94.12)	19 (58.00)
<b>Sinonasal (%)</b>	01 (1.58)	03 (6.25)	01 (0.5)	13 (4.33)	03 (09.09)
<b>Larynx (%)</b>	07 (11.11)	01 (2.08)	03 (1.4)	01 (0.31)	06 (18.180)
<b>Middle ear (%)</b>	03 (4.76)	00	06 (2.8)	01 (0.31)	03 (09.090)
<b>Others- Spine,parapharyngeal space,retropharyngeal space and adenotonsils (%)</b>	02 (3.19)	05 (10.42)	00	03 (0.93)	02 (05.64)

Among those with involvement of lymph nodes, two were of age below 18 years. There were 31 males and 19 females with cervical node EPTB.

The only one nasal TB case presented with chief complaints of nasal obstruction and blood stained nasal discharge. The diagnosis was confirmed by diagnostic nasal endoscopy and histopathological examination of the inflamed nasal mucosa.

One male child of age 13, presented with dysphagia, high grade fever and difficulty in breathing. This patient diagnosed as a case of Deep Neck Space Involvement (DNSI) and underwent emergency drainage of abscess via transoral route. The pus sample sent for acid fast staining turned out positive, confirmed with CB-NAAT and Anti Tubercular Treatment (ATT) initiated.

All the 7 cases of laryngeal TB presented with complaints of change in voice and dry cough (Table 3). Diagnosis was confirmed with direct laryngoscopic examination and biopsy of the involved or inflamed tissue. Among laryngeal TB cases 4 were males and 3 were females.

The temporal bone TB cases presented with chronic ear discharge and hard of hearing and underwent mastoid exploration as treatment procedure. Intraoperatively granulation tissue from the middle ear and mastoid cavity sent for histopathological examination and AFB staining and diagnosis of TB was made. The single case of cervical TB an unusual site for spine TB presented with neck rigidity and pain and MRI and CT of neck was done which showed prevertebral abscess with bony destruction of spine. Subsequently abscess was drained and pus showed AFB positive and ATT initiated.

Category 1 treatment as per RNTCP protocol was advised for all patients.

## DISCUSSION

Robert Koch identified the microbial agent causing human TB in the year 1882, however to date; this organism continues to be a major problem for human health.<sup>5</sup> As per WHO report in the year 2017, around 6 lakhs of

Rifampicin resistant TB and 5 lakhs of multi drug resistant TB has been detected worldwide.<sup>6</sup> This organism unlike other microbes does not express classical virulence factors. A long latency period without symptoms and signs in healthy individuals result in making the diagnosis extremely difficult in the population.

Evidence suggests that TB organism is highly adaptive in the human body, by forming a negative symbiotic relation. This feature makes them as a conditional pathogenic microbe causing disease manifestation mostly in immunocompromised individuals. These adaptive mechanisms include formation of metabolically active but quiescent granulomas, suppression of innate and adaptive immunity and expression of eukaryotic like enzymes which has serine/threonine kinase activity that modifies host cell immune signalling pathways.<sup>7</sup> Aside from causing TB, recent studies shows that MTB is also implicated in the pathogenesis of sarcoidosis, systemic lupus erythematosus, lung cancer and hypovitaminosis D.<sup>8</sup>

Epidemiological studies in the Indian subcontinent show a male preponderance of EPTB, but our study showed a significant female predominance. In our study the number of cases diagnosed with EPTB below the age of 18 were 3 out of 63 (04.76%) which is similar to studies conducted by Soumyajit et al and Monga et al.<sup>9,10</sup>

In the present study, the most common site of EPTB involvement in head and neck region was found to be cervical group of lymph nodes which is in accordance with other similar studies (Table 4).

The most common cervical lymph node groups involved with EPTB in the present study were level II and III (84%). This corresponds to findings of other studies (Jha et al, Soumyajit et al).<sup>14,9</sup> However study conducted by Baskota et al noted level V as the most common involved lymph node group (51%).<sup>15</sup>

Among the laryngeal TB patients, change in voice was the most common presenting symptom (100). Similar findings noted in the studies conducted by Mong et al and Agarwal et al.<sup>10,16</sup>

TB involvement of sinonasal region is a rare finding, especially in disease burden countries. In the present study, there was one case of sinonasal TB with no features of pulmonary TB.

3 cases of EPTB affecting temporal bone were observed in our study. The incidence of TB affecting the ear is rare worldwide.

We did not observe any case with involvement of adenotonsils, salivary gland, orbit and thyroid gland.

As this was a retrospective study, the authors could not find the details such as history of PTB in the family, history of passive smoking habits, occupational history and malnutrition, which are all contributing factors for the development of TB. The sample size of EPTB of non lymph node sites was a limitation factor. The details related to disease progression, disease related complications, treatment response or treatment outcome were not added for data evaluation in the present study.

## CONCLUSION

In a TB endemic country like India the manifestations of the disease can be diverse often causing dilemma in diagnosis. Otolaryngologists should be aware of the various unusual EPTB presentations in head and neck region to avoid misdiagnosis of the condition and late initiation of appropriate treatment.

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