



# Vocal Cord Paralysis Unveiling a Dilated Cardiomyopathy: A Rare Case of Ortner's Syndrome and Literature Review

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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**Case Report**

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## **ABSTRACT**

Ortner Syndrome (OS) is a disorder characterized by dysphonia due to vascular compression of the Left Recurrent Laryngeal Nerve (LRLN), mainly by heart or vessels abnormalities. We discuss the case of a 56-year-old patient with no medical past history, who enters our department due to four months of growing hoarseness. The left vocal cord was paralyzed, according to video stroboscopic testing. A CT scan of the neck and chest was ordered, and it indicated enlarged heart cavities. The patient was addressed to the cardiology department, and was later scheduled for heart surgery. The follow up was marked by an improvement of his hoarseness. The most prevalent

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cause of OS is mitral valve disease, which results in left atrial dilatation and nerve compression. This sickness may be associated with other symptoms caused by the compression of organs such as the esophagus. Treatment is based on the treatment of the underlying heart condition.

**Keywords:** Nerve; paralysis; vocal cord; hoarseness.

## 1. INTRODUCTION

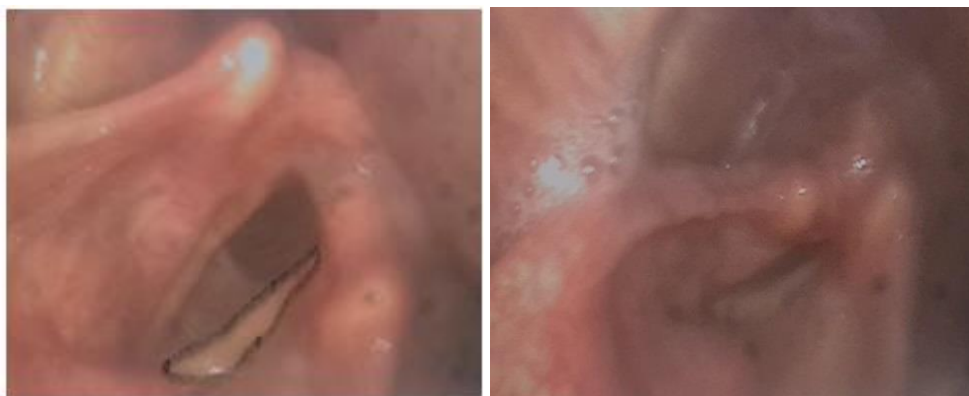
“Ortner Syndrome (OS) is a condition that produces dysphonia due to vascular compression of the Left Recurrent Laryngeal Nerve (LRLN), such as atrial enlargement” [1]. “Along its long path, the LRLN can be compressed by cardiac and vascular elements. Furthermore, this nerve crosses the aortic arch posteriorly before ascending to the tracheoesophageal groove, causing it to be more susceptible to compression by other structures” [2]. “OS has been defined as an hypertrophy of the left atrium caused by mitral stenosis, resulting in paralysis of the LRLN. However, other aetiologies may be responsible for that, including aortic aneurysms, pulmonary artery aneurysms, and atrial fibrillation. Although uncommon, dysphonia can develop as the sole symptom of vascular diseases such as those mentioned above” [3]. “Nobert Ortner, an Austrian clinician, first documented this illness in a patient with mitral valve stenosis and left atrial dilatation in context in 1897” [2]. “Various cardiovascular disorders related with LRLN palsy have been described over the last century. Because of these factors, the syndrome is sometimes known as cardiovocal syndrome. Giant cell arteritis, patent ductus arteriosus, and pericardial effusion are all unusual causes of OS. It is more frequent in older men, but it can also arise in children with congenital heart failure in rare situations. It is difficult to locate data on the occurrence of this syndrome in the literature,

although it is currently an uncommon phenomenon with a low prevalence” [4].

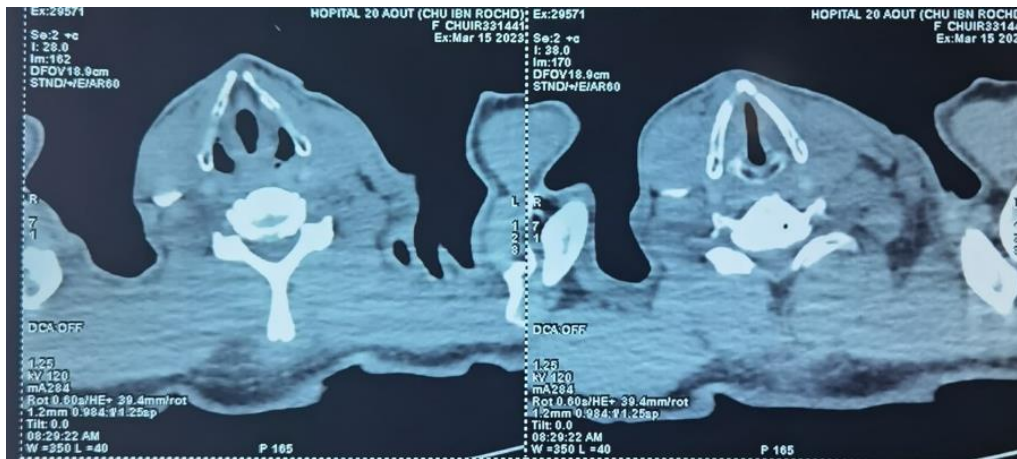
## 2. CASE REPORT

A 56-year-old male presented to our department with a four-month history of progressive hoarseness and dysphonia and dyspnea on exertion. He denied any respiratory symptoms, chest pain or dysphagia. He did not suffer any weight loss or fever. The patient was a 40 pack-year tobacco smoker with no evidence of pre-existing structural heart abnormalities or other medical conditions identified. Physical examination revealed left vocal cord paralysis in the paramedian position on flexible laryngoscopy (Fig. 1), prompting further investigation. The macroscopic aspect of the vocal cords was normal. No cervical lymph nodes were palpable and the thyroid gland was not enlarged. The rest of the otolaryngologic exam was normal.

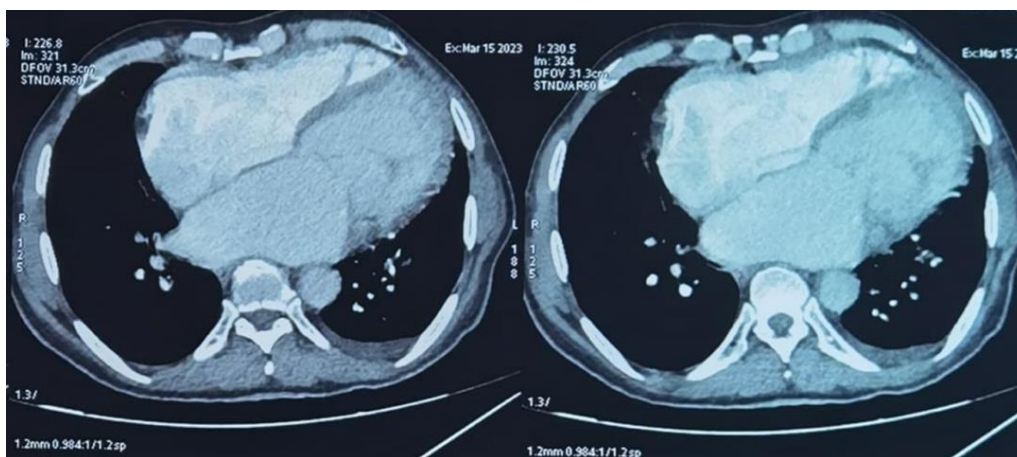
A cervicothoracic computed tomography scan revealed a dilatation of the cardiac cavities, particularly in the left atrium, resulting in a significant cardiomegaly with a cardiothoracic index of 0.75 and compressing the left recurrent laryngeal nerve. The vocal cords were asymmetrical with an enlarged left pyriform sinus and laryngeal ventricle. Echocardiography confirmed the presence of a severe degenerative mitral and tricuspid regurgitation with dilation and dysfunction of the left cardiac chambers. The right cavities were normal and the ejection fraction was 45%.



**Fig. 1. Videostroboscopy images showing left vocal cord paralysis**



**Fig. 2. Ct scan of the larynx showing left vocal cord paralysis**



**Fig. 3. Ct scan showing a severe dilation of the left cardiac chambers**

The patient was addressed to the cardiology department where a medical treatment was initiated and optimized. An electrocardiogram and a coronarography were performed and the patient was scheduled for a surgical intervention to manage both mitral and tricuspid valve regurgitation.

The patient has benefited from an injection of hyaluronic acid, followed by voice rehabilitation. He was subsequently examined during a 12-month follow-up, revealing a slight improvement of the hoarseness. Vocal cord medialization surgery was suggested, but the patient declined to proceed with the intervention.

### 3. DISCUSSION

Surgical trauma and cancer invasion of the thyroid, lung, and esophagus have been identified as the main causes of recurrent laryngeal nerve paralysis.

Ortner's syndrome is a rare form of extra laryngeal voice hoarseness caused by mechanical compression of the left recurrent laryngeal nerve by mediastinal structures, resulting in homolateral vocal cord paralysis. Ortner originally proposed that compressive symptoms in mitral stenosis were caused by left atrial enlargement, which is caused by various cardiac or valvular abnormalities, pulmonary hypertension, aortic disorders, right subclavian artery aneurysm, and ductus arteriosus aneurysm [2,5,6,1]. Recurrent laryngeal nerve paralysis can be caused by a ventricular hypertrophy or pathological aortopulmonary lymphadenopathy [3].

The left RLN normally arises from the left vagus nerve along the anterolateral boundary of the aortic arch, between the main pulmonary artery and the aortic arch. It rises in the space between the trachea and the esophagus, slightly behind the ligamentum arteriosum. The right RLN

connects the trachea with the esophagus by crossing and hooking around the first section of the subclavian artery. As a result, a dilated pulmonary artery, a persisting ductus arteriosus, or an aortic arch aneurysm may compress the RLN.

To identify this condition, the complete tract of the recurrent laryngeal nerves, including their passage through the aortopulmonary space, must be examined. The inferior extension of the scan should include the pulmonary bifurcation [4,7,8].

For individuals with persistent dysphonia, an ENT evaluation is required. A chronic dysphonia lasting more than two weeks should be checked and investigated, with the potential reasons for voice change assessed [4]. As a result, imaging investigations are necessary to rule out a compressive etiology (neoplastic or vascular) [7].

Once a video fibroscopic evaluation has determined that vocal cord paralysis is the cause of hoarseness, the origin of the paralysis must be investigated. It is critical to confirm that there are no alarming lesions visible on ENT examination [4].

Cervico-thoracic imaging investigations should be performed to rule out compressive causes of paralysis. CT is the most often used test today because it can detect indirect symptoms of vocal paralysis, such as medial displacement of the ipsilateral posterior edge of the vocal cords [9,10]. Furthermore, it enables us to assess a wide range of cervical, cardiovascular, and thoracic disorders that produce recurrent laryngeal nerve paralysis. The mediastinum up to the level of the aortopulmonary window (left side) or the brachiocephalic artery (right side) should be included in the CT scan [10].

A basic chest X-ray can also be used to diagnose some vascular compressive causes, providing equivalent sensitivity at a lower cost [11,12]. There are various entities that can compress the LRLN due to cardiovascular reasons. The primary cause was mitral valve disease with left atrial dilatation. Other diseases that might produce this cardiovocal condition have now emerged, including pulmonary artery aneurysms and aortic aneurysms [12-15].

Indirect laryngoscopy, paired with laryngeal electromyography, confirms the severity of cord paralysis.

The incidence of cardiovocal syndrome varies according to the underlying cause; in mitral stenosis, it ranges from 0.6% to 5%, whereas surgery for thoracic aortic aneurysm has a comparatively high incidence of more than 32%. [15].

In most cases, treatment requires correcting the underlying condition. The duration and intensity of hoarseness may influence the totality and speed of recovery of normal voice .

In our case, hoarseness was linked to compression of the left recurrent laryngeal nerve in the aorto-pulmonary window caused by an enlarged left atrium caused by mitral stenosis, and mitral and tricuspid valve surgery reduced slightly voice hoarseness.

Clinicians should be aware that patients who present with hoarseness of voice require meticulous evaluation in order to rule out significant cardiovascular illnesses.

#### **4. CONCLUSION**

Ortner syndrome, also known as cardiovocal syndrome, is a rare condition characterized by left RLN paralysis caused by extrinsic compression of a cardiovascular etiology. The pathology of the mitral valve has been the most studied etiology, although new diseases responsible for this illness, such as aortic dissection and aortic and pulmonary aneurysms , have surfaced in recent years. Hoarseness is the most common symptom. To rule out malignant pharyngolaryngeal lesions, a correct anamnesis and a fibroscopic examination are required for its diagnosis. To determine the compressive cause, imaging studies must be performed. Treatment is based on the treatment of the underlying cardiovascular condition, and there are several strategies for treating vocal paralysis.

#### **CONSENT**

As per International Standards or University Standards, Patient written consent has been collected and preserved by the authors.

#### **ETHICAL APPROVAL**

As per International Standard or University Standards written ethical approval has been collected and preserved by the authors.

#### **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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