How can cervical ribs cause a stroke: What is the best treatment if they do?

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Cervical Ribs and Thoracic Outlet Syndrome

- Cervical ribs can cause neurogenic or arterial TOS
- Neurogenic TOS classically muscle wasting of the hand

Can cervical ribs cause a stroke?

Cervical Ribs and Thoracic Outlet Syndrome

- Arterial TOS upper extremity arterial embolization/thrombosis, ± subclavian aneurysm

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Cervical Rib: Thrombosis of Subclavian Artery. Contralateral Hemiplegia of Sudden Onset, probably Embolic.

By C. P. Symonds, M.D.

Case II.—E. E., female, aged 30, admitted to hospital in January, this year for angina pectoris of the terminal phalanx of the right index finger and left hemiplegia.

Family history of heart disease.

The patient was healthy until three years ago; she was accidentally hit by an air gun bullet in the right hand, which caused the first intercostal space and became embolized. The subsequent symptoms have been attributed to this injury. The foreign body was removed six months ago.

Two and a half years ago, pains began to be noticed in the middle subclavian, and numbness in the fingers of the right hand, the index, middle, and ring fingers were asymmetrically involved. Two attacks were excited by raising the hands above the head (as in raising the hat) or by cold; they were not short by having the hand in cold water. Apart from this, there were no pains, weakness, or paraesthesia.

In January, 1906, the terminal phalanx of the right index finger gradually became gangrenous and was finally removed.

In May, 1906, she was having tea when suddenly felt faint and dropped her cap. She did not lose consciousness. A week later she had another similar attack. The following morning she awoke to find herself completely paralyzed on the left side. Together with this she had aphasia. From this she has gradually recovered.

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None
### Potential Mechanisms

- Prolonged arm abduction obstructs flow creating circular flow in subclavian pulling thrombus into the vertebral artery on the left and either carotid or vertebral on the right.
- Thrombus forms proximal to subclavian stenosis and propagates into left vertebral or right carotid or vertebral.
- Can occur with or without a subclavian aneurysm.

### Report

<table>
<thead>
<tr>
<th>Report</th>
<th>A/S</th>
<th>Symptoms</th>
<th>Ant/ Post</th>
<th>Side</th>
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<tr>
<td>Palaniandavan (2014)</td>
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<td>Khanam (2013)</td>
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<td>Lee (2007)</td>
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<td>Ko (2006)</td>
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<td>Yamaguchi (2008)</td>
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### Further Embolization

- 24h after stroke, patient developed acute LUE ischemia.
- Treated with thromboembolectomy via a brachial artery cut-down.
- Anti-coagulation initiated and discharged.

### Bilateral Cervical Ribs

- 56F presented with 12h history of sudden onset vertigo after a sustained coughing episode with arm abduction.
- PMH: Hyperlipidemia.
- Meds: atorvastatin.
- CXR bilateral cervical ribs.
- CT scan.
And More Embolization

- Despite being on therapeutic anticoagulation, patient admitted a month later with brachial artery embolus in right upper extremity
- Successfully treated with thrombectomy
- Switched to a factor Xa inhibitor
- Referred to our institution

Definitive Treatment

- Cervical rib resection performed through a supraclavicular incision
- Arterial reconstruction with reversed greater saphenous vein interposition graft
- Left side then two weeks later the right
- Recovered completely from stroke, arm ischemia and operations

Summary

- Cervical ribs with or without a subclavian aneurysm can cause anterior and/or posterior circulation Strokes
- Initial care; anticoagulation, stroke care and rehabilitation
- Definitive care requires resection of cervical rib with repair of subclavian aneurysm when present or removal of thrombus if non aneurysmal
- Larger question should all cervical ribs be removed irrespective of presence or absence of aneurysm/thrombus?