

# Leprosy of the Larynx: A Clinicopathological Study<sup>1</sup>

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Laryngeal involvement in leprosy was quite frequent in the presulfone era. Mitsuda and Ogawa (<sup>9</sup>) published a series of 150 necropsies out of which laryngeal stricture was found to be the cause of death in 1.3% of the cases. Yoshie (<sup>13</sup>) observed laryngeal lesions in 64.7% of lepromatous leprosy (LL) cases. In India, for the first time, Desikan and Job (<sup>4</sup>) studied laryngeal involvement in 37 autopsy cases. A review of the literature revealed that most of the reports on laryngeal involvement were based on autopsy findings. However, Barton (<sup>1</sup>), while working in India, reported involvement of the larynx in 31% of 29 patients with early lepromatous leprosy and Malik, *et al.* (<sup>8</sup>) described laryngeal biopsy findings in five LL cases. Gupta, *et al.* (<sup>6</sup>) also reported histological findings from laryngeal biopsy material in 30 LL cases. The present study was undertaken to ascertain the laryngeal clinicopathological findings in our leprosy patients.

## MATERIALS AND METHODS

A large number of patients were examined and 44 established cases of leprosy with otolaryngic manifestations were screened out. The larynx was involved in only ten of these 44 cases. A thorough history regarding general and laryngeal complaints was taken in every case, and all cases were examined for skin and cutaneous nerve lesions. Laryngeal involvement was assessed through indirect laryngoscopy. Direct laryngoscopy was performed in cases where the laryngeal view was obscured by the shape and position of the epiglottis. Laryngeal findings were duly recorded, and punch biopsies from ab-

normal looking areas of the larynx were taken by direct laryngoscopy under local anesthesia.

## RESULTS

Nine patients were males and one was female. The youngest patient was 30 years old and the oldest was 80. The duration of the general symptoms varied from 6–20 years. All of these patients had widespread skin and cutaneous nerve lesions. The most common laryngeal symptom was chronic cough (nine patients), while hoarseness was present in eight cases. Two patients each complained of pain in the throat and intermittent bleeding *per orum*; one patient complained of breathlessness. All of these laryngeal symptoms had lasted for 1–6 years. All of these patients had lepromatous leprosy, had been receiving antileprosy treatment from 2–10 years (Table 1) at the time of examination, and were acid-fast bacilli (AFB) negative cases.

**Gross appearance** (Fig. 1). The epiglottis was thickened in all cases. The thickening was generalized in six cases; it was confined to a portion of the epiglottis only, giving it a lopsided appearance, in the other four cases. In one case, small, pale, discrete nodules were also observed over the free margin of the epiglottis. The aryepiglottic folds were swollen in five cases, and the arytenoids were affected in four cases. All of the lesions over the arytenoid and the aryepiglottic folds were unilateral. Thickening of the vocal cords was present in three cases (unilateral in two, bilateral in one). In the case with bilateral thickening of the vocal cords, the arytenoids and the aryepiglottic folds were also involved and the patient complained of intermittent attacks of breathlessness. Mobility of the vocal cords was not impaired in any of the cases. The anterior commissure was swollen in four cases, while the posterior commissure was involved in three. The false vocal cords, vallecula, or pyriform sinuses were not involved in any case in the present study group (Table 2). The most

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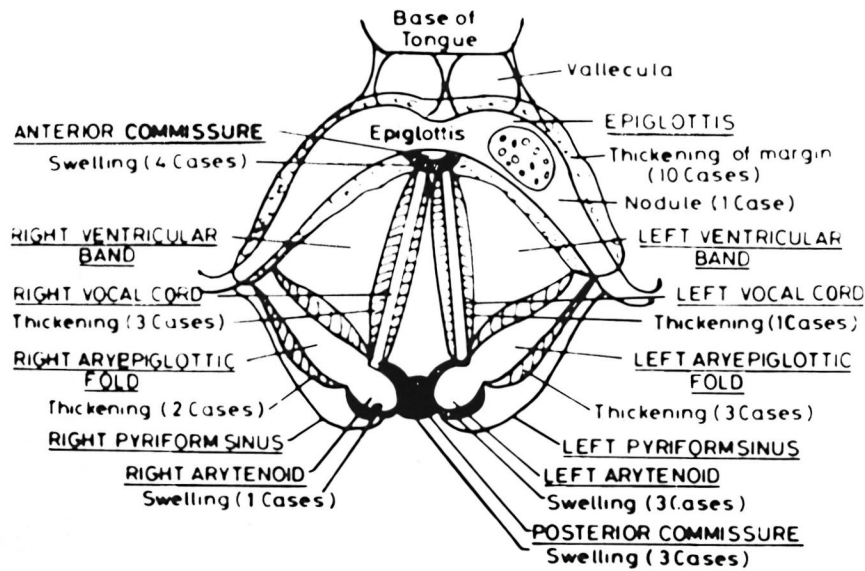


FIG. 1. Distribution of laryngeal lesions in a total of ten cases with laryngeal involvement.

common laryngeal lesion was swelling and thickening. In one case, nodules were also present over the epiglottis. We could not find a single case with ulceration or scarring of laryngeal structures in this study.

**Histopathology.** Laryngeal biopsies were taken from half of the cases. The histopathological changes varied in different cases in nature as well as in intensity. A dense infiltration of chronic inflammatory cells, predominantly lymphocytes and plasma cells in the subepithelium, was observed in all cases. In one case a round cell infiltration with foamy histiocytes, a feature suggestive of leprosy, was also seen throughout the thickness of the subepithelium (Fig. 2). In

addition, three cases showed fibroblasts present in the deeper layers of the mucosa. There was some evidence of nerve destruction and inflammation; atrophic changes in the epithelium were observed in two cases. In one case, marked epithelial hypertrophy with dysplasia was seen (Fig. 3). We were unable to find any granuloma in our material. It is possible that the prior antileprosy treatment might have altered the histopathologic picture in our study.

#### DISCUSSION

Leprosy of the larynx may be seen in two forms: fibrotic and ulcerative. In the fibrotic form, the tissue of the larynx reacts to *My-*

TABLE 1. *Laryngeal symptoms.*

Case no.	Age	Sex	Duration of general symptoms (yr)	Duration of laryngeal symptoms (yr)	Laryngeal symptoms				Duration of treatment (yr)	
					Change in voice	Pain	Bleeding	Cough		Breathlessness
1	42	M	6	3	+	-	-	+	-	4
2	80	M	10	3	+	-	-	+	-	7
3	59	M	10	6	+	-	-	+	-	8
4	50	M	8	4	+	-	-	+	-	5
5	30	M	12	1	+	-	-	+	-	10
6	75	M	9	6	-	-	-	+	-	8
7	51	M	11	6	+	+	+	+	-	5
8	52	F	6	3	+	+	+	+	+	2
9	48	M	7	5	-	-	-	-	-	5
10	41	M	20	6	+	-	-	+	-	8

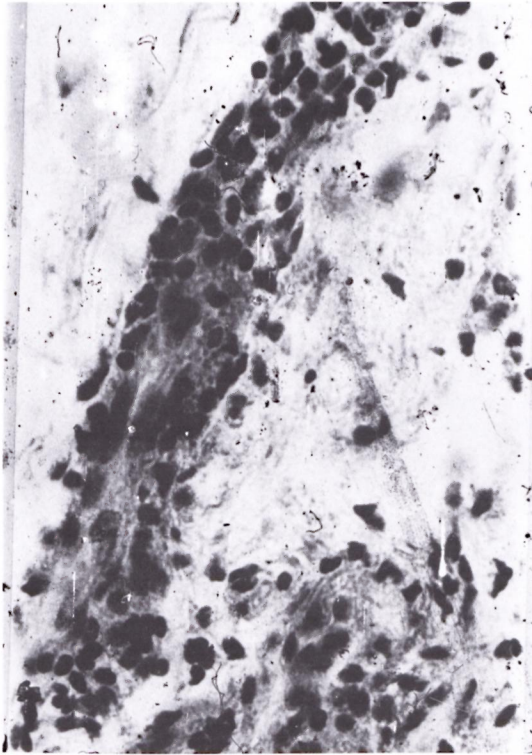


FIG. 2. Foamy histiocytes, lymphocytes, and plasma cells in subepithelial zone (H&E  $\times 500$ ).

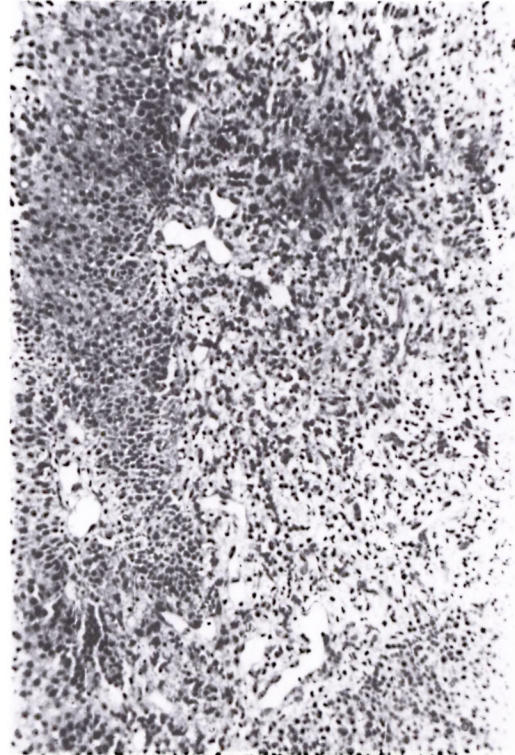


FIG. 3. Marked epithelial hypertrophy with dysplasia of the overlying epithelium (H&E  $\times 125$ ).

*cobacterium leprae* by forming fibrous tissue, resulting in immobility of the vocal cords, giving rise to hoarseness. The disease is slowly progressive and may lead to complete stenosis of the larynx and sometimes a tracheostomy may be required in order to save the patient's life (5). In the ulcerative form, the granulation tissue develops much earlier and gives rise to hoarseness, pain, and breathlessness. Punched out ulcers are formed over the mucous membrane of the arytenoids, corniculate cartilage, and in the regions of the false vocal cords. The danger to life is considerable due to the extensive inflammatory involvement; edema develops very fast and the patient may quickly reach the state of acute respiratory distress (2).

**Site of involvement.** The epiglottis is always affected first (1, 5, 11, 12). Later on as the infiltration spreads, the aryepiglottic folds, arytenoids, posterior commissure, and false vocal cords are also involved and, at this stage, the mobility of the vocal cords may

be impaired causing hoarseness (1). The arytenoids and aryepiglottic folds may be replaced by large swellings with uneven surfaces. The pyriform sinus, post-cricoid region, and the true vocal cords do not appear to be affected even in cases with marked laryngeal involvement. Barton (1) attributed the late involvement of the vocal cords to the poor vascularity of the vocal cord mucosa. In the early stage of the disease process only the anterior parts of the larynx are affected. In the later stages the entire larynx may be seen filled with dull, gray, nodular tissue (4). However, since the development of effective antileprosy drugs, such a picture is seldom seen today. The epiglottis was involved in all of the cases in our study. The arytenoids were swollen in 40% and the aryepiglottic folds were swollen in 50% of the cases. We were unable to find any lesion involving the false vocal cords or the pyriform sinus or vallecula, nor any ulceration, atrophy, or scarring of laryngeal tissue. The mobility of the vocal cords was not im-

TABLE 2. Site of laryngeal lesions

Case no.	Vallec- ula	Epi- glot- tis	Aryepiglottic folds		Arytenoids		False vocal cords		Vocal cords		Ant. comm.	Post. comm.	Pyri- form sinuses
			Right	Left	Right	Left	Right	Left	Right	Left			
1	-	+	+	-	+	-	-	-	-	-	-	+	-
2	-	+	-	-	-	-	-	-	-	-	-	-	-
3	-	+	-	+	-	-	-	-	-	-	-	-	-
4	-	+	-	-	-	-	-	-	-	-	-	-	-
5	-	+	-	-	-	+	-	-	-	-	-	+	-
6	-	+	+	-	-	-	-	-	+	-	+	-	-
7	-	+	-	-	-	+	-	-	-	-	+	-	-
8	-	+	-	+	-	+	-	-	+	+	-	-	-
9	-	+	-	+	-	-	-	-	-	-	+	+	-
10	-	+	-	-	-	-	-	-	+	-	+	-	-

paired in any of the cases. However, thickening of the vocal cords was observed in three cases. This may be due to the fact that we performed direct laryngoscopic examination in all cases where the laryngeal view was obscured by a swollen and distorted epiglottis. Direct laryngoscopy gives a much better view, and the entire larynx can be examined with satisfaction. The role of direct laryngoscopy has also been stressed by others (<sup>1,2</sup>).

There is no controversy regarding the fact that the epiglottis is almost always involved in leprosy of the larynx. The epiglottis can be termed as the site of predilection in the larynx. Apart from the mucosa of the nasal cavity, the single site most commonly involved in the upper air and food passages is the free margin of the epiglottis (<sup>1, 5, 11, 12</sup>). It is reported that after passing the posterior choanae the stream of inspired air flows over the epiglottis before entering into the larynx. The temperature of inspired air at this point is approximately 2°C cooler than the normal body temperature (<sup>10</sup>). It is generally accepted that *M. leprae* favor cooler parts of the body.

Systemic antileprosy chemotherapy rapidly modifies the laryngeal pathology by rapidly decreasing the bacterial count. Davey and Rees (<sup>3</sup>) reported zero or near zero bacterial counts in nasal discharges after two months' treatment with dapsone. The disease process is checked and healing starts with varying degrees of fibrosis.

#### SUMMARY

Ten established cases of lepromatous leprosy with laryngeal involvement are re-

ported, and their clinical and histopathological findings are discussed with a brief review of the literature.

#### RESUMEN

Se presentan 10 casos de lepra lepromatosa con afectación laríngea y se discuten los hallazgos clínicos e histopatológicos. También se hace una breve revisión de la literatura sobre este tema.

#### RÉSUMÉ

On rapporte l'observation de 10 cas confirmés de lèpre lépromateuse avec atteinte laryngée. Les observations cliniques et histopathologiques menées chez ces malades sont discutées. On présente également une courte revue de la littérature.

#### REFERENCES

- BARTON, R. P. E. Lesions of the mouth, pharynx and larynx in lepromatous leprosy. *Lepr. India* **46** (1974) 130-134.
- COCHRANE, R. G. and DAVEY, T. F. *Leprosy in Theory and Practice*. Bristol: John Wright & Sons Ltd., 1964, pp. 329-331.
- DAVEY, T. F. and REES, R. J. W. The nasal discharge in leprosy: Clinical and bacteriological aspects. *Lepr. Rev.* **45** (1974) 121-134.
- DESIKAN, K. V. and JOB, C. K. A review of post-mortem findings in 37 cases of leprosy. *Int. J. Lepr.* **36** (1968) 32-34.
- DHARMENDRA. *Leprosy*. 1st ed. Bombay: Kothari, 1978, vol. 1, p. 178.
- GUPTA, J. C., GANDAGULE, V. N., NIGAM, P. F. and GUPTA, D. K. A clinico-pathological study of laryngeal lesions in 30 cases of leprosy. *Lepr. India* **52** (1980) 557-565.
- JACKSON, C. and JACKSON, C. L., eds. *Diseases of the Nose, Throat and Ear*. 2nd ed. London: W. B. Saunders Co., 1959, pp. 618-619.
- MALIK, R., AHUJA, P. and CHANDRA, K. Leprosy of the larynx. *Int. J. Lepr.* **43** (1975) 114-115.

9. MITSUDA, K. and OGAWA, M. A. A study of one hundred and fifty autopsies on cases of leprosy. *Int. J. Lepr.* **5** (1937) 53-60.
10. NEGUS, V. E. *Comparative Anatomy and Physiology of the Nose and Paranasal Sinuses*. London: E. & S. Livingstone, 1958. Cited by Barton, R. P. F. in Lesions of the mouth, pharynx and larynx in lepromatous leprosy. *Lepr. India* **46** (1974) 130-134.
11. PINKERTON, F. J. Tropical diseases of the nose and throat. In: *Otolaryngology*. Coats, G. M. and Schneck, H. P., eds. Maryland: Fed. Proc. Comp. Incl., 1964, pp. 1-7.
12. THOMSON, S. C. and NEGUS, V. E. *Diseases of the Nose and Throat*. 6th ed. London: Cassell, 1965, pp. 928-930.
13. YOSHIE, Y. Clinical and histopathological studies in leprosy of the larynx. *Leprologia* **24** (1956) 392-399.