Manifestations of Tuberculosis in Otorhinolaryngology Practice: A Retrospective Study Conducted in a Coastal City of South India

Rithika Sriram¹ · Kiran M. Bhojwani²

Received: 30 October 2016 / Accepted: 25 January 2017 / Published online: 3 February 2017
© Association of Otolaryngologists of India 2017

Abstract Tuberculosis (TB) of the head and neck has proved to be a diagnostic challenge for otorhinolaryngologists around the world and is often misdiagnosed as cancer. To contribute to a better understanding of TB in the head and neck region by assessing its various manifestations, presentations, diagnostic techniques, risk factors, coexisting illnesses and treatment modalities. This was a retrospective study conducted over a 3 year period (2012–2014) in 2 hospitals in South India, among patients diagnosed to have TB of the head and neck. A semi structured proforma was used to capture information from the medical records pertaining to the various objectives of the study. Data was analysed using SPSS version 16.0 and results obtained were depicted as percentages. Chi-square test was used to find association between the variables and $p < 0.05$ was considered statistically significant. Among 104 patients with TB of the head and neck, the most common manifestation was found to be Tubercular Lymphadenitis (86.53%), followed by laryngeal TB, submandibular gland TB, deep neck space abscess and adenotonsillar TB. FNAC was found to be the gold standard for the diagnosis of TB

lymphadenitis. 26% of the patients had coexisting HIV infection and 16.3% of the patients had associated pulmonary TB. More than 20% of the patients were smokers. Most patients were treated using ATT. Tuberculosis of head and neck is no longer uncommon. Pulmonary TB need not be associated nor is smoking a risk factor according to our study.

Keywords FNAC · Mangalore · Smoking · Tuberculosis

Introduction

Though *Mycobacterium tuberculosis* infection can occur in almost all tissues of the body, pulmonary tuberculosis is by far, the most common type of infection representing approximately 80% of all cases of tuberculosis (TB) [1]. However, Tuberculosis of other regions of the body, is also on the rise. Studies regarding the otorhinolaryngeal manifestations of TB, which are uncommon but important extra pulmonary forms of the disease, are sparse. No study has been conducted so far, regarding risk factors for head and neck TB. Tuberculosis of the head and neck region comprises about 10% of all the cases of extra-pulmonary tuberculosis [2] and cervical lymph nodes are the most commonly affected, followed by laryngeal tuberculosis, deep neck space abscess and tuberculous otitis media [3]. The epidemic of HIV infection, drug addiction and outbreak of Multidrug Resistant TB has caused a dramatic increase in incidence of the disease in these regions and hence, it is important for otorhinolaryngologists to be aware of these lesions. In our study, we assess the incidence of head and neck TB, association of risk factors, its varied presentations, clinical manifestations and diagnostic techniques over a 3 year period.

✉ Rithika Sriram
rithikaatmanipal@gmail.com
Kiran M. Bhojwani
10sunbeams@gmail.com

¹ Kasturba Medical College, Light House Hill Road, Mangalore, Karnataka 575001, India

² Department of Otorhinolaryngology, Kasturba Medical College Hospital, Attavar, Mangalore, Karnataka 575001, India

Aims and Objectives

1. To study the incidence of head and neck TB for a 3 year duration.
2. To review the clinical features and diagnostic techniques employed for head and neck TB patients over 3 years.
3. To study the different treatment modalities employed.
4. To study its coexistence with illnesses such as Pulmonary TB, HIV AIDS and cancer.
5. To study the association of risk factors such as smoking, alcohol consumption and betel nut chewing with incidence of head and neck TB.

Review of Literature

A study conducted by Pandurang et al., on 70 patients from the year 2011–2013 in a renowned hospital in Mangalore revealed that the most common presentation of tuberculosis in the head and neck region was tuberculous lymphadenitis (77%) followed by deep neck space abscess (10%) then laryngeal tuberculosis (8.50%), submandibular gland tuberculosis (3%) and 1.5% diagnosed with pharyngeal tuberculosis. 12.8% of the patients had coexisting HIV infection and 33% patients had associated pulmonary TB [4].

A study was conducted on 100 patients in the ENT department, Khyber Teaching Hospital Peshawar for a duration of 2 years by Muhammad Hafeez et al. The study revealed that most of the patients had primary head and neck TB during the study duration. 97% had cervical lymphadenopathy and there was one patient each of laryngeal TB, cervical spine TB and retropharyngeal abscess TB. Majority of the patients were diagnosed using FNAC. Other modes included MRI, biopsy and histopathology. Gold standard was biopsy for histopathology [5].

In a study conducted by Akbar Khan et al., on 135 patients, majority of the cases of head and neck TB consisted of cervical lymphadenopathy (79.7%), tuberculous laryngitis (8.3%), tuberculosis of cervical spine with associated retro pharyngeal abscess (6.8%), tuberculosis of nose and middle ear (2.9 and 1.96% respectively). Majority of these patients (44.1%) belonged to the lower socioeconomic status. Mantoux test was positive in 96% of cases. Chest X-rays showed evidence of active or healed pulmonary tuberculosis in 28.9% cases. The overall diagnostic index of tubercular bacilli on microscopic examination and culture was 30%. Majority of the patients suffering from tuberculous cervical lymphadenitis were diagnosed by fine needle aspiration cytology. Both subjective as well as objective improvement was noted with the antitubercular therapy [3].

In a study conducted by Yang et al., with the objective of finding the risk factors for extra pulmonary TB, revealed that alcohol consumption did not impact the incidence of extra pulmonary TB [6].

Materials and Methods

Study setting The study was conducted in the Department of Otorhinolaryngology, Kasturba Medical College, Mangalore.

Study design Retrospective study.

Study subjects Patients admitted in the ENT department with TB lesions in the head and neck region, from the years 2012–2014.

Study duration 2 months.

Study sample size All patients admitted in the ENT department with TB lesions in the head and neck region, from the years 2012–2014.

Methodology Institutional Ethics Committee (IEC) permission was obtained prior to the commencement of the study. Case sheets of study subjects were analysed and data in accordance with the aims and objectives of the study was obtained.

Data analysis The data collected was entered in MS Excel. Chi-square analysis was used to study the association between the incidences of the lesions with risk factors such as smoking. Statistical Package for Social Sciences (SPSS) version 16 was used to analyse the data and *p* value less than 0.05 (<0.05) was considered statistically significant. The data was presented in the form of percentages in tables and pie charts.

Implications

Our study expands the knowledge base for the assessment and epidemiology of head and neck TB. Otorhinolaryngologists must keep TB in mind while dealing with head and neck lesions. Health workers must be abreast with these lesions so that diagnosis can be made quickly and appropriate treatment initiated as soon as possible. Our study also helps assess the association of risk factors such as smoking, with head and neck TB and helps find out the most efficacious diagnostic technique to detect TB in these areas.

Results: Observations

A total of 104 patients from KMC Hospital Attavar, and Government Wenlock Hospital, Mangalore, over a 3 years span, were found to have head and neck TB lesions.

Table 1 shows the demographic distribution of the population.

Most patients belonged to the 31–60 years age group. The mean age of the population was found to be 40.34 years. Most patients were males. Table 2 and Fig. 1 show the incidence of the various Head and neck TB lesions among the patients, in our study.

Table 1 Demographic variables of the population (N = 104)

	Frequency (n)	Percentage (%)
<i>Age range (in years)</i>		
0–30	32	30.8
31–60	60	57.7
61–90	12	11.5
<i>Gender</i>		
Male	66	63.5
Female	38	36.5

Table 2 Head and neck TB lesions (N = 104)

S. no.	Diagnosis	Frequency (n)	Percentage (%)
1	Tubercular lymphadenitis	90	86.53
2	Deep neck abscess	4	3.8
3	Submandibular gland tuberculosis	4	3.8
4	Laryngeal TB	5	4.8
5	Adenotonsillar TB	1	1.0

TB lymphadenopathy was found to be the most common lesion (90/104), followed by laryngeal TB, Deep neck space abscess, submandibular gland TB and adenotonsillar TB. Table 3 reveals the common presentations of the patients with these lesions.

Fever and swelling in the neck were found to be the most common presentations. Table 4 compiles the various diagnostic techniques that were employed to diagnose TB in the head and neck region.

FNAC was the method found most effective in the diagnosis of TB lymphadenitis. Indirect Laryngoscopy was the method used to diagnose the cases of laryngeal TB. CT and USG were employed in case of deep neck space abscess and excision biopsy was used in some cases of lymphadenopathy.

Specimens and samples collected from the various diagnostic techniques were subjected to AFB staining. Figure 2 shows the percentage of specimens that were found to be AFB positive and negative.

Majority of the specimens were found to be AFB negative. In our study, we also obtained information about habits such as smoking and alcohol consumption. Figure 3 shows the percentage of the population with risk factors such as Smoking and alcohol consumption.

Majority of the patients (70.2%) did not have any of the risk factors. No association was found between Head and neck TB lesions and Smoking or alcohol consumption. There was no statistically significant association found between cervical lymphadenopathy and smoking ($p = 0.56$).

Fig. 1 Head and neck TB lesion (N = 104)

Table 3 Clinical presentations (N = 104)

S. no.	Presentation	Frequency (n)	Percentage (%)
1	Fever	49	47.1
2	Swelling in the neck	39	37.5
3	Cough with expectoration	7	6.7
4	Pain in the neck	5	4.8
5	Hoarseness of voice	3	2.8
6	Change in voice	2	1.9
7	No complaints	1	1.0

Table 4 Diagnostic techniques employed (N = 104)

S. no.	Diagnostic technique	Frequency (n)	Percentage (%)
1	FNAC	71	68.26
2	Excision biopsy	23	22.1
4	Indirect laryngoscopy	5	4.8
5	CT	2	1.9
6	USG	1	1.0
7	Sputum AFB	1	1.0
8	No technique recorded	2	1.9

Fig. 2 Acid fast staining of the specimens (N = 104) **Fig. 3** Risk factors (N = 104)**Table 5** Coexisting illness (N = 104)

S. no.	Coexisting illness	Frequency (n)	Percentage (%)
1	No coexisting illness	55	52.9
2	HIV AIDS	27	26.0
3	Pulmonary tuberculosis	17	16.3
4	Pott's spine	2	1.9
5	Other extrapulmonary TB	2	1.9

Table 6 Treatment (N = 104)

S. no.	Treatment	Frequency (n)	Percentage (%)
1	ATT	97	93.3
2	Incision and drainage	6	5.8
3	Surgery—adenotonsillectomy	1	1.0

Table 5 reveals the various coexisting illness found among the patients in our study.

Pulmonary TB and HIV were found in minor proportion of patients.

It was found that most patients i.e. 97/104, following diagnosis, were started on anti-tubercular therapy. Adenotonsillectomy was performed for the patient with adenotonsillar TB. This is shown in Table 6.

Discussion

TB is global and is one of the world's deadliest infections. India is the country with the highest burden of TB, with World Health Organisation (WHO) statistics for 2013 giving an estimated incidence figure of 2.1 million cases of TB for India out of a global incidence of 9 million [7].

Extrapulmonary Tuberculosis forms 10–15% of all cases of Tuberculosis in India [8].

In our study we have retrospectively studied the extrapulmonary lesions of Tuberculosis in the head and neck region in 104 patients over a 3 year period. Tuberculosis rarely occurs in otorhinolaryngology practice, but unrecognized and without treatment is potentially lethal and remains an epidemiological threat [9]. Indeed, sufficient knowledge and high degree of suspicion is needed to diagnose lesions in these regions (Table 7).

In this study, majority of the cases were found among males. The male:female ratio did not vary while studying the individual lesions as well. This was in contrast with the study conducted by Akbar Khan et al. [3] where it was observed that females had higher incidence of TB lymphadenopathy compared to males. We attribute our finding to the fact that none of the females in our study had history

Table 7 Comparison of the different TB lesions with observed parameters (N = 104)

Head and neck TB lesion (n)	Age (n)	Sex (n)	Presentation	Diagnostic technique	Risk factor	Coexisting illness	Treatment
Cervical lymphadenitis (90)	31–60 (55)	M (53)	a. Fever (45)	FNAC (63)	No addictions (61)	No illness (48)	ATT (84)
	0–30 (25)		b. Swelling in the neck (34)	Excision biopsy (21)	Smoking (18)	Pul.TB (13)	I&D (3)
	61–90 (7)		c. Pain in the neck (3)	USG (1)	Alcohol (2)	HIV (26)	
	* <i>p</i> = 0.01		d. Cough with expectoration (8)	CT (1)			
Laryngeal TB (5)	31–60 (2)	M (5)	Hoarseness of voice (3)	Indirect laryngoscopy	None of the patients had risk factors	No illness— (4)	ATT (5)
	61–90 (3)		Change in voice (2)	(5). Vocal cords affected in all cases		Pul TB (1)	
Deep neck space abscess (4)	0–30 (3)	M (4)	Pain in the neck (2)	FNAC (2)	No risk factors-(3)	No illness (1)	I&D (3)
	31–60 (1)		Fever (1)	Excision biopsy (1), CECT (1)	Smoking (1)	Pul TB (1)	ATT (1)
			Swelling in the neck (1)			Cancer (1)	Patients treated by I&D were subsequently started on ATT
Submandibular gland TB (4)	0–30 (2)	M (3)	Swelling in the nec (2)	FNAC (4)	No risk factors (3)	No illness (2)	ATT (4)
	31–60 (1)	F (1)	Fever (1)		Smoking (1)	Pul TB (1)	
	61–90 (1)		No complaints (1)			HIV (1)	
Adenotonsillar TB (1)	7	M	Fever and dyspnoea	No recording	No risk factor	No illness	Adenotonsillectomy

M male, F female, ATT antitubercular therapy, I&D incision and drainage, Pul. pulmonary

* A statistically significant association was found between age and incidence of cervical lymphadenopathy (*p* = 0.01)

of smoking which some studies have proven to be a risk factor for TB [10].

The age group of 31–60 years, i.e. the middle age group was found to have the maximum number of cases. We found a statistically significant association between the incidence of Tubercular Lymphadenopathy and Age. Similar results were obtained in a study conducted by Perlman et al. [11], in a study titled “Mycobacterial Infections of Head and Neck”, where Tubercular lymphadenopathy was most found among the age group of 20–40 years.

Tubercular lymphadenopathy was found to be the most common head and neck lesion and this is in accordance with studies conducted in London, Pakistan and other parts of India [3, 4]. Most commonly, patients presented with fever followed by swelling in the neck. FNAC was found to be the most efficient technique used for diagnosis. This is similar to the findings of the study conducted by Nalini et al. [12]. Nearly all patients with these lesions were treated with ATT. This is the recommended treatment plan under CDC and WHO. Excision biopsy was advised for those patients with slow response to medical treatment.

Laryngeal Tuberculosis was the second most common lesion found. This agrees with the findings of Choudary et al. [13]. Laryngeal TB is usually secondary to TB lesion in the lung [14], but in our study only 2 patients had pulmonary TB.

Deep neck space infections often have a rapid onset and can progress to life-threatening complications such as airway obstruction, involvement of carotid sheath and septic shock. In this study, these patients presented with pain in the neck and were diagnosed using Contrast Enhanced CT scan and treated using incision and drainage technique. CT scan helps us isolate the exact location of the lesion and its extent.

Submandibular gland TB is a rare entity but was found among 4 cases in our study. It was found in the younger age group. This form of lesion is usually found in the immunocompromised individual from low socioeconomic status or malnourished [15] but in our study only 1 patient had coexisting HIV AIDS.

Adenotonsillar TB patients usually present in the younger age group as in our study. Tuberculosis of the tonsil is of primary nature. Prior to the introduction of

chemotherapy, when tonsils removed from asymptomatic patients were subjected to histopathological examination, 6.5% of the tonsils were found to be infected with tubercles [16]. With the advent of effective antitubercular therapy and pasteurisation of cow's milk, a considerable reduction in the worldwide prevalence of tuberculosis was achieved and tonsillar tuberculosis became rare [17].

Over a 3 year period, only 1 case of adenotonsillar TB was found in our study.

Smoking did not pose as a risk factor in our study though studies by Gupta et al. [18] revealed the opposite. Also studies conducted by Berkeley University, USA hypothesised that smoking causes a decrease in the immune response of the respiratory tract causing increased activation of latent TB infection.

Alcohol intake also did not prove to be a risk factor for extrapulmonary TB in our study.

It was also found that these lesions need not occur secondary to pulmonary TB or coexist with HIV. Studies by Pandurang et al. [4], is in accordance with this finding.

FNAC and imaging formed the cornerstone of diagnosis in our study.

Almost all cases were started on ATT and surgery was considered in those unresponsive to treatment.

We have observed a changing trend in the pattern of head and neck TB and its coexistence with pulmonary TB and HIV. These lesions can occur independent of the involvement of the lung. Smoking and other risk factors such as alcohol need not be present in the affected individuals.

Conclusion

Tuberculosis is still a rampant disease in India with extrapulmonary forms of the disease on the rise. TB lymphadenitis remains the most common manifestation in the head and neck region. Various efficient diagnostic techniques such as FNAC are available for the diagnosis of these lesions. These need not be associated with HIV AIDS and Pulmonary TB. According to our study, smoking and alcohol were not associated with these lesions.

Compliance with Ethical Standards

Conflict of interest There is no conflict of interest.

Ethical Approval This article does not contain any studies with human participants performed by any of the authors. This article does not contain any studies with animals performed by any of the authors.

Informed Consent Permission to analyse case sheets of patient participants was obtained from the Medical Superintendent of Government Wenlock Hospital and Kasturba Medical College Hospital Attavar, Managlore. Since this is a retrospective study, there is no informed consent as there are no active participants.

References

1. Global Tuberculosis Control (2010) WHO report 2010. World Health Organization, Geneva
2. Gupta KB, Yadav SPS, Manchanda M (2005) Primary pharyngeal tuberculosis. *Lung India* 22:127–129
3. Khan KA, Khan NA, Maqbool M (2005) Otorhinolaryngological manifestations of tuberculosis. *JK Sci* 4:3
4. Pandurang K, Shenoy VS, Bhojwani K, Alva A, Prasad V et al (2014) Tuberculosis in the head and neck in India: down but not yet dead. *J Mycobact Dis* 4(2):148. doi:10.4172/2161-1068.1000148. Accessed on 6th Jan 2015
5. Hafeez Muhammad, Ullah Inayat, Ahmad Ibrar, Ullah Zakir (2011) Otorhinolaryngological manifestations of tuberculosis. *Pak J Med Sci* 27(4):855–857
6. Al-Serhani AM (2001) Mycobacterial infections of the head and neck: presentation and diagnosis. *Laryngoscope* 111:2012–2016
7. Global Tuberculosis Control (2014) WHO report 2014. World Health Organization, Geneva, p 171
8. Wares F, Balasubramanian R, Mohan A, Sharma SK (2005) Extrapulmonary tuberculosis: management and control. *Indian J Tuberc*: 2007 (54):165–167
9. Bruzgielewicz A, Rzepakowska A, Osuch-Wojcikewicz E (2014) Tuberculosis of the head and neck—epidemiological and clinical presentation. *Arch Med Sci* 10(6):1160–1166
10. Agarwal A, Agrawal VK (2011) Impact of tobacco smoke on tuberculosis: a case control study. *Natl J Integr Res Med* 2(3):38–42
11. Perlman DC, D'Amico R, Salomon N (2001) Mycobacterial infections of the head and neck. *Curr Infect Dis Rep* 3(3):233–241
12. Nalini B, Vinayak S (2006) Tuberculosis in ear, nose, and throat practice: its presentation and diagnosis. *Am J Otolaryngol* 27(1):39–45. doi:10.1016/j.amjoto.2005.07.005. Accessed on 7th Jan 2015
13. Choudhury N, Bruch G, Kothari P, Rao G, Simo R (2005) 4 years' experience of head and neck tuberculosis in a South London Hospital. *J R Soc Med* 98:267–269
14. Bull TR (1966) Tuberculosis of the larynx. *Br Med J* 2:991–992
15. Ataman M, Sözeri B, Özçelik T, Gedikoglu G (1992) Tuberculosis of the parotid salivary gland. *Auris Nasus Larynx* 19:271–273
16. Jadia S, Chauhan A, Hazari R, Maurya A, Biswas R (2010) An unusual case of recurrent tonsillitis. *BMJ Case Rep*. doi:10.1136/bcr.12.2009.2561. Accessed on 11th Aug 2015
17. Kulkarni NS, Gopal GS, Ghaisas SG, Gupte NA (2001) Epidemiological considerations and clinical features of ENT tuberculosis. *J Laryngol Otol* 115(7):555–558
18. Gupta KB, Gupta R (2003) Association between smoking and tuberculosis. *Indian J Tuberc* 50(1):5–8