

# Finding the underlying cause of thoracic outlet syndrome

## Torasik outlet sendromunun nedenini bulmak

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### SUMMARY

Cervical rib is an extra rib arising from the 7th vertebra. It is estimated to occur in 0.6% (1 in 150 people) to 0.8% of the population. It may compress the nerves and vessels and cause thoracic outlet syndrome. Cervical rib is diagnosed by Computer Tomography (CT). 3D CT images are very helpful for the correct diagnosis. Treatment is surgical most of the time. Symptoms usually diminish dramatically after surgery.

**Keywords:** Brachial plexus, thoracic outlet syndrome; CT; MRI.

### INTRODUCTION

Cervical rib is one of the most common causes of neurogenic thoracic outlet syndrome (1,2). When bilateral, it may cause severe limitation of range of motion. Computer Tomography (CT) and Magnetic Resonance Imaging (MRI) are essential for diagnosis. CT images demonstrate the bony abnormalities and MRI demonstrates the soft tissue abnormalities(3). For some cases, we may use both of the modalities for diagnosis.

### CASE REPORT

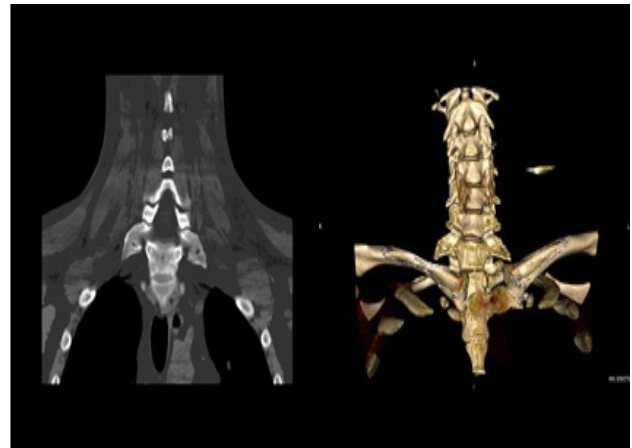
A 39-year-old man was admitted to our hospital presenting with shoulder pain and limited range of motion when trying to lift his arms. He had been given physiotherapy for shoulder pain for a couple of months but his symptoms did not diminish. Finally, he was referred to radiology department for imaging of the brachial plexus. CT examination was performed with a 64-MDCT ( Multi Detector Computer Tomography) scanner (Aquillion 64; Toshiba Japan) and MRI was performed with a 1.5 Tesla magnet (25 mT/m: Magnetom Vision Plus; Siemens, Erlangen, Germany). Both of the exams were done in neutral ( arms adducted near body) and in stress position (arms raised above head level). CT scan revealed

### ÖZET

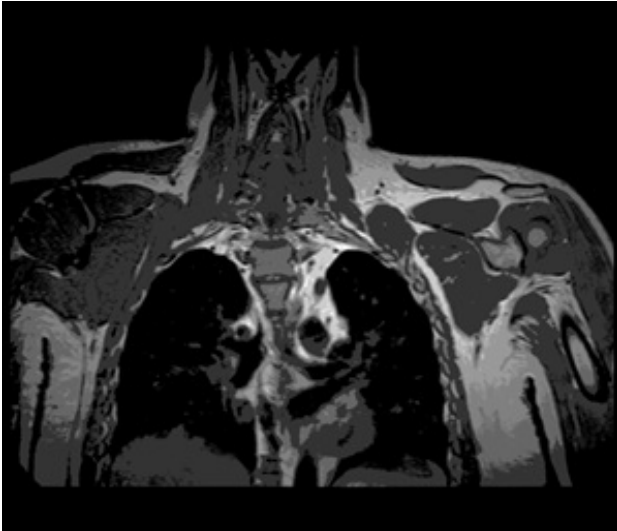
Servikal kot 7.vertebradan kaynaklanan ekstra kostadır. Popülasyonun % 6-% 8 arasında bulunur. (Her 150 kişiden 1'inde). Sinir ve damarlara bası yaparak torasik outlet sendromuna yol açabilir. Servikal kot, Bilgisayarlı Tomografi (BT) yardımı ile tanı alır. 3D BT görüntüler doğru tanıda çok yardımcıdır. Tedavi çoğunlukla cerrahidir. Cerrahi sonrası semptomlarda genelde dramatik gerileme olur.

**Anahtar Kelimeler:** Brakial pleksus; torasik outlet sendromu, BT, MRG.

(Fig.1A-B) bilateral cervical ribs articulating with transverse processes of 7th cervical vertebra. MR imaging (Fig.2) confirmed the diagnosis. There were no solid/cystic lesions in that region and in the scalene muscles. Surgery was planned for complete resection of the cervical ribs.



**Figure 1** A-B. Coronal CT and 3D CT images showing bilateral cervical rib.



**Figure 2.** Coronal MRI showing cervical ribs and adjacent scalene muscles.

### DISCUSSION

There are 3 types of thoracic outlet syndrome (neurogenic, venous, arterial). Neurogenic TOS is caused by compression of brachial plexus along its pathway by a soft tissue or bony structure. Cervical rib is one of the most common causes. A cervical rib is estimated to occur in 0.6% (1 in 150 people) to 0.8% of the population. They are underreported most of the time. Individuals may have a cervical rib on the right, left or both sides. It can cause thoracic outlet syndrome when the brachial plexus or subclavian artery is compressed between the cervical rib and scalene muscles. It may take a long time to diagnose and can be asymptomatic or symptomatic. The differential diagnosis with the large transverse process must be made since these 2 entities may be easily confused. Surgery for neurogenic TOS in patients with cervical ribs should include both cervical and first rib resection (4).

### REFERENCES

1. Brewin J, Hill M, Ellis H. The prevalence of cervical ribs in a London population. *Clin Anat.*2009;22: 331–336.
2. Khatib N, Boulet J. Thoracic outlet syndrome: a congenital case manifesting in middle age. *CMAJ* 2015; 17;187(3):206.
3. Akal M, Kayi Cangir A. Three-dimensional CT of thoracic outlet syndrome: report of three cases. *Ann Thorac Cardiovasc Surg* 2002;8:456.
4. Povlsen B, Belzberg A, Hansson T, et al. Treatment for thoracic outlet syndrome. *Cochrane Database Syst Rev* 2010;CD007218.