

A clinical and videostroboscopic evaluation of laryngeal tuberculosis

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Abstract

A series of 31 cases of tuberculous laryngitis is reviewed to assess the diagnostic features of the disease.

The condition generally presents in males of late middle age who have pulmonary tuberculosis. It presents in a manner similar to laryngeal carcinoma except that painful dysphagia is a prominent symptom. Histological examination of biopsy material is usually the diagnostic procedure.

Stroboscopy was able to document a number of abnormalities which included abnormalities of laryngeal configuration, vibratory asymmetry, reduction of amplitude and mucosal wave. Symptoms responded well to antituberculous chemotherapy.

Key words: Tuberculosis, Larynx; Laryngoscopy; Stroboscopy

Introduction

Laryngeal tuberculosis was the most common disease involving the larynx in the early part of the twentieth century.

In developed countries there has been a gradual decline in the incidence of tuberculosis due to more effective antituberculous chemotherapy and an improvement in the standard of living of the people (Bailey, 1981). However, in the presence of acquired immunodeficiency syndrome, there has been a resurgence of tuberculosis in some countries (WHO, 1993).

In developing countries, such as India, the problem of tuberculosis is acute and the case rate is 250–500 per hundred thousand and continues to exist in spite of extensive tuberculosis eradication campaigns. The majority of cases are never diagnosed at all, still less get correctly treated (ICMR, 1959). Consequently the incidence of complications of pulmonary tuberculosis, e.g., laryngeal tuberculosis is high.

The clinical findings of laryngeal tuberculosis, however, have changed since the classical description of pre-antibiotic days. The disease now presents in a manner similar to laryngeal carcinoma except that painful dysphagia is a common symptom (Bull, 1966).

Much of the behaviour of the vibrating vocal folds is not visible by indirect laryngoscopy. When the human retina is presented with an image, the image lingers on the retina for 0.2 seconds, after exposure due to 'persistence of vision'. When the vocal folds which vibrate between 60–1500 Hz, produce sequen-

tial images on the retina at intervals shorter than 0.2 seconds, successive images fuse and the vibrating vocal folds appear as a blur along their medial edge.

Stroboscopy generates light flashes at a rate slightly out of synchrony with the fundamental frequency of phonation, as a result the vocal folds appear to stand still or move only slowly.

Strobovideolaryngoscopy is currently the most convenient technique permitting a detailed assessment of the vibratory margin of the vocal folds (Sataloff *et al.*, 1991).

Patients and methods

We analysed 31 cases of laryngeal tuberculosis in the Department of Otolaryngology, Lady Hardinge Medical College, New Delhi. Seventeen patients were referred from the Department of Medicine with the diagnosis of pulmonary tuberculosis and dysphonia, five were admitted for suspected laryngeal carcinoma, one with left superior laryngeal nerve paralysis, two patients with right recurrent laryngeal nerve paralysis, one patient with a laryngeal nodule, five presented to the ENT outpatient department with odynophagia.

All patients had a complete clinical and laboratory work-up including sputum cultures, chest X-rays and laryngeal biopsies. Twenty-five patients also had videostroboscopy of the larynx.

Videostroboscopy on each case was performed with an ATMOS Endostroboscope model IV using a 90 degree rigid telescope passed transorally. Examination of the vocal folds was made during sustained

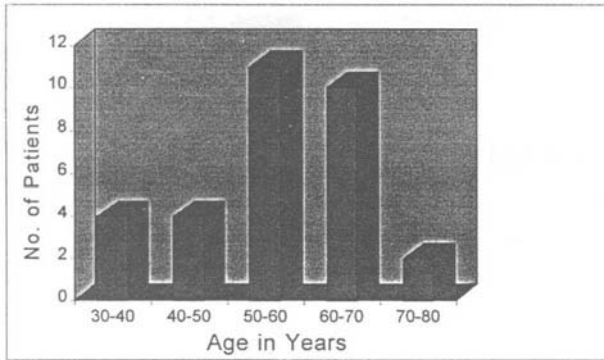


FIG. 1

normal soft and loud vowel phonation /a/ and at the upper and lower extent of voice range.

The onset, extent and velocity of the travelling wave were analysed. Phase differences were noted in cases of asymmetric vibrations.

Other characteristics included the degree of glottic closure, the lateral excursion of the vocal fold during vibration and the regularity of glottic cycles, reflecting the presence or absence of severe frequency perturbation.

All patients subsequently underwent microlaryngoscopy with biopsies for histopathological diagnosis.

Results

The patients' ages varied from 35 to 62 years with a mean of 55 years. The age distribution of patients is presented in Figure 1. The study included 22 men and nine women. Sixty-five per cent came from urban areas while the rest were from rural areas.

The prominent presenting symptom was hoarseness, noted in 25 patients. In most cases the hoarseness started five to 10 months after pulmonary symptoms with a range from 25 days to two years (Table I).

Other symptoms encountered in order of frequency included odynophagia (67.7 per cent, $n = 21$), productive cough (48.4 per cent, $n = 15$), weight loss and fever (38.7 per cent, $n = 12$), haemoptysis (29 per cent, $n = 9$) and night sweats (19.4 per cent, $n = 6$).

A history of previous tuberculosis exposure was obtained in 15 patients and 25 patients had a positive purified protein derivative (PPD) test.

Admission chest radiographical findings revealed evidence of pulmonary tuberculosis in 25 patients, apical thickening and fibrosis (12 patients), apical

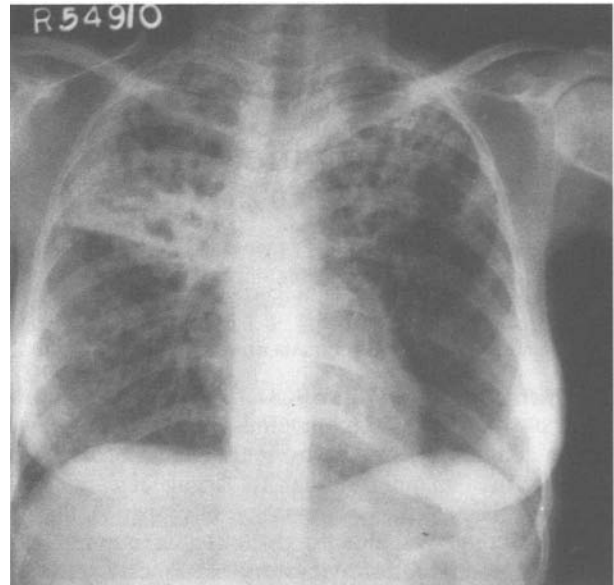


FIG. 2

Photograph showing bilateral infiltrative pulmonary tuberculosis in a 40-year-old female.

cavitary lesions (five patients), mediastinal lymphadenopathy (three patients), chronic obstructive pulmonary disease (three patients), miliary pattern (one patient) and bilateral infiltrative lesion (one patient) whose chest X-ray is shown in Figure 2. Positive sputum was found in 21 patients. All histopathological results showed evidence of granuloma (Table II).

Clinical symptoms and the site of lesion identified are listed in Table III, and a summary of stroboscopic findings of laryngeal tuberculosis are listed in Table IV.

Treatment

Patients were started on antituberculous chemotherapy. At this hospital the regime currently used for patients who are otherwise fit and have no evidence of liver disease is to give rifampicin 450 mg, isoniazid 300 mg, ethambutol 800 mg together as a single daily dose before breakfast with pyrazinamide 750 mg twice daily for an initial period of two months.

Side effects of these drugs must be watched carefully, rifampicin and pyrazinamide may impair liver function, isoniazid may produce peripheral neuropathy, ethambutol may damage visual acuity and colour vision.

TABLE I
LARYNGEAL TUBERCULOSIS

| Time lapse between pulmonary and laryngeal symptoms | Cases | Percentage (%) |
|---|-------|----------------|
| <1 month | 3 | 9.7 |
| 1-5 months | 5 | 16.1 |
| 5-10 months | 11 | 35.5 |
| 10-15 months | 3 | 9.7 |
| 15-20 months | 5 | 16.1 |
| >20 months | 4 | 12.9 |
| Total | 31 | 100.0 |

TABLE II
LARYNGEAL TUBERCULOSIS PATHOLOGY

| | Cases | Percentage (%) |
|---|-------|----------------|
| Ziehl-Neelson | 6 | 19.35 |
| Histological evidence of granuloma (mononuclear lymphocyte infiltration, epithelioid and Langerhan's giant cells) | 25 | 80.65 |
| Total | 31 | 100.00 |

TABLE III
LARYNGEAL TUBERCULOSIS – CLINICAL FINDINGS

| Case | Age | Sex | Hoarseness | Productive cough | Haemoptysis | Odynophagia | Weight loss | fever | Night sweats | Site of laryngeal lesion |
|------|-----|-----|------------|------------------|-------------|-------------|-------------|-------|--------------|---|
| 1. | 45 | M | + | – | + | + | + | – | – | Left TVC |
| 2. | 71 | F | – | – | – | – | – | – | – | Right TVC |
| 3. | 78 | M | + | – | – | – | – | + | + | Epiglottis + Left AE fold |
| 4. | 62 | M | + | + | – | + | + | – | – | Left granular TVC |
| 5. | 57 | F | – | + | + | – | + | + | + | Left TVC |
| 6. | 66 | M | + | + | – | + | – | – | – | Bilateral granular TVC |
| 7. | 57 | M | + | + | + | + | – | – | – | Irregularity and ulceration Left FVC |
| 8. | 60 | F | + | + | + | + | – | + | + | Left FVC and TVC + Subglottis |
| 9. | 52 | F | + | + | + | – | + | – | – | Interarytenoid space |
| 10. | 65 | M | + | + | – | – | – | – | – | Ulceration both folds |
| 11. | 31 | F | – | – | – | + | – | – | – | Epiglottis |
| 12. | 49 | M | + | – | – | + | + | + | + | Epiglottis + Right AE fold |
| 13. | 60 | M | + | + | – | + | + | + | + | Posterior left TVC |
| 14. | 35 | M | – | + | + | – | – | – | – | Interarytenoid space + B/L posterior FVC |
| 15. | 62 | F | – | – | – | + | + | + | + | Posterior right TVC |
| 16. | 49 | M | + | – | – | + | + | – | – | Bilateral granular TVC |
| 17. | 58 | M | + | + | + | + | + | – | – | Left TVC |
| 18. | 60 | M | + | + | – | + | – | – | – | Right FVC and TVC |
| 19. | 50 | M | + | + | + | + | – | – | – | Interarytenoid space |
| 20. | 53 | M | – | + | – | + | + | – | – | Left FVC + TVC |
| 21. | 39 | F | + | – | – | – | – | – | – | Ulcerated right TVC |
| 22. | 56 | M | + | – | – | + | + | – | – | Posterior right FVC and TVC |
| 23. | 58 | M | + | + | + | + | – | – | – | Right TVC |
| 24. | 57 | M | + | – | – | + | + | – | – | Inflammation right fold |
| 25. | 54 | F | + | – | – | + | – | – | – | Left TVC |
| 26. | 62 | M | + | – | – | + | – | – | – | Posterior right FVC and TVC |
| 27. | 55 | M | + | + | – | + | – | – | – | Posterior 2/3 left TVC |
| 28. | 37 | M | + | – | – | – | – | – | – | B/L FVC and TVC |
| 29. | 65 | M | + | – | – | – | – | – | – | Ulcerated right TVC |
| 30. | 40 | F | + | – | – | – | – | – | – | Posterior 2/3 left TVC |
| 31. | 64 | M | + | – | – | + | – | – | – | Left vocal nodule |

TVC: True vocal fold; FVC: False vocal fold; AE: Aryepiglottic.

After two months, ethambutol and pyrazinamide are discontinued and treatment continued with the remaining two drugs for a further four months. There was a prompt improvement in symptoms usually within two weeks of commencing treatment.

It was not possible to assess the results of treatment of all patients in this series since some patients continued treatment at local chest clinics and their records are not available.

Eighteen patients however continued treatment in this hospital. Hoarseness associated with ulceration

TABLE IV
SUMMARY OF STROBOSCOPIC EVALUATION OF LARYNGEAL TUBERCULOSIS

| Stroboscopic findings | | | No. of Cases |
|-----------------------|---|--|--------------|
| Regularity | Closure | Symmetry of vibration and characteristics of mucosal wave | |
| Regular | Variable | Marked diminution of TW excursion and velocity on affected side, greater TVF excursion on normal side | 2 |
| Regular | Complete | Asymmetry of vibration with greater excursion and velocity of TW on normal side, normal TVF adduction and abduction | 4 |
| Variable periodicity | Partial | Marked asymmetry of TW, greater velocity of TW on normal side, normal TVF precedes affected TVF | 4 |
| Irregular | Complete | Asymmetry of vibration. Amplitude of horizontal excursion of vocal fold on affected side is decreased. TW on affected side decreased | 1 |
| Regular | Incomplete glottic chink of irregular shape along entire length | Bilateral asymmetrical involvement, successive vibrations aperiodic, amplitude of lateral excursion limited bilaterally. Mucosal wave not observed at site of lesion | 3 |
| Regular | Complete | Moderate asymmetry of TW, greater velocity and excursion of TW on normal side, particularly at low frequency of vibration decreased tension of TVF on affected side, occasional shifting of glottis from side to side during vibration | 1 |
| Regularity | Closure | Symmetry of vibration and characteristics of mucosal wave | |
| Irregular | Partial, irregular gap at maximum closure | Asymmetry of TW in both phase and amplitude, amplitude on both sides decreased | 4 |
| Stroboscopy | Not possible | | 6 |

TW: Travelling wave; TVF: True vocal fold.

of the ventricular fold or vocal fold in 15 patients cleared completely after three weeks of therapy. The hoarseness associated with right recurrent laryngeal nerve paralysis in the patient with active chronic pulmonary tuberculosis cleared after four months. Hoarseness in the patient who had left superior laryngeal nerve paralysis persisted despite continued administration of anti-tuberculous chemotherapy.

Discussion

In the developed countries early diagnosis, regimes of modern chemotherapeutic agents and natural decline have reduced dramatically the incidence of pulmonary tuberculosis as well as its sequelae such as laryngeal tuberculosis.

In developing countries pulmonary tuberculosis still ranks among the major health problems. The health infrastructure of many developing countries suffers from shortage of human and physical resources.

Poverty, economic recession and malnutrition make populations more vulnerable to tuberculosis. The recent increase in human migration has rapidly mixed infected with uninfected communities. To this already explosive mixture has been added the human immunodeficiency virus (HIV), a potent and dangerous ally of the tuberculosis bacterium, so that a person infected with both *M. tuberculosis* and HIV is much more likely to develop active tuberculosis than someone infected with *M. tuberculosis* alone.

Individual patient presentation varies from localized laryngeal dysfunction to constitutional complaints.

The symptom of hoarseness remains the most common presentation of laryngeal tuberculosis and it was present in 25 of our patients. Odynophagia was present in 21 patients. The laryngeal symptoms are frequently indistinguishable from those of non-specific laryngitis or laryngeal malignancy. The most common constitutional symptom documented was weight loss.

There has been a marked shift in the age distribution of patients suffering from tuberculous laryngitis in recent years. Ormerod (1951) states that 'the period of greatest incidence of tuberculosis of the larynx is in the young adults between 20 to 30 years'. Our patients, however, were mostly in the fifth and sixth decades in agreement with recent studies (Brodovsky, 1975).

There is a male predominance in the sex distribution. Ormerod quotes a male:female ratio of 1.5:1. Brodovsky writing 30 years later quotes 3:1 and this series had a male to female ratio of 2.4:1.

All patients received short course chemotherapy which was highly effective in the 18 patients who were followed up.

Granulomatous and ulcerative lesions responded well to antituberculous treatment within two months. In contrast fibrotic lesions resulting in vocal fold fixation took about four months. Adding steroids in cases of vocal fold fixation may be useful for diminishing the fibrotic reaction.

Lesions tended to be localized in the anterior portion of the larynx in accordance with recent studies. We attribute this to ambulatory treatment regimens which prevents pooling of saliva in the posterior larynx.

Conclusion

Laryngeal tuberculosis is a frequent complication of pulmonary tuberculosis and clinical patterns have changed in recent decades.

The laryngoscopic findings are variable depending upon the location of the lesion. This requires the otolaryngologist to maintain a high index of suspicion and awareness in dealing with patients with dysphonia and concurrent pulmonary and constitutional symptoms.

The response of laryngeal tuberculosis to anti-tuberculosis therapy is excellent with most lesions resolving over a two month period. Further studies are needed, however, to clarify the videostroboscopic findings in tuberculosis of the larynx.

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