

## CASE REPORT

# Left vocal cord paralysis - as the presenting sign of an aortic arch aneurysm (cardiovocal syndrome). A case report

Roxana Duda<sup>1</sup>, Amalia Neagu<sup>1,2</sup>

<sup>1</sup>"Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

<sup>2</sup>ENT&HNS Department, "Sfanta Maria" Hospital, Bucharest, Romania

## ABSTRACT

Left recurrent laryngeal nerve paralysis caused by various cardiovascular disorders is termed as cardiovocal syndrome (Ortner's syndrome), which is a rare clinical entity. Several cardiovascular conditions that can lead to this syndrome include primary pulmonary hypertension, mitral stenosis, congenital heart diseases, aortic aneurysm. A 71-year-old male patient was referred to our clinic with a two-month history of progressive hoarseness due to left vocal cord paralysis. Flexible fiberoptic laryngoscopy showed a left vocal cord paralysis in a paramedian position. CT scanning revealed a saccular aneurysm arising from the posterior wall of the aortic arch and extending to the aorto-pulmonary window. Although uncommon, left vocal cord paralysis can be a presenting sign of an aortic arch aneurysm. This case illustrates that the left vocal cord paralysis may be a first warning sign of an underlying disorder, therefore it is very important to establish a complete and correct diagnosis.

**KEYWORDS:** vocal cord paralysis, cardiovocal syndrome, thoracic aortic aneurysm, cardiovascular diseases

## INTRODUCTION

Cardiovocal syndrome, also known as Ortner's syndrome, is an infrequent pathological entity defined as hoarseness due to paralysis of the left recurrent laryngeal nerve caused by various cardiovascular disorders<sup>1,2</sup>.

It was originally described more than a century ago, in 1897, by the physician Norbert Ortner, in patients with left atrium dilatation as a result of severe mitral stenosis<sup>3</sup>. Since then, a myriad of cardiovascular conditions that can lead to this syndrome have been reported, such as atrial septal defects, patent ductus arteriosus, primary pulmonary hypertension, congenital heart disease, aortic aneurysm<sup>4,5</sup>.

Although uncommon in the ENT practice, cardiovascular abnormalities may be the main cause of left vocal cord paralysis<sup>6</sup>. In this paper, the authors present

a rare case of left vocal cord paralysis as the presenting sign of an aortic arch aneurysm, in order to draw attention to the clinical manifestations of the underlying pathology and to highlight the importance of a correct diagnosis.

## CASE REPORT

A 71-year-old man was referred to our clinic complaining of progressive hoarseness with an almost 2-month onset. He was a non-smoker, a non-alcoholic and had no associated symptoms of aspiration, dysphagia or dyspnea. The medical history revealed arterial hypertension, coronary artery disease, type 2 diabetes and ischemic stroke. Physical examination did not reveal any cervical masses or lymphadenopathy.

Indirect laryngoscopy combined with flexible fiberoptic laryngoscopy revealed an immobile left vocal cord, fixed in the paramedian position, without any mass in the larynx and hypopharynx. The rest of the otolaryngologic exam was normal.

A contrast-enhanced cervical and chest CT scan was performed to evaluate the patient for a possible malignancy or other abnormalities.

The cervical CT exam did not reveal any important findings that could be related to the paralysis of the left vocal fold (Figure 1). Chest CT scan showed a saccular aneurysm involving the posterior wall of the aortic arch, on the inferolateral side, with a maximum diameter of 55 mm, extending to the aortopulmonary window, where normally the left recurrent laryngeal nerve passes. No other abnormalities were detected (Figure 2). Based on these findings, the diagnosis of left vocal cord paralysis due to aortic arch aneurysm, respectively cardiovocal syndrome, was established. Our patient was referred to the cardiothoracic surgery department to decide the therapeutic algorithm.

## DISCUSSIONS

Vocal cord paralysis may result as a consequence of an injury anywhere along the entire course of the



**Figure 1** Cervical CT scan, axial slice – left vocal cord paralysis

vagus nerve or its recurrent laryngeal branch between the jugular foramen and the larynx.

Unilateral vocal cord paralysis mostly occurs from recurrent laryngeal nerve damage and is a result of a peripheral neuropathy rather than a central nervous system process<sup>7</sup>. The anatomical pathway of the recurrent laryngeal nerves determines the potential causes of vocal cord paralysis, which are multifactorial<sup>8</sup>. Different etiologies are responsible for unilateral recurrent laryngeal nerve paralysis and those vary from neoplasms (lung, thyroid, esophagus, bronchus, mediastinal metastasis), iatrogenic injury (intubation, thyroid surgery, carotid surgery, anterior approaches to the cervical spine, thoracic surgery), infectious, traumatic causes to idiopathic paralysis<sup>8,9</sup>. Although uncommon, in the practice of ENT, the cardiovascular pathology may represent a cause of recurrent laryngeal paralysis. Cardiovascular syndrome, also known as Ortner's syndrome, initially described in patients with left atrium dilatation as a result of severe mitral stenosis, has also been reported as a consequence of several other cardiovascular conditions including atrial septal defects, congenital heart disease, patent ductus arteriosus, pulmonary hypertension and aortic aneurysm<sup>10</sup>.

A proper understanding of the pathophysiological mechanism involved in unilateral vocal cord paralysis secondary to cardiovascular diseases requires a thorough knowledge of the recurrent laryngeal nerve particular anatomy<sup>10,11</sup>. On the right, the recurrent laryngeal nerve arises from the vagus nerve at the anterior surface of the subclavian artery and passes inferiorly, then curves posteriorly making an anteroposterior loop around the artery and ascends towards the neck into the groove between the esoph-



**Figure 2** Axial contrast enhanced CT of the thorax in the upper mediastinum shows a 55 mm saccular aneurysm of the aortic arch at the aortopulmonary window level

agus and trachea. The left recurrent laryngeal nerve originates from the main vagal trunk, as the vagus nerve crosses the anterior surface of the aortic arch, then loops medially under the aorta and passes through the aortopulmonary window, ascending in the tracheoesophageal groove<sup>11</sup>. The aortopulmonary window is a small mediastinal region delimited anteriorly by the ascending aorta, posteriorly by the descending aorta, superiorly by the aortic arch, inferiorly by the left pulmonary artery, medially by the left main bronchus, and laterally by the left lung pleural surface that contains, in addition to the recurrent laryngeal nerve, the ligamentum arteriosum, lymph nodes, and fatty tissue<sup>12</sup>.

The left recurrent laryngeal nerve at the level of the thorax is more vulnerable to injuries than the right one because of its longer course and its close rapports to mediastinal structures, such as the great vessels, left atrium, left main bronchus, lymph nodes<sup>13</sup>.

Although Ortner was the first who gave an explanation regarding the pathogenic relationship between cardiovascular diseases and left vocal cord paralysis in patients with left atrium dilatation as a result of severe mitral stenosis<sup>3</sup>, Fetterolf and Norrest, based on anatomic studies, demonstrated that any cardiovascular abnormalities that compress and injure the left recurrent laryngeal nerve within the aortopulmonary window can cause the paralysis of the left vocal cord<sup>14</sup>. Various cardiovascular comorbidities can contribute to the cardiovocal syndrome and previously published reports estimate that, among these, the aortic arch aneurysm is a rare condition with around 12% incidence<sup>15</sup>.

Most aortic arch aneurysms often go unnoticed, being asymptomatic, and are incidentally discovered when imaging tests are performed for unrelated reasons<sup>16</sup>, as in our case.

Symptoms tend to develop late in the course of aneurysmal enlargement and, when they do appear, they may be attributed to the compression of the surrounding structures like the tracheo-bronchial tree, the esophagus and the left recurrent laryngeal nerve, causing wheezing, dyspnea, cough, dysphagia, hoarseness. Aortic arch aneurysms are prone to rupture or dissection and that represents a life-threatening condition, which can lead directly to death in more than 40% of cases; therefore avoidance of misdiagnosis is essential<sup>17,18</sup>.

A CT scan is an useful diagnostic tool that can provide pertinent information in establishing the underlying etiology of the left vocal cord paralysis and understanding the pathological mechanism involved<sup>19</sup>. CT findings in our case revealed that the aortic arch aneurysm is responsible for the injury of the left recurrent laryngeal nerve, due to its direct compression in the aortopulmonary window.

Aortic arch aneurysm should be considered in the differential diagnosis in patients with left recurrent laryngeal paralysis.

Early correct diagnosis and treatment of the underlying cause of the left vocal cord paralysis can lead to the possibility of recovery of the vocal cord mobility. The reversibility of the nerve damage depends on the injury degree<sup>19</sup>.

## CONCLUSIONS

Extralaryngeal causes, such as cardiovascular diseases, should never be overlooked in a patient presenting with left vocal cord paralysis. Left vocal cord paralysis may be a first warning sign of a hidden and life-threatening disease; therefore a careful and extensive assessment will clearly identify the etiology. Left vocal cord paralysis associated with aortic arch aneurysm is an uncommon occurrence in the ENT practice; therefore we present this case report in order to highlight the importance of a correct diagnosis.

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