CASE REPORT

CERVICAL RIB –UPPER LIMB ISCHEMIA

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INTRODUCTION: Cervical rib occurs in 1% of the general population.¹ It is an uncommon cause for thoracic outlet syndrome (TOS). Less than 10% are symptomatic.² This is because of the compression on the neurovascular bundle of the upper limb i.e. the brachial plexus and the subclavian artery. The main complaint is pain and treatment is conservative, but in case of vascular symptoms and signs of ischemia then surgery is the treatment of choice.

METHODS: We present a prospective study done at the department of vascular surgery at Kempegowda Institute of Medical Sciences and Research Centre, Bangalore. The period of study was from January 2005 to June 2011. In this study only those patients presenting with vascular symptoms were included. Diagnosis was done based on clinical examination, X- ray of neck, CT/MRI angiography and Doppler ultrasound. All patients were operated by the same vascular surgeon through the supraclavicular approach. Scalenotomy followed by excision of the cervical rib was done with exploration and repair of the artery, Embolectomy was done in case of distal thromboembolism. Post operatively patient was on low molecular weight heparin for 3 days with oral anticoagulants which was continued for 6 months and ecosprin lifelong.

RESULTS: Total number of patients (n) =18. Sex distribution; 12 females, 6 males. (F: M =2:1). Age distribution: Most patients were in the 2nd to 4th decade with a median age of 35.83.3% of the patients were between the age group of 20 to 60 years. 10 patients presented with right upper limb symptoms and 8 patients involving left upper limb. Clinical presentation: All patients presented with pain or numbness (100%), Pre-gangrene was seen in 44% and gangrene in 28%. The incidence of rest pain was 28%. 11 patients (61%) had compression of subclavian artery, 5 patients (28%) had compression with post stenotic dilatation and 2 patients (11%) with distal artery thromboembolism. 16 of the 18 patients had no post-operative complications. 1 patient (5%) had supraclavicular hematoma which was treated conservatively, 1 patient (5%) that presented late had to undergo above elbow amputation as the limb could not be salvaged.

DISCUSSION: The cervical rib is a supernumerary rib arising from the costal element of the seventh cervical vertebra. It is an uncommon anomaly which is usually detected as an incidental finding on radiographic films. The incidence of cervical rib being 0.6-0.7%.³ Symptomatic cervical ribs are due to the compression of the subclavian artery causing ischemia of the arm and on the brachial plexus causing neurogenic symptoms.

Cervical ribs may compress the subclavian artery at the point where the vessel crosses the first rib. This is most often the case with complete cervical ribs that join the first rib lateral to the subclavian artery.⁴ Post-stenotic dilatation leads to aneurysmal changes, which begin in the distal subclavian artery and extend into the proximal axillary artery. This leads to intimal damage and

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thrombus formation which may become dislodged and embolise distally. In some cases, the aneurysm may completely thrombose, and retrograde propagation may result in emboli in the vertebral circulation and, on the right side, in the common carotid artery.⁵ Occasionally, Raynaud's phenomenon may occur.⁶ Women may be more susceptible to arterial complications. A review of the literature shows a female predominance among reported cases. This predominance may be because cervical ribs are more common in women.^{1,3} The right-sided predominance of arterial complications is also evident, perhaps because more frequent muscular activity with the dominant upper extremity leads to earlier and more pronounced changes in the artery on that side.

Patients who present with any ischemic symptoms need expeditious and complete upper extremity angiography. In asymptomatic individuals who are found to have a cervical rib with a prominent supraclavicular pulse and bruit, arteriography, CT angiography, or magnetic resonance angiography is recommended to assess the degree of post-stenotic dilatation of the subclavian artery. Duplex ultrasonography also may allow partial visualization of this portion of the subclavian artery and has been used to document dilatation. An aggressive approach is warranted because the first manifestations may threaten limb or digit.^{7,8,10} The urgency of diagnosis is mandated by the imminent threat of limb or digit loss.

In asymptomatic individuals with more extensive aneurysmal change (more than two times the normal artery diameter); repair of the subclavian aneurysm in addition to cervical rib removal usually should be performed. Intraoperative inspection of the artery to assess its size accurately and, in selected cases, its luminal aspect to look for mural irregularity and thrombus may be useful to determine the need for repair.^{9,10} Evidence of thromboembolism mandates repair of the aneurysm. Rarely, vascular reconstruction can be accomplished by proximal and distal mobilization of the ends of the artery and end-to-end anastomosis. Most cases require a short interposition vein or prosthetic graft, however. In most cases, small subclavian aneurysms are resected, and the graft is interposed. The cervical rib can be excised by two approaches the supraclavicular approach and the transaxillary approach. The key points in both the approaches are (1) complete resection of bony, cartilaginous, and fibrous parts of (2) complete resection of the scalenus anterior muscle at the scalene tubercle on the first rib and (3) arterial exploration and reconstruction. Although concomitant first rib resection has been advocated by some with either the transaxillary or the supraclavicular approach,^{10,4} this rarely should be necessary.

Balloon catheter thromboembolectomy is necessary to restore patency to recently occluded distal arteries crucial to limb viability. This procedure may require separate exposure of the brachial and forearm arteries to affect complete thrombectomy. Many patients have experienced chronic repetitive embolic episodes, and the occluding thrombi may be partially organized and impossible to extract. In such cases, vein graft bypasses to arm and forearm arteries may be necessary to relieve critical ischemia and to promote healing of digital tip gangrene and ischemic ulcerations. Adjunctive cervicodorsal sympathectomy has been advocated in the past^{7,8}, but most experts believe that this is unnecessary and that the emphasis should be placed on adequate arterial reconstruction.^{9,10} Sympathectomy might be considered for selected patients in whom vasospastic symptoms are prominent, and complete restoration of pulsatile flow at the level of the hand is not possible.

CONCLUSION: Surgical management is the only option for cervical rib with vascular symptoms. Cervical ribs are almost always associated with aneurysms of the distal subclavian artery and

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proximal axillary artery¹¹. As there is intimal damage of the artery, simple excision of the rib will not suffice. It is important to explore the artery and reconstruct it using various graft materials. Embolectomy for distal emboli has to be done at the earliest to prevent high chances of limb and digital loss and thus prevent morbidity and mortality.

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List of Abbreviations

TOS –Thoracic outlet syndrome

CT- Computerized Tomography

MRI- Magnetic Resonance Imaging

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Photo 2: Late Presentation with gangrene of hand

X-ray neck showing bilateral cervical rib

CT angiogram 1

CT angiogram 2

CT angiogram showing distal arterial occlusion with embolus

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Excised cervical Rib

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Endarterectomy done

Repair of artery with PTFE patch graft

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Embolectomy being done of distal artery embolus

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