

Tuberculosis in the head and neck: experience in India

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Abstract

Objective: With improvement in economic and social conditions and the use of effective anti-tubercular therapy, the developed nations, and most developing nations, have enjoyed a decline in tuberculosis for several decades. It is now seen that extra-pulmonary presentations form a major proportion of new cases, especially since the advent of the acquired immunodeficiency syndrome epidemic. Therefore, it is important that otolaryngologists are aware of tuberculosis in the head and neck region and its varied manifestations. We report the increased incidence of isolated head and neck tuberculosis, its various presentations and clinical manifestations over a 10-year period.

Materials and methods: A 10-year (1995–2004), retrospective study was undertaken by the department of otolaryngology and head and neck surgery, Kasturba Medical College, and its allied hospitals, Mangalore, South India, involving a group of 165 patients with head and neck tuberculosis. Each patient underwent a detailed clinical examination and a battery of investigations. Most patients were treated with anti-tubercular therapy alone; others required surgical intervention followed by Anti-tubercular therapy (ATT). In addition, those with human immunodeficiency virus infection or malignancy were treated with anti-retroviral therapy and radiotherapy, respectively.

Results: Of the 165 cases, 121 (73.3 per cent) had isolated tubercular lymphadenitis, 24 (14.5 per cent) had laryngeal tuberculosis, four (2.4 per cent) had tubercular otitis media, three (1.8 per cent) had tuberculosis of the cervical spine, three (1.8 per cent) had tuberculosis of the parotid, eight (5 per cent) had tuberculosis of the oral cavity, one had tuberculosis of the temporo-mandibular joint and one had tuberculosis of the nose. Fine needle aspiration cytology was highly effective in the diagnosis of tubercular lymphadenitis (92 per cent) but not so for other sites. The purified protein derivative (PPD) test was positive in only 20 per cent of cases. Pus for culture and sensitivity was positive only in cases of the spine and mandibular tuberculosis. Excision biopsy and histopathological examination were required to make a diagnosis in tuberculosis of the oral and nasal cavities, salivary glands, ear, temporo-mandibular joint, and mandible. There were 40 cases (24.2 per cent) with coexisting pulmonary tuberculosis and five cases (3 per cent) with coexisting malignancy. Of the 65 patients who were tested, 30 per cent were found to have coexisting human immunodeficiency virus infection.

Conclusion: In addition to cervical lymphadenitis, tuberculosis in the head and neck region can produce isolated disease in the oral cavity, ear, salivary glands, temporo-mandibular joint, nose and larynx. Seventy-five per cent of our head and neck tuberculosis patients did not have pulmonary involvement. Fine needle aspiration cytology was highly effective in the diagnosis of nodal tuberculosis, but histopathological examination was required to make the diagnosis in other head and neck sites. The PPD test was not effective as a diagnostic tool. If the otolaryngologist maintains a high index of suspicion, an early diagnosis can be made with the help of simple investigations. Successful outcome depends upon appropriate chemotherapy and timely surgical intervention when necessary.

Key words: Head and Neck; Tuberculosis; HIV; Needle Biopsy; Antimicrobial Therapy

Introduction

Head and neck tuberculosis (TB) forms nearly 10 per cent of all extrapulmonary manifestations of the disease.¹ It is in otolaryngologists' best interests to be fully cognizant of all the various presentations of head and neck TB. A high index of suspicion can

help direct investigations, allowing early diagnosis and quick commencement of appropriate treatment.

India accounts for nearly one-third of the global TB burden, with nearly 2.2 million cases diagnosed every year.² Our hospital is a tertiary referral centre situated on the west coast of India. In our

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study, we evaluated various head and neck TB presentations, the prevalence of the different forms, and the diagnostic and treatment modalities used. We also studied the coexistence of human immunodeficiency virus (HIV) infection and malignancy.

Materials and methods

The study was conducted within the department of otolaryngology and head and neck surgery, Kasturba Medical College, and allied hospitals in Mangalore, over a 10-year period from 1994 to 2004. The study group comprised 165 patients diagnosed with TB of the head and neck region.

After a detailed clinical examination, the patients underwent a series of investigations, including complete blood analysis, early morning sputum examination, Mantoux test and chest radiograph. Fine needle aspiration cytology (FNAC) or excision biopsy and histopathological examination were performed as required. In addition, plain X-rays or computed tomography (CT) scans of the affected site were performed as necessary. Not all patients in our study were screened for HIV (by enzyme-linked immunosorbent assay). In the early years of our study, it was not the practice in our centre to screen all patients for HIV. However, after 2000, when awareness of acquired immunodeficiency syndrome (AIDS) increased, all patients diagnosed with TB were subjected to this screening test. In cases screened for HIV, coexistence of the disease was documented.

All the 165 patients were offered chemotherapy. Patients with isolated extra-pulmonary TB were administered a regimen that included isoniazid, rifampicin, pyrazinamide and ethambutol, daily for two months, followed by isoniazid and rifampicin daily for four months. Patients with coexisting pulmonary TB were also administered a similar regimen. Patients with coexisting HIV were offered anti-retroviral therapy.

Thirty-eight (23 per cent) patients required surgical procedures in addition to chemotherapy. A few of these were therapeutic procedures, but some were diagnostic procedures done to provide tissue for histopathological examination. The procedures, depending on the site of involvement, included saucerisation, abscess drainage with mandibular condyle sequestrectomy, drainage of retropharyngeal abscess, lymph node excision biopsy, mastoid exploration, tonsillectomy, superficial parotidectomy, selective neck dissection and laryngectomy (for coexisting laryngeal malignancies).

Results and observations

The study included 165 cases of TB of the head and neck. The age group of the patients ranged from five to 100 years. Forty patients (24.24 per cent) were aged 21–30 years, 37 (22.43 per cent) were aged 31–40 years, and 29 (17.58 per cent) were aged 40–50 years. One hundred and eight patients (64.45 per cent) were male and 57 (34.55 per cent) were female. Tuberculosis of the lymph nodes (73.3 per cent) constituted the major bulk of the disease.

Presenting complaints

Forty-seven patients (28 per cent) presented with fever, 21 (12 per cent) with weight loss and 39 (23 per cent) with cough. The details of the presenting complaints at the individual sites are described below.

Coexisting disease

Of the 165 cases, 40 (24.2 per cent) had coexisting pulmonary TB, the relationship being strongest for tuberculosis of the larynx (79 per cent) and oral cavity (28.5 per cent). Five patients (3 per cent) had coexisting laryngeal malignancy with tubercular neck nodes. Of the 65 patients who were tested for HIV, 20 (30 per cent) were positive for the disease.

Investigations

All patients were thoroughly investigated. Depending upon the site of the lesion, the relevant investigations were performed, as depicted in Table I.

Response to treatment

One hundred and twenty-nine patients (78.2 per cent) improved with treatment. Fifteen (9.1 per cent) of those who showed no signs of improvement were given the second line of anti-tubercular drugs, following culture and sensitivity studies. The remaining 18 patients (10.9 per cent) were lost to follow up.

Results for individual regions

Tuberculosis of the lymph nodes. Of the 165 patients, 121 (73.3 per cent) suffered from tubercular lymphadenitis. Patients with TB of the larynx with cervical lymphadenopathy were not included in this group. One hundred and two patients (84.29 per cent) presented with discrete cervical node swelling, 18 (14.9 per cent) presented with matting, and five (4.13 per cent) presented with ulceration and discharge (Figure 1). The most commonly involved lymph node group was the upper jugular, involved in 84 cases (69.4 per cent). Five cases (4.13 per cent) had coexisting malignancy of the larynx. Fine needle aspiration cytology was able to diagnose up to 92 per cent of cases. Nine cases (7.4 per cent) required excision biopsy. The purified protein derivative (PPD) test was performed in 112 (92.6 per cent) cases and was positive in only 14 (12.5 per cent). Most cases were treated with Anti-tubercular therapy (ATT), but patients with matted and ulcerated nodes were treated by selective neck dissection.

Tuberculosis of the larynx. Of the 165 cases, 24 (14.5 per cent) had TB of the larynx. Eleven of these had coexisting tubercular lymphadenitis. Hoarseness was present in all cases. Odynophagia was present in five patients (20.8 per cent), dysphagia in three (12.5 per cent) and otalgia in five (20.83 per cent). Nineteen cases (79 per cent) had coexisting pulmonary TB. The vocal fold was the most frequent site involved (66 per cent), then the arytenoids (17 per cent), aryepiglottic fold (7 per cent),

TABLE I
INVESTIGATIONS AND RESULTS

Diagnosis	PPD		CXR		Sput cult		HPE		Swab cult		FNAC	
	Pf	Pt	Pf	Pt	Pf	Pt	Pf	Pt	Pf	Pt	Pf	Pt
TB lymph node	112	14	112	18	110	18	9	9	–	–	121	112
TB larynx	24	11	24	14	24	10	24	24	–	–	11	11
TB OM	4	3	4	–	4	–	4	4	4	–	–	–
TB cerv sp	1	1	3	–	3	–	–	–	3	3	–	–
TB parotid	1	1	3	1	1	1	3	3	–	–	3	–
TB tonsil	3	3	3	1	3	1	3	3	–	–	–	–
TB tongue	1	–	1	–	1	–	1	1	–	–	–	–
TB hard palate	1	–	1	–	1	–	1	1	–	–	–	–
TB soft palate	1	–	1	1	1	1	1	1	–	–	–	–
TB nose	1	–	1	–	1	–	1	1	–	–	1	1
TB TMJ	1	–	1	–	1	–	1	1	–	–	1	–
TB man	1	–	1	–	1	–	1	1	1	1	–	–

PPD = purified protein derivative; CXR = chest X-ray; sput cult = sputum culture; HPE = histopathological examination; FNAC = fine needle aspiration cytology; pf = number of patients who underwent test; pt = number of patients who had positive test; TB = tuberculosis; OM = otitis media; cerv sp = cervical spine; TMJ = temporo-mandibular joint; man = mandible; – = Nil

interarytenoid area (7 per cent) and, least often, the epiglottis (3 per cent). Histopathology was positive in all 24 patients, but the PPD test was positive in only 11 (45 per cent). Of the five patients with coexisting laryngeal malignancy, laryngectomy was performed in two, while both laryngectomy and radiotherapy were offered to three patients.

Tuberculous otitis media. Ear discharge was the presenting complaint in all four cases. Three had a



FIG. 1

Chronic, non-healing, tuberculous lymph node ulcer in a patient with tuberculosis of the larynx.

post-aural fistula (Figure 2). All patients complained of hearing loss. All cases had middle-ear granulations and perforated tympanic membranes. All patients underwent mastoid exploration. The middle-ear granulations that were sent for histopathological examination were reported as TB.

Tuberculosis of cervical spine. Three patients (1.8 per cent) were diagnosed with caries of the cervical spine with retropharyngeal abscess. All patients presented with dysphagia. Oral cavity examination revealed a bulge in the posterior pharyngeal wall and a swelling in the neck. After radiological investigations (Figure 3), the patients were treated with drainage of the retropharyngeal abscess via an external approach. Pus for acid-fast bacilli staining (Ziehl-Neelsen stain) and biopsy of diseased tissue was positive in all cases. Post-operatively, these patients were given ATT.

Tuberculosis of oral cavity. Two patients with chronic ulcers of the tongue were diagnosed by excision biopsy (partial glossectomy) as having TB of the



FIG. 2

Tuberculous otitis media with post-aural fistula with granulations.

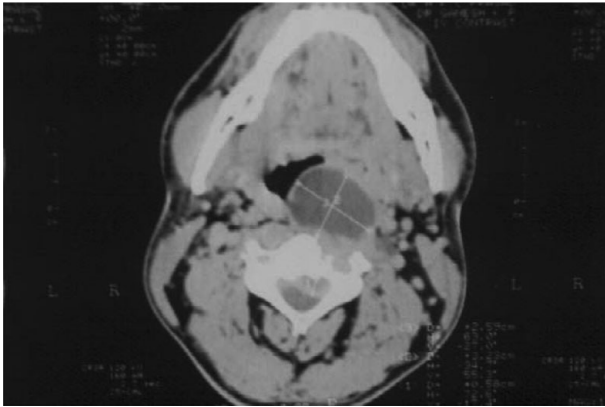


FIG. 3

Axial computed tomography scan of a patient with tuberculosis of the cervical spine, showing destruction of the vertebral body, with pre-vertebral cold abscess compressing the vertebral column.

tongue. One patient presented with a chronic ulcer on the soft palate and another with a hard palatal perforation, proven on wedge biopsy to be tuberculous. Of the three patients diagnosed with TB of the tonsil, one had an ulcer on the tonsil which was proven by biopsy to be tuberculous. The second patient had chronic tonsillitis, for which a tonsillectomy was performed. Histopathological examination of the resected tonsil proved to be positive for TB. The third patient also had chronic tonsillitis, with enlarged and tender jugulodigastric nodes. He gave a past history of pulmonary TB, and reported a habit of consuming unpasteurised cow's milk. Fine needle aspiration cytology was inconclusive in this patient. Tonsillectomy was performed, with excision of the lymph nodes. Histopathological examination of both the tonsil and the excised lymph nodes was positive for TB.

Tuberculosis of parotid. Two of the three cases of TB of the parotid gland presented with long-standing, fluctuant swelling in front of the ear. The third case presented as a chronic, non-tender swelling in the parotid area. Fine needle aspiration cytology was negative for TB in all three cases, and superficial parotidectomy was performed in all cases. Histopathological examinations of the excised specimens were positive for TB. A fourth case of a cold abscess of the parotid gland secondary to TB of the temporo-mandibular joint is discussed below.

Tuberculosis of temporo-mandibular joint. A 62-year-old woman presented with a fluctuant swelling in front of the ear, trismus and a history of chronic ear discharge. A CT scan showed an eroded condyle of the mandible with sequestrum, an abscess of the parotid gland and a communication between the middle ear and the temporo-mandibular joint. Histopathological examination of the middle-ear granulations proved positive for TB. We concluded that this was a neglected case of TB of the middle ear, involving the temporo-mandibular

joint and the parotid. Drainage of the abscess, with superficial parotidectomy and sequestrectomy of the condyle, was performed primarily, followed by mastoidectomy.

Tuberculosis of nose. This was diagnosed in a 16-year-old girl complaining of epistaxis. Clinical examination revealed ulceration over the cartilaginous septum and irregular nodules over the middle and inferior turbinates. Biopsy and acid-fast bacilli staining diagnosed TB. The patient also had tuberculous lymphadenitis and erythema multiforme skin lesions.

Tuberculosis of mandible. This case involved a 26-year-old man with a jaw swelling and a discharging sinus. An orthopantomogram revealed a 'moth-eaten' appearance of the mandible (Figure 4). The disease was treated surgically by saucerisation of the mandible via an external approach. Histopathological examination revealed TB. The patient was treated with ATT, achieving a complete cure.

Discussion

The South East Asian regions carry a disproportionate 38 per cent of the world's TB burden, with only 25 per cent of the world's population.² In India, about 30 per cent of the population has TB, and 1 000 000 people develop a highly infectious variety of TB every year.²

Presentation

The most common site in the head and neck region to be affected by TB is the cervical lymph nodes.³ The upper deep cervical nodes are commonly involved, often with matting, ulceration and abscess formation.⁴

The clinical findings in laryngeal TB vary, from ulcers on the true vocal folds to hypertrophic nodules and hyperaemia and oedema of the arytenoids and aryepiglottic folds.^{5,6} Exophytic, broad-based lesions without significant erythema and oedema may also be seen.⁷ The true vocal folds are the most common site of involvement, followed by the false vocal folds.⁷

Tuberculosis is rare in the nasal and paranasal sinus, since nasal mucosa is inherently resistant to

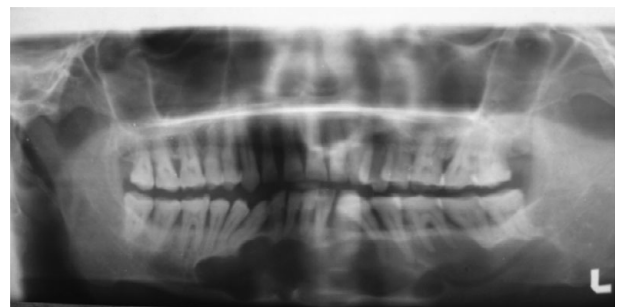


FIG. 4

Orthopantomogram of a patient with tuberculosis of the mandible, showing 'moth-eaten' appearance.

the mycobacterium involved. The disease occurs more commonly in women in their fourth decade.^{8,9} The lesions may be ulcerated, infiltrative or polypoidal, and the most common sites of occurrence are the cartilaginous septum and the inferior turbinate.^{8,9} Lesions of the paranasal sinuses present as pale, polypoidal mucosa of the maxillary antrum or multiple polyps of the ethmoid. Rarely, bone involvement with fistula formation can be seen.¹⁰

The oral cavity is involved in less than 1 per cent of cases.¹¹ In the mouth, the lesions occur in the following order: (1) tongue tip, (2) tongue border and floor of the mouth, (3) soft palate, (4) anterior tonsillar pillar and uvula, and (5) dorsum and base of the tongue. The oral lesions appear as painful ulcers, nodules, fissures and tuberculous granulomas.¹²

Only a handful of cases have been reported of TB of the mandible and temporo-mandibular joint. Tuberculosis of the mandible occurs in young patients with pulmonary involvement.¹³ Tuberculosis of the temporo-mandibular joint can be a primary infection or a fistulous communication from tuberculous otitis media. Patients complain of a painful, fluctuant swelling in front of the ear, associated with trismus.¹⁴

The cervical spine is affected in less than one-fifth of cases of Pott's disease of the spine.¹⁵ Spinal disease is commoner in prepubertal children than in adults. Pain is the commonest symptom in TB of the cervical spine, followed by dysphagia, dyspnoea and stridor due to pressure effects. Abscess formation is initially contained behind the prevertebral fascia and will present as a retropharyngeal abscess or, more rarely, as a sternomastoid abscess or even as a parotid mass.¹⁶

Aural TB usually affects children and young adults.^{17,18} The typical features are: painless otorrhoea; central perforation; pale, abundant middle-ear granulations; severe conductive or profound hearing loss; and facial palsy.¹⁹ Bone necrosis and sequestration in the mastoid are common findings.¹⁷ Superimposed infection changes the clinical picture. There may be otalgia, foul-smelling infection, and even acute mastoid infection and fistulisation.²⁰ The clinical picture may closely resemble an unsafe ear with complications.¹⁷

- **This paper reviews the presentation of tuberculosis (TB) over a 10-year period within a large otolaryngology department in Mangalore, south India**
- **In addition to cervical lymphadenitis, TB in the head and neck region can produce isolated disease in the oral cavity, ear, salivary glands, temporo-mandibular joint, nose and larynx**
- **The majority of head and neck TB patients did not have pulmonary involvement**
- **There was a high level of coexisting human immunodeficiency virus infection in patients presenting with head and neck TB**

Tuberculosis of the salivary glands is rare, even in countries where the disease is otherwise rife.²¹ The disease can be focal, with the involvement of the intra-glandular lymph nodes, or diffuse, with involvement of the parenchyma.²² Usually, parotid involvement presents as a firm, non-tender mass. Abscess formation and fistulisation may also occur.^{22,23} Rarely, VIIth nerve palsy is seen.

Mode of infection

In high prevalence areas such as India, the probable method of infection is droplet transmission from a TB patient and then primary infection of Waldeyer's ring, with secondary infection of the affected site.⁴ Direct inoculation from a pulmonary source to the larynx, oral cavity and nasopharynx is possible, causing TB of these sites.¹¹ Lymph nodes of the neck can be affected by spread from the pulmonary focus via haematogenous or lymphatic routes.^{24,25} Consumption of infected milk is thought to be an important source of infection of the oral cavity; minute trauma of the mucosa invites seeding of the bacilli.¹²

Diagnosis

Fine needle aspiration cytology is a simple and cost-effective investigative tool for the diagnosis of tubercular lymphadenitis, with a reported specificity of 93 per cent and a sensitivity of 77 per cent.¹⁵ In our study, FNAC established the diagnosis in 92 per cent of cases (Table I).

In contrast, the PPD test gave a high number of false negative results in our study. Of the 165 patients, this test was positive in 22 per cent. This leads us to conclude that a negative PPD result does not necessarily rule out TB and that this test is irrelevant in the detection of TB, owing to its low levels of specificity and sensitivity.

A chest X-ray was performed in all 165 cases and a sputum culture in 161 cases. Pulmonary TB could be detected by chest X-ray in 35 cases (21 per cent), and sputum positivity for TB bacilli was proven in 31 out of 35 (88 per cent) of these. Significantly, there were no patients with a positive sputum culture and a negative chest X-ray. This shows that both chest X-rays and sputum cultures are highly effective in the diagnosis of pulmonary TB.

Pus for culture from affected areas was found to be positive only in cases of spinal caries and mandibular TB. Aural swabs in all three cases of tuberculous otitis media were negative. Superimposed bacterial infection is said to be the main cause of a negative culture in cases of aural TB.^{17,20}

Radiological investigation is helpful when TB of the head and neck is suspected (as stated above), but diagnosis requires histopathological examination. In 156 patients, tissue samples were sent for histopathological examination; all were reported positive for TB. If the index of suspicion is high and all other tests are negative for TB, tissue should be sent for histopathological examination to make the final diagnosis.

Treatment

Conservative therapy with anti-tuberculous drugs is the mainstay of treatment. Tuberculosis responds very well to chemotherapeutic agents. In our series, 15 patients showed no signs of improvement after primary therapy. In these cases, further culture and sensitivity studies were performed, and second-line ATT was commenced, with good response.

In our institution, it is not the practice to perform primary culture and sensitivity studies before commencing ATT, since there is a delay of three weeks. We did not culture atypical mycobacteria in any of our cases which showed resistance to primary ATT. Infection with atypical mycobacteria occurs in immunocompromised individuals and presents mainly as lymphadenitis or chronic cutaneous ulcers. The atypical mycobacteria are generally resistant to ATT and require chemotherapeutic agents such as rifabutin, clofazimine and quinolones.²⁶

Adjuvant surgical excision was necessary in cases of tubercular lymphadenitis with large, matted lymph nodes or fluctuant, cold abscesses in the neck. The importance of experienced staff attending such surgery is stressed, as these nodes often lie adjacent to great vessels and, if due care is not exercised, injury to great vessels or incomplete excision of the nodes may occur.²⁷ Tuberculosis of the temporomandibular joint requires condylectomy, abscess drainage and evacuation of sequestrum.²⁸ Tuberculosis of the mandible causes osteomyelitis and therefore requires sequestrectomy and saucerisation. Tuberculosis of the spine with retropharyngeal abscess requires drainage via an external approach.

Tuberculosis of the salivary gland, oral cavity and ear respond very well to ATT and do not require surgical management, except where excisional biopsy is needed to establish a diagnosis.

Coexistence with cancer and HIV

Tuberculosis can coexist with cancer in different organs, in the same organ, or even in the same microscopic slide.²⁹ In the head and neck region, TB can coexist with carcinoma of the larynx,⁶ tonsil and nasopharynx.³⁰ However, the strongest association is with carcinoma of the larynx and the pharynx.

Tuberculosis is 500 times more common in HIV-infected patients than in the normal population, with up to 80 per cent of affected patients developing extra-pulmonary disease.⁹ The problems with such co-infection are manifold.³¹ The HIV infection makes the individual anergic, and skin testing with PPD may not be positive. This may cause a diagnostic problem. Moreover, multi-drug-resistant strains of TB are highly associated with HIV infection. The other compounding factor in this picture is the strong association of the AIDS virus with non-tuberculous mycobacteria, which must be differentiated from *Mycobacteria tuberculosis*. Thus, the presence of TB in an HIV-infected individual is fraught with diagnostic and therapeutic difficulties.

Conclusion

Tuberculosis is on the rise, particularly its extra-pulmonary manifestations. The twenty-first century is likely to see a 'new' TB, with isolated extra-pulmonary manifestations, particular problems due to co-infection with HIV and an increase in multi-drug-resistant strains. Head and neck TB presents a challenge in both diagnosis and treatment, and only a well informed otolaryngologist can do justice to these cases.

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