

LARYNGEAL INVOLVEMENT IN RHEUMATOID ARTHRITIS

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Abstract

Patient with rheumatoid arthritis should be screened prior to surgery for any laryngeal manifestation. A thorough history and physical examination coupled with indirect or direct laryngoscopy are mandatory. Nonspecific laryngeal symptoms in patients with rheumatoid arthritis should raise suspicion of laryngeal involvement. Phonatory disturbances or airway difficulties may reflect advanced stages of the disease. Their presence is usually coupled with high resolution computerized tomography findings. Aggressive therapy should be started and corticosteroid injection should be contemplated in cases of failure of conventional treatment. The anesthesiologist should handle with extreme care the inflamed laryngeal structures and be least aggressive in securing the airway.

Introduction

Rheumatoid arthritis is one of many destructive systemic diseases

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that are progressive in nature and characterized by remissions and exacerbations. The chronic aspect of this condition very often leads to substantial disability. It affect approximately 5% of the population with predilection for small peripheral joints. The most commonly involved sites are the pressure areas where the synovial membrane is affected by chronic inflammation with consequent joint damage and bone destruction¹⁻⁴. Extra-articular rheumatoid nodules may be present in various organs of the body in up to 20% of patients with rheumatoid arthritis⁵⁻⁹. Laryngeal manifestations of rheumatoid arthritis may be in the form of laryngeal myositis, neuropathy of the recurrent laryngeal nerve, postcricoid granulomas, cricoarytenoid joint arthritis and rheumatic submucosal nodules^{6,10-22}. These finding have fostered keen interest in many authors to investigate further laryngeal involvement, and since then many reports were published describing these lesions in patients with autoimmune diseases. In a survey conducted by the American Broncho-Esophagological Association, 38% of its members request serum level for rheumatoid factor in the diagnostic work up of immobile vocal fold. In parallel with the laryngeal manifestations of this systemic autoimmune disease, what are the laryngeal symptoms often reported by the affected patient and what are the most common endoscopic laryngeal and radiological findings that the anesthesiologist and caring physician should be aware of ?

Clinical Presentation

Laryngeal symptoms

Laryngeal involvement in patients with Rheumatoid Arthritis is common but usually subclinical. The phonatory and airway symptoms are very often overlooked by the physician who is more focused on the severe small joint polyarthropathy. Laryngeal symptoms during the course of the disease may vary between 31% to 75% with histopathologic laryngeal involvement reaching up to 90% in postmortem examination^{24,25}. In the early stages of the disease patients report fullness or tension in their

throat, foreign body sensation and later hoarseness, odynophagia, pain, cough and dyspnea. Hoarseness may be the first complaint in patients not previously diagnosed with autoimmune diseases as reported by Emi Murano et al²⁶. In a study published by R Ylitelo et al, all of his 14 patients had vocal roughness and reported an increase in their phonatory effort. Perceptually the most prominent features were intermittent aphonia and voice instability²⁷. The laryngeal symptoms are secondary either to the presence of a vocal fold lesion often referred to as bamboo node or to the involvement of the cricoarytenoid joint. The presence of rheumatic nodules on the vocal fold interferes with the oscillation of the vocal fold cover, changing its vibratory pattern and thus increasing the perturbation of the vocal signal. On the other hand in up to two third of the cases the phonatory symptoms may be attributed to cricoarytenoid joint involvement²⁸. Very rarely amyloidosis secondary to rheumatoid arthritis or secondary Sjogren's syndrome are the causes of laryngeal manifestation²⁹. An increase in translaryngeal resistance during phonation has been reported and attributed to the synovitis of the laryngeal joints^{30,31}. Failure of the vocal folds to abduct during inspiration may lead to narrowing of the rima glottides manifesting clinically as stridor during exercise or at rest in close to 75% of the cases³². This can result from the inflammation and edema of the arytenoids and posterior commissure in acute involvement of the joint or from the ankylosis of the joint in chronic cases. Severe rheumatoid arthritis may present as laryngeal obstruction most often following surgery leading to cardiac, pulmonary and fatal complications. The vocal folds are usually in the median or paramedian position and their abduction is disturbed secondary to cricoarytenoid arthritis. Substantial compression of the arytenoids by the laryngeal mask or endotracheal tube may aggravate the laryngeal rheumatoid inflammatory changes, a condition that may lead to open surgical intervention and temporary tracheotomy.

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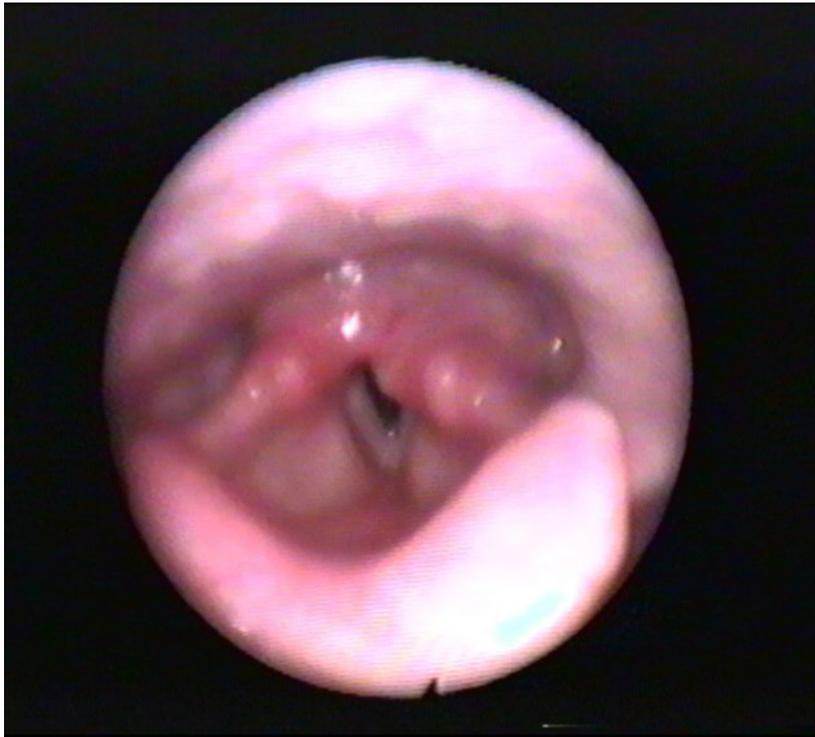
Laryngeal findings

Laryngeal examination using fiberoptic endoscopy or rigid telescopy is a must. The yield of examination can vary from 13% to

75%¹⁰⁻¹⁸. The laryngeal manifestation may include mild mucosal edema, mucosal inflammation, epiglottitis, cricoarytenoid arthritis and rheumatoid vocal fold nodules. In case of cricoarytenoid joint involvement, there is edema or redness of the arytenoid cartilages, interarytenoid pachydermia, impaired mobility or fixation of the arytenoids or vocal folds (Fig. 1).

Fig. 1

Edema and redness of the posterior commissure and left arytenoid cartilage with fixation of the left vocal fold in the paramedian position in a patient with rheumatoid arthritis and laryngeal involvement



Histologic examination of the affected diarthrodial joints has shown synovial proliferation, with fibrin deposits and the formation of pannus in

the early stage of the disease and later ankylosis and obliteration of the joints³³. The other common laryngeal findings are inflammatory and granulomatous lesions very often witnessed in the larynx and pharynx of patients with rheumatoid arthritis. They are described as small submucosal cystic masses at the junction of the anterior and middle third of the vocal folds. Histopathologically, they are similar to rheumatoid nodules found elsewhere in the body, with areas of focal necrosis and lime salt deposition surrounded by an epithelioid zone and fibrous connective tissue^{19,20}. Hosako et al in 1993 reported a transversal cream-yellow band lesion at the midpoint of the upper surface of the vocal folds in a patient with systemic lupus erythematosus³⁴.

Subsequently, there were several reports in the literature on vocal fold lesions related to autoimmune diseases, and the term vocal fold bamboo node has been used to simplify the nomenclature of the same feature²⁶. The nodulosis can be secondary to the disease itself or to the usage of methotrexate as part of the treatment, which may accelerate this nodulosis³⁵. Severe nodulosis occurring at the upper lip of the vocal fold or anywhere in the larynx may cause dysphonia or change in voice quality. Direct visualization of the macroscopic features of the vocal fold bamboo node with the laryngeal endoscope provides important information on these lesions. The lesions are not always in the middle of the vocal folds and symmetrical. Laryngeal stroboscopic examination allows one to study the vibratory pattern of the mucosa on the affected side, estimate the depth of the lesion in the mucosal layer confirming thus the unique characteristics of these lesions. The lesions are often mistaken for vocal fold nodules or cysts. They have the appearance of bilateral submucosal deposits that appear as transverse bands, especially when the patient phonates at a high register, extending thus the vocal fold and thinning the mucosal cover. There is invariably a decrease or absence of mucosal waves and at times a 180 degree phase shift noted between the anterior and posterior portions of the vocal folds when the lesion is in the middle. Laryngeal stroboscopy will also allow you to assess adduction defects and bowing of the vocal folds when present. Palpation of these lesions under general anesthesia reveals hard fibrotic masses anchored to

the underlying structures of the vocal folds^{26,27}.

Radiologic findings

In more than seventy percent of the cases, radiologic evaluation can help both anesthesiologists and otolaryngologists in detecting laryngeal involvement in patients with rheumatoid arthritis³⁶. For that purpose, either plain radiographic evaluation or computerized tomography of the neck and laryngeal structures may be requested. Low voltage radiography may reveal osseous destruction of the cricoarytenoid joint in close to 50% of the cases³⁷. High resolution CT scan seems to be very useful for early detection of cricoarytenoid joint arthritis. There is a very high correlation between the radiologic findings and the patients symptomatology²⁸. In 9 out of 10 patients, symptoms and high resolution CT scan findings were present together. A five mm contiguous sections from the hyoid bone to the cricoarytenoid joints and from the subglottis to the trachea are taken, and a 0.7 mm sections in the region of the cricoarytenoid joint are added using the overlap technique. Cricorytenoid joint involvement can reach up to 80% and the most common finding are cricoarytenoid prominence (46%), density and volume changes (46%), followed by cricoarytenoid subluxation (39.9%). Magnetic resonance imaging may be used for further evaluation of laryngeal soft tissue changes in patients with Rheumatoid Arthritis (See Table 1).

Treatment

Early recognition and initiation of treatment are crucial in sparing the larynx chronic deformities that can be life threatening. It is important not to mistake airway symptoms with asthma, psychoneurosis or paradoxical vocal fold motion. Treatment consists mainly of administration of high doses of steroids systemically or locally into the cricoarytenoid joint as reported by Habib et al³⁸. Injection of the cricoarytenoid joint with steroid may be an adjunctive procedure to parental corticosteroid therapy. In cases of acute respiratory distress of

life threatening emergencies, a tracheostomy should be performed to secure the airway. Exposure of the laryngeal inlet with possible injection of corticosteroids into the joint

Table 1
Laryngeal manifestations of rheumatoid arthritis

Laryngeal manifestations of rheumatoid arthritis		
Laryngeal Symptoms	Laryngeal Findings	Radiologic Findings
a – Vocal Symptoms: Hoarsenes Intermittent aphonia Vocal breaks Vocal fatigue Increase in phonatory effort b – Airway Symptoms Cough Dyspnea Aspiration Stridor Respiratory distress Failure to intubate Failure to extubate c – Nonspecific Symptoms Sore throat Throat fullness Foreign body sensation Dysphagia Odynophagia	a – Cricoarytenoid Joint Involvement (CAJ) Edema of CAJ Redness of CAJ Interarytenoid pachyderma Impaired CAJ mobility (unilateral or bilateral) Fixed CAJ (unilateral or bilateral) b – Vocal fold Involvement Bowing of the vocal folds Adduction defects of the vocal folds Presence of rheumatic nodules (Bamboo nodes) Cream-yellow band Whitish transverse band Submucosal cystic lesion Unilateral or bilateral Middle of the vocal fold At the junction of the anterior and middle of the vocal fold c – Other Findings Mucosal edema Mucosal redness Epiglottitis	a – Low voltage neck radiography Erosive arthritis of CAJ b – High resolution computerized tomography CA prominence Density changes in CAJ Volume changes in CAJ Decrease in CAJ space Erosion of CAJ Ankylosis of CAJ Soft tissue changes such as narrowing or irregularities around the glottis and pyriform sinuses

becomes a secondar procedure. It should always be kept in mind that endolaryngeal or tracheal manipulation by laryngeal mask anesthesia or endotracheal tube can aggravate laryngeal rheumatoid arthritis due to substantial pressure on the arytenoids. From that angle it is always recommended that the anesthesiologist manipulates the least the upper airway and uses a smaller endotracheal tube if intubation is needed. Narrowing of the rima glottidis may be secondary to a reversible inflammation of the cricoarytenoid joint, a point that should alert the anesthesiologist to handle the glottic region with extreme care and to be less aggressive while securing the airway. By the same analogy, otolaryngologists are recommended to treat the inflammatory process prior to arytenoidectomy because the fixation of the vocal fold may not always be secondary to ankylosis¹. The presence of vocal fold bamboo nodules may require surgical intervention and microlaryngeal resection when patients are very symptomatic. Excision of these lesions should always be coupled with aggressive medical treatment in view of the systemic nature of the disease and the high recurrence rate.

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