Laryngeal Tuberculosis Revisited

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Although a rare entity, laryngeal tuberculosis must be a diagnostic consideration - along with laryngeal carcinoma - whenever patients present with prolonged hoarseness or painful dysphagia. This form of tuberculosis was once thought to be especially virulent and more infections than other forms; however, severity was probably the result of the frequent association with advanced cavitary disease. Laryngeal tuberculosis usually responds well to multiple-drug antituberculous therapy.

Laryngeal involvement is a well-recognized complication of *Mycobacterium tuberculosis* infection. Tuberculosis may be the most common cause of granulomatous lesions of the laryngeal mucosa. These lesions can mimic malignancy. Usually associated with cavitary pulmonary tuberculosis, laryngeal tuberculosis has been considered highly contagious. Early studies suggested that the infected larynx is an effective locus for the production of tuberculous-laden droplet nuclei. More recent studies, however, suggest that the coexistence of cavitary pulmonary tuberculosis makes laryngeal tuberculosis appear to be highly infectious.

Illustrative Case

A previously healthy 33-year-old woman presented for medical care because of a progressive sore throat, a slight nocturnal nonproductive cough and a sensation of fullness in the throat. She related her symptoms to four months previously, when she swallowed a fish bone while eating.

The patient's medical history was unremarkable. She was a nonsmoker and did not drink alcohol.

On physical examination, she was afebrile, asthenic and in no obvious distress. Head and neck examination revealed a large exophytic mass (Figure 1) involving the right glossoepiglottic fold and the false cord. The true vocal cords and the remainder of the larynx and pharynx were normal. Neck examination also revealed several lymph nodes, 3 mm in diameter, in the right posterior cervical triangle.

Laboratory studies included a normal complete blood cell count, urinalysis and chemistry panel. Chest radiographs revealed several left hilar calcifications and a subtle left upper lobe fibrolinear infiltrate without pleural change or adenopathy. Three induced sputum specimens were negative for acid-fast bacilli.

Bronchoscopy with brushings of the left upper lobe was performed. Specimens were negative for acid-fast bacilli, but biopsy of the laryngeal mass revealed acid-fast bacilli within

a caseating granulomatous background. Subsequent tissue culture was positive for pansensitive *M. tuberculosis.*

The patient was given a two-month course of four antituberculous agents: isoniazid, rifampin, pyrazinamide and ethambutol. This regimen was followed by rifampin and isoniazid for four months.

Repeat examinations over the next few weeks revealed a remarkable resolution in the size of the laryngeal mass (Figure 2). Contact investigation produce no evidence of tuberculous infection in four household members, which included two children of preschool age. No recurrence of the infection was seen at two-year follow-up.

Clinical Overview

Granulomatous lesions of the larynx include syphilis, sarcoidosis, Wegener's granulomatosis, fungal infection, neoplasm and tuberculosis. Before the availability of effective chemotherapy, laryngeal tuberculosis was the most common granulomatous lesion of the larynx. Upper airway involvement was a common accompaniment to severe pulmonary disease and carried a 33 percent greater mortality rate than pulmonary tuberculosis alone. An earlier series noted that laryngeal involvement occurred in 15 to 25 percent of tuberculosis cases.

Following World War II, the incidence of laryngeal tuberculosis fell to 5 percent, and over the past few years, laryngeal tuberculosis has become an unusual presentation of tuberculous disease. A 1975 Canadian study revealed an incidence of 1.5 percent among 1.383 patients with pulmonary tuberculosis.

Clinical Presentation

Physical Findings

Physical findings in patients with laryngeal tuberculosis include a markedly edematous epiglottis (a "turban-shaped" epiglottis). Local edema and/or ulceration of the arytenoid cartilage may be present, as well as unilateral edema or infection of the true vocal cord. Some authors have described edematous nodular swellings, most frequently in the interarytenoidal area. The edematous area is often quite pale, with exuberant granulation tissue that may obliterate anatomic landmarks. Laryngeal tissues may become quite rigid.

Roentgenographic configurations that suggest tuberculosis in the upper airway include prominent swelling and ulceration, particularly of the posterior aryepiglottic folds (pear-shaped folds) and upper epiglottis. These findings may be bilateral but not necessarily symmetric. It is not possible to differentiate laryngeal carcinoma from tuberculosis on clinical examination.

Symptoms

Dysphagia is a prominent presenting symptom of laryngeal tuberculosis. A relatively short history of hoarseness is usually present. Lower respiratory symptoms are uncommon in patients with primary laryngeal tuberculosis. Otalgia is quite frequent, and pain may be referred by way of the superior laryngeal branch of the vagus nerve.

Discussion

Three aspects of laryngeal tuberculosis have frequently been described in the literature: (1) this manifestation has been considered an unusually severe form of the clinical illness, with a high mortality rate; (2) laryngeal tuberculosis is frequently associated with widely advanced cavitary pulmonary tuberculosis, and (3) it is extremely infectious.

Unusual Severity

Before the introduction of streptomycin, a mortality rate of 45 to 90 percent was reported in patients with tuberculous laryngitis. It was rare in these patients to find laryngeal tuberculosis without advanced cavitary pulmonary tuberculosis. Patients tended to be extremely debilitated, with weight loss, malaise and night sweats.

After the introduction of streptomycin in 1944, mortality from laryngeal tuberculosis fell to (and remains) 1 to 2 percent. This dramatic decrease probably resulted from earlier diagnosis and more effective therapy.

Laryngeal tuberculosis occurs more commonly in men and now seems to occur more often in older persons. Antituberculous therapy usually results in prompt relief of symptoms within a few days; complete resolution of symptoms may take two months.

The previously reported high mortality rates are probably no longer applicable, given the availability of several more effective antituberculous agents.

Advanced Cavitary Pulmonary Disease

Laryngeal tuberculosis is generally thought to develop through bronchogenic extension from a primary pulmonary tuberculous lesion, rather than by hematogenous spread, which is considered rare. The most likely cause of laryngeal involvement is inoculation from infected pulmonary secretions. An alternative theory suggests that secondary invasion comes from lymphatic and hematogenous routes. Primary infection of the laryngeal structures may rarely occur.

In patients with minimal or no evidence of active pulmonary tuberculosis, hematogenous dissemination from a lung nidus seems to be the most likely mode of spread. The findings in these cases, as in our illustrative case, resemble those of laryngeal carcinoma. Advanced cavitary

pulmonary tuberculosis no longer seems to be present in all cases. Thus, painful dysphagia in a patient presenting with hoarseness should raise the suspicion of tuberculosis (regardless of chest film findings), as well as laryngeal carcinoma.

Extreme Infectivity

Based on a 1962 study of tuberculosis in guinea pigs, it was theorized that human laryngeal tuberculosis has a greater degree of infectivity than pulmonary tuberculosis. Tuberculous infections caused by exposure to persons with laryngeal tuberculosis were thought to be more virulent and more frequently miliary in form. However, it was later postulated that the active cavitary pulmonary process usually accompanies laryngeal tuberculosis and accounts for the extreme infectivity. This theory is substantiated by the observation that if few tubercle bacilli are present in sputum specimens and radiographic pulmonary disease is minimal, tuberculosis of the upper respiratory tract has a low potential for infectivity.

In 1976, Horowitz and associated reported on two patients with laryngeal tuberculosis but repeatedly negative bronchial secretions for acid-fast bacilli. Laryngeal tissue cultures were positive for tuberculosis. Neither patient had radiographic evidence of active pulmonary involvement. Furthermore, the purified protein derivative (PPD) test results of 17 close household contacts remained negative. In a study of 10 patients with minimal pulmonary involvement, no evidence of infectivity was found in close contacts. In our illustrative case, there was no infection in other household members, which supports the view that this subset of tuberculosis patients has a low incidence of infectivity. Thus, the concern about contagion in the case of isolated laryngeal tuberculosis in a patient without active pulmonary involvement may be overstated.