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Cervical Rib: Dept of Neurosurgery Khoula Hospital Muscat Oman Experience: A Critical Analysis

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Abstract An extra rib arising from seventh cervical vertebra is termed as cervical rib. The condition is a congenital anomaly. Thoracic outlet syndrome is the common presentation. [1] Resection of the rib alleviate the symptoms. We present here our experience of cervical rib resection and a critical analysis of condition with literature review.

Keywords: *Cervical rib*

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1. Introduction

Cervical rib is known to have an incidence of .6% in the population. It can be either bilateral or only on one side. Thoracic outlet syndrome is the common presentation. However a major population cervical rib is detected incidentally and patients are asymptomatic. [1] Size and shape of the cervical rib also has different anatomic profile. Persistent ossification of the C7 lateral costal cartilage is attributed to the formation of cervical rib. Hence elongation of transverse process or a complete cervical rib or fusion to the 1 st rib are various anomalies which are encountered. Inferolateral projection in comparison to the normal anterolateral projection of thoracic transverse process is the differentiation for the cervical rib. Brachial plexus compression or subclavian artery compression by cervical rib leads to positive Adson's test on examination. Excision of the rib via various approaches, superaclavicular, trans axillary or inferaclavicular is generally practiced [4].

2. Material and Methods

We present series of 8 patients operated by two consultants in our department. All patients presented with symptoms of thoracic outlet syndrome of varying intensity. All patients were investigated thoroughly with a x ray chest, CT scan, MRI cervical spine and EMG /NCV studies to rule out the associated or other conditions. After confirming the cervical rib, hypertrophied transverse process or a band from transverse process compressing the neurovascular structures causing thoracic outlet syndrome treatment option was planned and discussed with the patient.

Superclavicular approach via small incision in the scalene triangle was the choice of operating consultant. After retracting the clavicular head of the sternoceidomastoid muscle the scalene anterior muscle with phrenic nerve crossing it from lateral to medial size was appreciated. The Subclavian vein was seen anterior to scalene anterior muscle and subclavian artery and brachial plexus were seen between the scalene anterior and medial muscle. Cervical rib was seen here causing the compression of neurovascular bundle. Post stenotic dilatation of subclavian artery was not noticed in our series of patients. After careful retraction of neurovascular bundles the excision of cervical rib was performed subperiosteally till C7 vertebra removing all compressing elements on scalene triangle neurovasdcular structures. Pleural injury was carefully avoided. Haemostasis was achieved adequately and closure of wound was done in a conventional way.

3. Results

The patients are tabulated as per Figure 5. Age of our patients ranged from 16 yrs to 46 yrs. Male female ratio was 2: 6. Presentation was neck pain with cervical radiculopathy in 6 patients and in two had associated hand pain and numbness too. One patient required later carpal tunnel decompression too. Adson test was positive in 4 of our patients. Investigations done were Xray, CT scan, MRI cervical spine and EMG/NCV studies in all of our patients. MRI cervical spine was done to rule out any associated disc disease. In two patients rib was bilateral. One was symptomatic only on one side other had on both sides and required two surgeries. Surgical approach in all patients was superaclavicular. Complications included in one patient persistence of symptoms and required decompression of carpel tunnel syndrome too. Other all

patients improved in the symptoms. Patients are all being followed up in outpatient clinic.

Table 1.

S.No	Hospital ID No.	Sex	Age	Symptoms	Investigation	Date of surgery	Complications	Follow up
1	480171	Female	36 yrs	Bilateral hand and neck pain	X ray, CT, MRI and EMG/NCV	5/4/2006 left, 14/5/2006 right	nil	1 yr Satisfactory
2	492761	Female	39 yrs	Pain left side neck and hand	X ray, CT, MRI and EMG/NCV	7/6/2006	nil	3 yrs Satisfactory
3	351660	Female	37 yrs	Left hand numbness	X ray, CT, MRI and EMG/NCV	18/9/2006	Was symptomatic required carpal tunnel decompression too	7yrs satisfactory
4	377249	Female	38 yrs	Pain and numbness in left sided limbs	X ray, CT, MRI and EMG/NCV	1/11/2006	nil	7 yrs satisfactory
5	66654	Female	58 yrs	Left sided pain and numbness	X ray, CT, MRI and EMG/NCV	22/6/2009	nil	1 yr Satisfactory
6	697916	Male	45 yrs	Left sided Neck pain	X ray, CT, MRI and EMG/NCV	20/11/2011	nil	Lost to follow up
7	789762	Female	46 yrs	Right sided neck pain and numbness	X ray, CT, MRI and EMG/NCV	20/1/2014	Nil	One follow up in OPD after 2 months satisfactory
8	508752	Male	16 yrs	Left sided neck pain and numbness		23/1/2017	nil	Immidiate post op period uneventful awaits follow up in OPD

Figure 1. CT scan of Patient no 2 showing left sided cervical rib

Figure 2. X ray neck showing right sided cervical rib of patient no 7

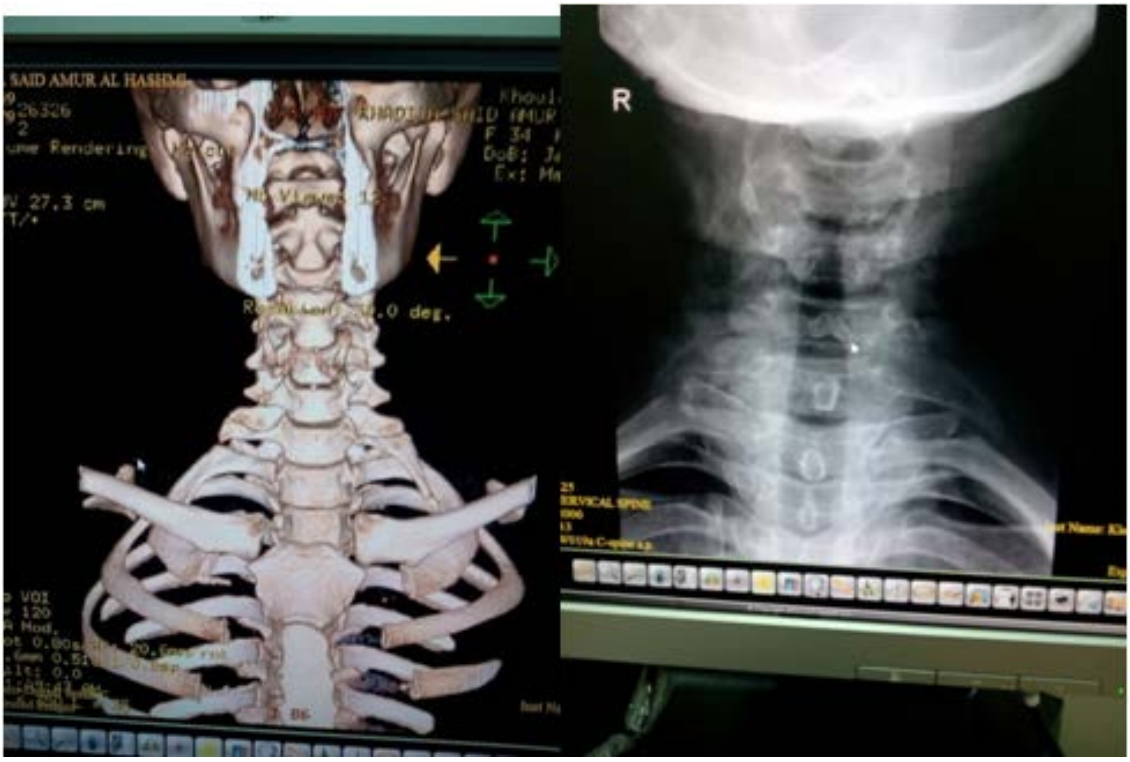

Figure 3. CT and X ray of patient no 4 showing left sided cervical ribs

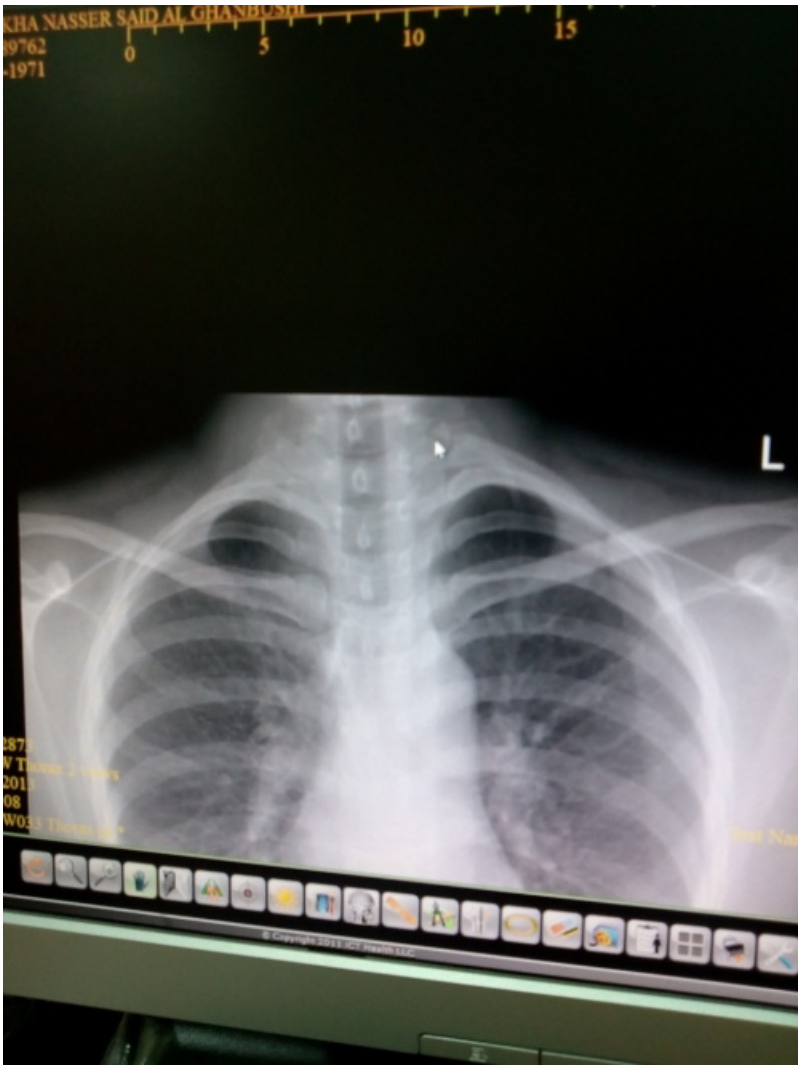

Figure 4. X ray showing cervical rib of patient no 8

4. Discussion

As reviewed in the literature cervical rib is not an uncommon entity but mostly managed by thoracic or vascular surgeons. As we further review the literature Ferrante MA and Ferrante ND in 2016 reported the thoracic outlet syndrome caused by cervical rib into various categories viz arterial, venous, neurovascular and disputed thoracic outlet syndromes categories and their management thereof. Cervicoscapular pain has to be studied carefully to be distinguished from true thoracic outlet syndrome by carefully seeing anatomy, neurophysiology, electromagnetic correlations and underlying pathology. [1] Buyukkaya A Buyukkaya R in 2015 reported incidences where a cervical rib was mimicking a superaclavicular mass. [2] Ist rib itself or lesions thereof can present as TOS as reported by Kargar S et al in 2013 who reported a case of osteoid osteoma of the 1 st rib and case presented as thoracic outlet syndrome. [3] In 2009 White PW et al discussed in detail the cervical rib causing the arterial type of TOS with subclavian artery compression and etiology, pathophysiology, diagnostic and treatment plans were discussed. [4] In 1983 Neveu P etal described their 15 cases of cervical ribs causing vartious set of pathophysiologhies and role of ultrasound and computed angiography as useful tool in the management. [5] In 2011 Rivera-Vega A reported a case of bilateral cervical rib in an adolescent with fibrotendimous band being the reason for TOS and atrophy of hand muscles along with other neurogenic presentation treated by surgical excision of the rib with band on symptomatic side. [6] In Our case series youngest patient being matching this case report and establishing the treatment standards. In 2006 Hug U et al further emphasized patients presenting with thenar muscles hypotrophy and on investigations reveled cervical rib, enlarged C7 transverse process or a fibrotendinous band as a causative feature and surgical resection gave encouraging result [7].

To conclude our study further emphasised the TOS caused by cervical rib as a challenging condition. Thorough investigation with EMG/NCV, CT /X ray and MRI cervical spine to rule out associated cervical radiculopathy being the standard array of investigation prior to superaclavicular approach for excision of the cervical rib. Our small group owing to small population of country had negligible complications and good outcome.

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