

Isolated Sclerosis of the Left Arytenoid Cartilage Revealed by Intermittent Dysphonia: A Case Report

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ABSTRACT

Introduction: Arytenoid cartilage sclerosis is a poorly known radiologic entity, most often discovered incidentally on cervical computed tomography (CT) performed for another indication. Its main clinical relevance lies in its differential diagnosis with neoplastic cartilage invasion in patients with laryngeal cancer, but it may also occur in isolation in patients without any oncologic history, raising a diagnostic interpretation challenge.

Case Presentation: We report the case of a 54-year-old woman with no notable medical history, presenting with intermittent dysphonia evolving over approximately 4 to 5 years, without any identifiable triggering factor (no intubation, cervical trauma, or recent ENT infection) and without associated symptoms. Clinical examination was normal. Flexible nasofibroscope showed vocal folds of normal mucosal appearance, with hypomobility of the left hemilarynx involving both the arytenoid and the ipsilateral vocal fold, the right vocal fold retaining normal mobility. Standard laboratory workup was unremarkable. Cervical CT with and without contrast injection showed a sclerotic appearance of the left arytenoid cartilage, without lysis, erosion, or associated soft-tissue process. No MRI, biopsy, or direct laryngoscopy was performed. Given this presentation suggestive of benign arytenoid cartilage sclerosis, a conservative approach was adopted, combining nasofibroscope surveillance with speech therapy, and the patient was reassured about the benign nature of her condition.

Discussion: Arytenoid cartilage sclerosis reflects a change in laryngeal cartilage mineralization, a physiological phenomenon related to cartilage aging, but it may also indicate a local pathologic process (cricoarytenoid arthritis, granuloma, cartilaginous tumor) or a systemic disease (rheumatoid arthritis, gout, sarcoidosis). Its left-sided and female predominance, as well as its possible association with arytenoid hypomobility through cricoarytenoid joint ankylosis, are discussed in light of the available literature.

Conclusion: In the setting of chronic dysphonia with isolated arytenoid hypomobility, benign arytenoid cartilage sclerosis should be recognized as a differential diagnosis, allowing unnecessary invasive investigations to be avoided when the clinical, biological, and evolutionary context is reassuring.

Keywords: Arytenoid Sclerosis, Dysphonia, Arytenoid Hypomobility, Cervical Computed Tomography, Nasofibroscope, Laryngeal Cartilage

Introduction

The arytenoid cartilage is a paired, mobile, pyramid-shaped structure that articulates with the cricoid cartilage at the cricoarytenoid joint (CAJ), a true diarthrodial joint lined by synovium [1]. This mobility governs glottic function during abduction and adduction of the vocal folds, and any impairment of this joint or of the cartilage itself may present clinically as dysphonia. Histologically, the laryngeal cartilages (with the exception of the epiglottis and the vocal process of the arytenoid, which are fibroelastic) are hyaline cartilages that undergo a progressive process of calcification followed by enchondral

ossification with age [2]. Cervical CT allows several stages of cartilage mineralization to be distinguished: nonmineralized cartilage (homogeneous soft-tissue density), calcified cartilage, sclerotic cartilage (dense, “chalk-like” appearance that may obliterate the medullary space), and ossified cartilage (dense cortex surrounding a hypodense fatty marrow) [2].

Arytenoid cartilage sclerosis has long been studied in the context of laryngeal cancer staging, where it constitutes a CT sign suggestive of cartilage invasion, with imperfect sensitivity and specificity that can lead to tumor overstaging [2]. However, several studies have shown that asymmetric arytenoid mineralization, particularly sclerosis, is a relatively common finding in subjects free of any laryngeal malignancy, with a marked female predominance and a pronounced left-sided predilection [2,3]. Outside the oncologic

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setting, isolated arytenoid sclerosis, whether or not associated with hypomobility, remains a rare and poorly documented entity in routine ENT practice.

We report a case of isolated sclerosis of the left arytenoid cartilage associated with ipsilateral arytenoid hypomobility, revealed by chronic intermittent dysphonia, in order to raise awareness of this benign entity and discuss its diagnostic work-up.

Case Presentation

A 54-year-old woman with no notable medical or surgical history (in particular, no history of recent orotracheal intubation, cervical trauma, ENT infection, or known inflammatory or rheumatologic disease) presented with progressive, intermittent dysphonia. Its exact duration was difficult to establish because of this fluctuating character, which had delayed consultation, but was estimated by the patient at approximately 4 to 5 years. No

associated symptoms were reported: no dysphagia, odynophagia, dyspnea, referred otalgia, or general deterioration.

Head and neck examination, including cervical palpation, was strictly normal, with no palpable lymphadenopathy or mass.

Flexible nasofibroscope showed vocal folds of normal mucosal appearance, with preserved mobility on the right but decreased mobility of the left hemilarynx, involving the left arytenoid and the ipsilateral vocal fold in a concordant fashion, without any other associated abnormality. Standard laboratory workup, including inflammatory markers, was unremarkable.

Cervical CT with and without contrast injection was performed, showing a sclerotic appearance of the left arytenoid cartilage, without bone lysis, cortical erosion, adjacent soft-tissue thickening, or pathological contrast enhancement.

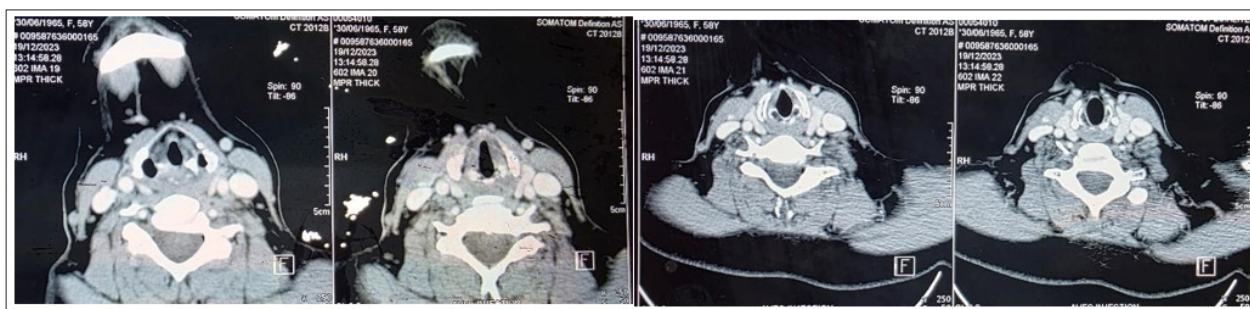


Figure 1: Cervical CT showing a sclerotic appearance of the left arytenoid cartilage without associated lesions.

No further work-up by MRI, biopsy, or direct laryngoscopy under general anesthesia was deemed necessary, given the normal clinical and laboratory findings and the absence of any warning sign.

Given this presentation suggestive of isolated benign sclerosis of the left arytenoid cartilage, with concordant but isolated left arytenoid and vocal fold hypomobility, and no mucosal lesion or other warning sign, a conservative approach was chosen, combining clinical surveillance with repeated nasofibroscope and speech therapy. The patient was reassured about the benign nature of her condition.

Discussion

Pathophysiology of Laryngeal Cartilage Mineralization

The process of calcification followed by ossification of the laryngeal cartilages is a physiological phenomenon related to aging, the kinetics of which are influenced by the mechanical stresses applied to the different cartilaginous structures [2]. In the arytenoid, ossification classically begins in the lateral peripheral third (at the muscular process, the insertion site of the lateral and posterior cricoarytenoid muscles) before progressing toward the center of the cartilage, with the exception of the vocal process, which remains fibroelastic [2]. Sclerosis represents an intermediate stage of this mineralization process, characterized by a “chalk-like” densification that may obliterate the medullary space, without the frank peripheral cortication seen in complete ossification [2].

Frequency and Characteristics of Arytenoid Sclerosis in The General Population

In a large retrospective series of patients without a history of

laryngeal cancer, arytenoid sclerosis was a common finding, present in nearly one-fifth of the subjects analyzed, with asymmetric sclerosis found in about 5% of cases [2]. This study confirms a marked female predominance and a pronounced left-sided predilection for asymmetric sclerosis [2], two features that are exactly mirrored in our observation (female sex, elective involvement of the left arytenoid). The authors also note that the frequency of sclerosis increases with age, peaking around the fourth decade of life [2], which is consistent with our patient’s age (54 years) and the long-reported duration of symptoms (4 to 5 years), suggesting a slowly progressive rather than acute process.

An earlier reference study on this topic had already reported a similar frequency, around 16%, with the same female and left-sided predominance, although no definitive pathophysiological explanation has yet been established [3].

Differential Diagnoses to Consider

Although isolated arytenoid cartilage sclerosis is most often a simple benign anatomical variant, several differential diagnoses should be systematically excluded in the setting of dysphonia combined with arytenoid hypomobility and CT-detected sclerosis, particularly when the clinical context is atypical:

- **Laryngeal Neoplasia:** although no visible tissue lesion or associated mass was present in our case, isolated arytenoid cartilage sclerosis has been described as potentially preceding or accompanying early neoplastic invasion, due to inflammatory changes and reactive osteogenesis that precede actual tumor invasion [2]. The absence of mucosal lesion, soft-tissue mass, and pathological contrast enhancement, together with normal laboratory findings and

an indolent course over several years, makes this diagnosis highly unlikely in our patient, but justifies the surveillance instituted.

- **Cricoarytenoid Arthritis:** the cricoarytenoid joint may undergo changes comparable to osteoarthritis or inflammatory involvement seen in other joints, potentially progressing to ankylosis responsible for arytenoid immobility [2]. Numerous systemic conditions have been reported to affect this joint, including rheumatoid arthritis, ankylosing spondylitis, gout, sarcoidosis, Sjögren's syndrome, and, more rarely, infectious or granulomatous disease such as tuberculosis [2]. The absence of biological inflammatory syndrome and of any known rheumatologic background in our patient makes these causes unlikely, though they warrant continued monitoring should new symptoms appear.
- **Contact Granuloma or Scarring Process:** an advanced vocal process granuloma may be associated with sclerosis of the adjacent arytenoid cartilage, generally accompanied by a mucosal mass at the posterior commissure, which was absent in our case.
- **Primary cartilaginous tumor (chondroma, chondrosarcoma):** these tumors remain exceedingly rare at the arytenoid, cricoid involvement being far more common when a laryngeal cartilaginous tumor is suspected.

Role and Limitations of Imaging

CT remains the first-line examination for characterizing laryngeal cartilage mineralization, but its performance in distinguishing benign sclerosis from early tumor invasion remains imperfect, with a risk of overstaging described in the oncologic literature [2]. MRI, long proposed as an alternative, has also shown limitations due to false positives related to inflammatory changes mimicking neoplastic spread [2]. In our case, the absence of any concerning clinical, laboratory, or evolutionary finding allowed further imaging by MRI or an invasive procedure (biopsy, direct laryngoscopy) to be deferred, in favor of close, noninvasive surveillance, an approach that appears reasonable in this reassuring context but that should be reconsidered should the clinical picture change.

Management

In the absence of major functional impairment beyond dysphonia (no dyspnea or dysphagia, normal mobility of the contralateral vocal fold) and given a reassuring lesion work-up, a conservative management strategy combining regular nasofibrosopic surveillance with speech therapy, aimed at optimizing vocal

compensation by the contralateral vocal fold and limiting the functional impact of the left arytenoid-vocal fold hypomobility, appears appropriate. In our case, this approach provided effective reassurance to the patient regarding the benign nature of her condition.

Conclusion

Isolated arytenoid cartilage sclerosis is a most often benign radiologic entity, awareness of which helps avoid unnecessary invasive investigations in patients presenting with chronic dysphonia and isolated arytenoid hypomobility, in the absence of clinical, biological, or radiological warning signs. Its female and left-sided predominance, as described in the literature, is mirrored in our observation. Regular clinical and endoscopic follow-up nonetheless remains essential to avoid overlooking a secondary cause, particularly neoplastic or inflammatory, that would warrant further investigation.

Declarations

Conflicts of interest: the authors declare no conflict of interest related to this article.

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