

## **A Rib on One Side Causes a Lopsided Eye Post Resection for Subclavian Vein Thrombosis and Pulmonary Embolism Case Report Cervical Rib, Pulmonary Embolism and Horner's Syndrome: How does that happen?**

**Moe Ameri MBS<sup>1</sup>, May Al-Ameri<sup>3</sup>, Nagham Al-Zubidi MD<sup>2,4\*</sup>, Rosa A Tang MD<sup>3,4,5</sup> and Jade S Schiffman MD<sup>5</sup>**

<sup>1</sup>American University of the Caribbean School of Medicine, USA

<sup>2</sup>The University of Texas MD Anderson Cancer Center, USA

<sup>3</sup>University of Houston, USA

<sup>4</sup>Blanton Eye Institute/Houston Methodist Hospital, USA

<sup>5</sup>Neuro-Ophthalmology of Texas, USA

**\*Corresponding Author:** Nagham Al-Zubidi, The University of Texas MD Anderson Cancer Center and Blanton Eye Institute/Houston Methodist Hospital, USA.

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### **Abstract**

Cervical rib is defined as an extra rib that grows abnormally from the cervical vertebrae from the base of the neck to just above the collar bone. We present a patient with cervical rib and secondary thoracic outlet syndrome resulting in venous thrombosis and secondary pulmonary embolism.

**Keywords:** Rib; Lopsided Eye; Subclavian Vein Thrombosis; Pulmonary Embolism; Horner's Syndrome

### **Introduction**

Cervical rib is defined as an extra rib that grows abnormally from the cervical vertebrae from the base of the neck to just above the collar bone. We present a patient with cervical rib and secondary thoracic outlet syndrome resulting in venous thrombosis and secondary pulmonary embolism. Horner syndrome occurred post-operatively. Here we review the vascular complications of cervical rib by way of this patient.

### **Case Report**

A 34-year old white male was diagnosed with a cervical rib after he had presented with recurrent episodes of right upper arm and hand swelling. Ultrasound revealed a venous clot in the right upper extremity. Soon thereafter, he developed back pain and his work-up revealed multiple pulmonary emboli. He was treated with thrombolysis and anticoagulation with eventual cervical rib resection, which was complicated by severe bleeding.

Several weeks postoperatively he became aware of ptosis and decreased sweating on the right side of his face and he was diagnosed with a right Horner's syndrome. CT Angiogram of the neck and brain did not show any arterial dissection or aneurysm of the right subclavian/carotid artery which was considered due to his major post-operative bleeding diaphysis. Post-operative Horner's was diagnosed whether related to surgical manipulation vs. post-operative scarring.

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**Discussion**

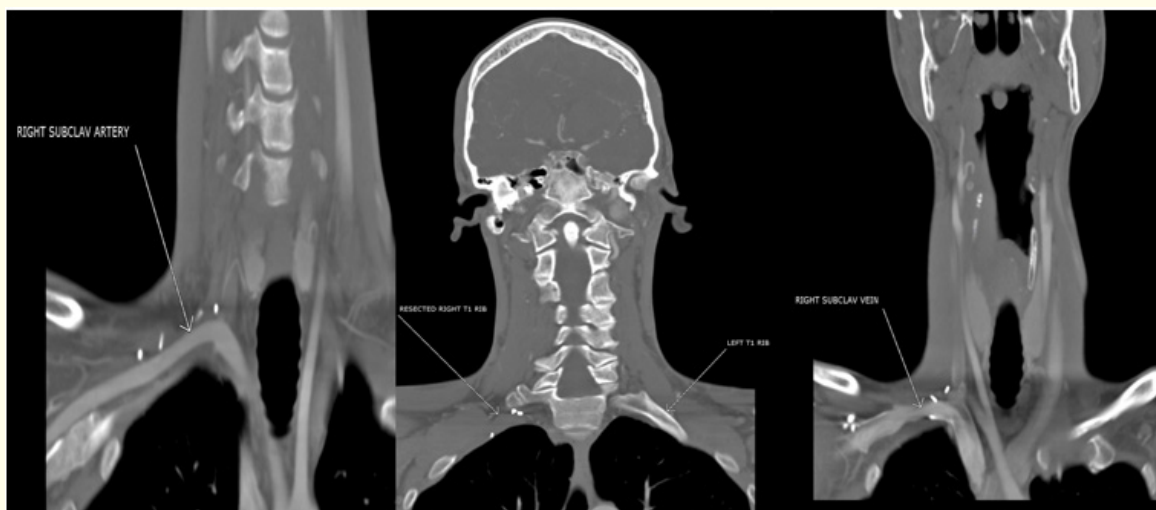
Cervical rib is a congenital anomaly of the seventh cervical vertebrae. Its presence may narrow the supraclavicular space creating a “compartment” like syndrome with compression and resultant thoracic outlet syndrome. Cervical ribs are seen in around 0.5% of population with only 10% symptomatic. Cervical rib identification on x-ray or MRI may be challenging when this anomaly is not totally made up of bone but composed of thinly stranded tissue fibers, which will not show up on these imaging modalities. Patients usually present with neck pain and numbness in the affected upper limb that progressively worsens. Patients with cervical rib may have vascular compromise (see below under II and III) and may suffer from thrombus (less likely aneurysm) which may require rib resection with or without thrombolysis.

Cervical Ribs symptoms are most often are due to thoracic outlet syndrome (TOS). About 10% of patients with a cervical rib develop TOS. Cervical rib causes TOS when it results in compression of one or more of the following: nerves, and blood vessels.

TOS can be classified into three separate syndromes due to compression of nerves, veins or arteries:

1. Neurogenic (94% - 97%) is caused by compression of the Upper (C5 through C7), or Lower (C8- T1) trunks of the brachial plexus. Presentation usually presents as pain, paresthesia, and/or weakness.
2. Venous (4% - 6%) also called Paget-Schoroetter syndrome; presents with arm swelling, discomfort heaviness, redness, cyanosis and dilated, visible veins across the shoulder and upper arm. It can lead to venous clots and secondary pulmonary emboli.
3. Artery (< 1%) presents with distal emboli and may cause severe hand ischemia. Rarely a CVA may be precipitated by a thrombus in the subclavian.

When a Horner’s syndrome develops in the presence of a Cervical rib, which is rare, it is usually in the setting of neurogenic thoracic outlet syndrome. Traumatic incidents appear to potentially precipitate this occurrence. Cervical rib induced Horner’s syndrome when present is due to compression of the preganglionic neuron in the brachial plexus. Preganglionic Horner’s syndrome is most commonly due to tumors, trauma and head and neck surgery. Horner’s syndrome in Cervical rib is more likely post- operatively induced [1-12].



*Figure 1*

## Conclusion

Radiological Imaging analysis showed that incidence of cervical ribs is below 1% in general population, however it varied largely depending on the population being studied, ranging between 0.58% in Malawian population to even 6.2% in Turkish population. A 1998 study revealed the prevalence of Cervical ribs among US population was around 0.5-1%, while another study published in 2013 that examined MRI data and clinically relevant information from patients in US identified the prevalence to be 1.2% or (25/2083) of examinations. Therefore even though, cervical ribs are not that uncommon, up to 10 % of patients with cervical rib become symptomatic with Thoracic Outlet Syndrome Thoracic Outlet Syndrome of the neurogenic variety, but when it affects the venous structures it can present with arm swelling from venous clotting which may result in pulmonary embolism. If it affects the arterial structures, it can lead to distal extremity embolism and/or rarely an embolic stroke. Cervical Ribs can result in Horner Syndrome, but it is extremely rare except in the post- operative cervical rib resection, as in our patient. When a cervical rib causes Horner's syndrome preoperatively, it appears to be due to compression of the preganglionic neuron of the brachial plexus as a result of thoracic outlet syndrome, which may be induced by trauma.

## Conflict of Interest

Authors have no conflict of interest.

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