

## Incidence of Cervical Rib in Chennai Population

Vathsala Venkatesan, K.P. Prabhu, B. Ram Kumar and Chandran Joseph

Sree Balaji Medical College and Hospital,  
Chennai-44, Bharath University, India

**Abstract:** Presence of anomalous ribs are very rare especially the Cervical ribs. In view of the clinical syndromes and the associated compression on neurovascular structures at the thoracic inlet are gaining importance in recent years and so a detailed analysis of the chest and spine X-rays are done and reported.

**Key words:** Cervical Rib • Thoracic Outlet Syndrome

### INTRODUCTION

Cervical rib is a supernumerary rib, normally located above the 1<sup>st</sup> rib and its incidence is only 0.5-1% and among these only 10% of cases only it shows symptoms and in rest of cases with cervical rib it is asymptomatic. This rare congenital anomaly is the costal element of last cervical vertebra and produced due to the excessive growth of anterior tubercle of the cervical vertebra [1]. As per the embryologists it is reported to be present always in fetuses and disappears just before birth [2]. The prevalence of cervical rib in London population was found to be 0.74% out of 1352 chest radiographs examined [3]. A case with cervical rib causing partial occlusion of subclavian artery followed by aneurysm and gangrene formation was described by William and MacFee [4]. Mirza *et al.*, described a case of 49 year old male patient with right cervical rib leading to subclavian arterial thrombosis [5].

Todd [6] claimed the vascular compression could also be due to paralysis of sympathetic nerve supply also.

A case of 9 year old boy with subclavian artery aneurysm was found to have been caused by a supernumerary rib and state such a finding has never been reported in so a young child [7]. The cervical was the cause in a patient with recurrent stroke [8]. In a study of 16 patients with cervical ribs 8 had neurological and 8 had vascular symptoms [9]. The significance of cervical rib in thoracic outlet syndrome was studied in 16 patients with cervical rib among which 3 had bilateral, 7 displayed subclavian artery thrombosis, 3 had subclavian artery aneurysm and 5 had neurogenic symptom. Chang *et al.*

[10] and Viertel *et al.* [11] found the prevalence of cervical rib to be 2% (67/3404), bilateral occurrence in 40.3% and in women it was more in the population studied.

Baumgartner *et al.* [12] described the symptoms of Thoracic outlet syndrome are neurogenic mostly(90%) and not vascular and the subclavian artery compression in his study was related to 1<sup>st</sup> rib and not to cervical rib. Adson and Coffey, Baumgartner observed gangrenous changes at finger tips due to vascular compression. this was caused by direct pressure by cervical rib [13] and Halsted and Reid [14] reviewed 716 cases of cervical rib from both autopsy and museum specimens and clinical cases. some had vascular, some had nerve compression and some had both together. Sultanov *et al.* [15] had described in his work about the surgical management in 51 patients with cervical rib of which 33 were women and most of them were suffering due to neurovascular compression. Managing the cervical ribs and anomalous first ribs causing neurogenic thoracic outlet syndrome(TOS) was given by Sanders and Hammond [16].

**Symptoms:** When present, in 10% of cases only, it causes compression symptoms on structures at the thoracic inlet, similar to Thoracic Outlet Syndrome (TOS). The structures compressed in the thoracic outlet are subclavian artery and vein and the lower trunk of brachial plexus. Causes of compression are reduction in costoclavicular space when these lie in the scalene triangle. The following are the boundaries of scalene triangle. Anteriorly by skin, fasciae and Scalene Pad of fat and at the sides by the anterior and middle scalene muscles. The base is formed by 1<sup>st</sup> rib.

Costoclavicular space is between the first rib and clavicle and hence reduction of this space due the presence of cervical rib causes TOS.

**Types of Cervical Rib:** It normally exists in the form of a bony, cartilagenous or fibrous structure from anterior tubercle of seventh cervical vertebra. It is attached posteriorly to 1<sup>st</sup> rib and extends upto posterior triangle of neck lying freely at its anterior end. Very often it exists as a fibrous band [17] and when not ossified it can't be visualized in x-rays and hence skips diagnosis.

From the above literature it is evident that a vast number of studies have been performed and many contradictory results are reported. As many had neurogenic and some had vascular compression and many varying results in the incidence of the cervical ribs have been reported, we have taken up to study in detail, the incidence of its occurrence in patients attending some of the Chennai hospitals. X-rays, clinical manifestation, surgical procedures and investigations performed on the patients were analysed in this study.

#### MATERIAL AND METHODS

800 chest and cervical spine x-rays from SBMC hospital taken from patients attended the hospital over a period of 2 years were examined of which 13 X-rays revealed the presence of cervical rib.

Another set of 700 X-rays from another medical centre taken over a period of 2 years revealed its presence in 9 cases.

So out of 1500 X-rays 22 of them displayed this feature. Case histories of all cases were analysed in detail and surgical procedure also noted. It was also observed to see whether it was unilateral or bilateral, whether predominance was in females or males and if they were all symptomatic or asymptomatic.

**Observations:** All the reported cases were subjected to various investigations and a sample Case history and the investigations performed in one of the patients out of the 22 cases is given here.

22 year old male presented in the surgery op with the complaints of Intermittent pain in the left upper limb.

- No H/o parasthesia
- No H/o numbness
- No H/o giddiness/dizziness/
- No H/o pain in the right upper limb.
- Distal pulses normal at wrist.
- Mild discolouration of Left upper limb.



Fig. 1: X-ray of cervical rib (Arrow pointing)



Fig. 2: Fragments of surgically removed cervical rib

Investigations results:

Xray: showing left cervical rib. (Fig. 1 and 2)

MRI: Impression – presence of left side cervical rib.

Doppler: Stenosis at the level of 2<sup>nd</sup> part of subclavian A. with post stenotic dilatation with thrombus.

Local examination revealed the following  
left supraclavicular fullness present-pulsatile  
Adson test positive.

Pain when left upper limb is hyperabducted.

The left cervical rib was only present and no cervical rib found on the right side and hence it was only unilateral occurrence.

Out of 1500 x-rays analysed, only 22 of them showed the presence of cervical rib Unilateral or bilateral and the percentage:

And in this 22 also, in 20 cases it was unilateral and only in two cases it was bilateral and the incidence of cervical rib was found to be 1.16% in our study.

**Gender:** Our data revealed 19 out of 22 were male cases and only 3 were females contrary to earlier data where majority were reported to be females cases [15].

**Symptomatic or Asymptomatic:** It was asymptomatic in most of the cases except in 2 patients who came with severe pain in the left upper limb and were detected to have cervical rib. In remaining cases its presence was found out only accidentally i.e. while taking x ray of cervical spine etc.

**Age group:** Age wise distribution in our study the cervical rib was noted between 20 and 30 years and none were found above 50 and 60 years of age.

## DISCUSSION

From the earlier reports it was seen to be mostly bilateral. Chang *et al.* [10] but our study showed it occurs in all cases only on one side and hence unilateral was predominant (2 out of 22). Most of the reported cases were females [15].

In the present study we found male cases are predominant. Percentage of its occurrence as per our analysis is only 1.16% whereas it was 2% as per the previous records (11) and 74% in London population.

The neurogenic compression is the most common as per the existing reports [12] but in our study all had only vascular compression and none had neurogenic compression (22/1500).

From the above account it is clearly evident that in 4 aspects our data from the population under study was differing from earlier works and hence we can conclude the following: from the age wise data we can say that if the cervical rib is present it usually shows symptoms between 20 and 40 years and beyond that the neurogenic or vascular compression may not be caused by cervical rib but may be due to other factors of TOS.

- Incidence of occurrence was 1.16% only in our population.
- Earlier studies found bilateral cases were more common. In our work unilateral cases were seen to be more.
- The previous work revealed female cases were more in Number but our data showed male cases were Predominant.

- The fourth difference is the compression was mostly neurogenic in the earlier cases but in all the cases observed by us, vascular compression was more common. But here again some studies claim vascular compression to be more common and some say neurogenic is more common and reports are very controversial.

## CONCLUSION

It was indicated that the cases of vascular compression in male ones should always look for the presence of cervical rib. The fact it is not visible in X rays but mainly be attributed to its fibrous status and its presence can not be ruled out as this may not produce shadow in X rays. One more fact is, the TOS can be due to so many factors like trauma, poor posture, large breasts and thyroid oestrogen deficiency etc. One of the causes could be due to the presence of cervical rib which in turn creates reduction in costoclavicular space thereby narrowing the space lead to compression of subclavian vessels and lower trunk of brachial plexus. Hence we have concluded that in case of the vascular and neurogenic compression, apart from other factors causing TOS.

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