

THE PREVALENCE OF CERVICAL RIB IN ANATOLIAN POPULATION

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SUMMARY

Purpose: The importance of cervical ribs lies in their involvement in neurovascular compression syndromes of the upper extremity. Thus, we investigated the prevalence of cervical rib in the Anatolian population and reviewed the literature for clinical manifestations caused by cervical rib. **Methods:** Plain radiographs of 6630 cases which showed the cervical and upper thoracic region clearly were reviewed prospectively for the incidence of cervical rib. **Results:** 3543 (53.4%) of the cases were females and 3087 (46.6%) were males. Among 6630 cases, 199 (3%) cervical ribs were detected. 144 (2.17%) of the cervical ribs were observed in females and 55 (0.83%) were observed in males. All of the cervical ribs originated from the seventh cervical vertebra. **Conclusion:** The prevalence of cervical rib in Anatolian population was three times higher compared to the others reported in the literature.

Key words: Cervical Rib, Incidence, Diagnostic Imaging.

INTRODUCTION

Cervical rib is a separate piece of bone that articulates with the transverse process of one or more cervical vertebrae. It is most common at the seventh cervical vertebra whereas the sixth and fifth cervical vertebrae may be involved in a smaller proportion (1, 2). These ribs may be differentiated from elongation of a cervical transverse process (apophysomegaly or transverse mega-apophysis), that would demonstrate no costovertebral articulation. They may be differentiated from rudimentary first thoracic ribs via the orientation of the transverse

processes with which they articulate. Cervical transverse processes are caudally oriented, while thoracic transverse processes project cephalically. Cervical ribs are present in 0.5-1% of the population and are twice as common in females (1, 3, 4). It is present bilaterally in 47-73% of the cases (1, 3, 5) but often the two sides are asymmetrical (6). When unilateral, it is generally on the right side. On postmortem studies, the incidence was 1% (5). The cervical rib may be composed of bone completely (complete cervical rib) or may be incomplete with a short bony part and a fibrous or fibromuscular band extending from the bony part (incomplete cervical rib). To understand the

manifestations one must look at the anatomy involved.

The scalenus anterior muscle is inserted into the tubercle of the first thoracic rib, while the scalenus medius muscle is inserted about halfway along the arc of the first rib. Between them, the subclavian artery and the brachial plexus leave the neck for the arm. The subclavian vein lies anterior to the insertion of the scalenus anterior muscle. Together, the subclavian vein, artery and the brachial plexus pass posterior to the clavicle, and then between the clavicle and the first thoracic rib, where the divisions form the lateral, posterior, and medial cords of the plexus. Laterally, the neurovascular structures lie inferior to the coracoid process and deep to the pectoralis minor muscle. The complete cervical rib, or the fibrous extension of the incomplete rib, implants on (or close to) the scalene tubercle. This makes the interscalenus triangle even smaller, causing the above mentioned structures to "hang over" the cervical rib or its fibrous extension (7).

The symptoms are more prevalent in incomplete cervical ribs, compared to the complete ones. Pressure upon the brachial plexus and the subclavian artery and vein cause the symptoms. Only 5-10% of people with cervical ribs have symptoms (3,8). If they cause symptoms, this usually occurs after middle age (1, 2). For this reason it is important to know the

were reviewed for the incidence of cervical rib. The radiographs were taken at Gazi University Medical School Department of Radiology. 3543 (53.4%) of the cases were females and 3087 (46.6%) were males. Only adults above 18 years of age were included in the study. PA chest radiographs were obtained with FFD 180 cm and 120-130 KV technique, while AP cervical radiographs were obtained with FFD 100 cm and 60-70 KV technique. Radiographs which showed the cervical and upper thoracic region clearly were reviewed. In suspicious cases the diagnosis was confirmed with oblique cervical radiographs. The radiographic diagnosis was made when articulation of the anomalous rib with a transverse process orienting in caudal direction was detected. Cervical ribs which extend to the first thoracic rib (with or without articulation) were accepted as complete, and those do not extend to the first thoracic rib (ending blind in the soft tissue) were accepted as incomplete. In this study only the incidence of cervical rib was investigated, symptomatology was not evaluated.

RESULTS

Among the 6630 cases, 199 (3%) cervical ribs were detected. 144 (2.17%) of the cervical ribs were observed in females and 55 (0.83%) of them were observed in males. The

Table 1: The incidence of cervical rib in Anatolian Population (n = 6630)

	FEMALE				MALE				TOTAL					
	Incomplete		Complete		Total		Incomplete		Complete		Total			
	n	%	n	%	n	%	n	%	n	%	n	%		
Right	32	0.48	11	0.17	43	0.65	17	0.26	4	0.06	21	0.32	64	0.97
Left	21	0.32	5	0.07	26	0.39	8	0.12	2	0.03	10	0.15	36	0.54
Bilateral	56	0.84	19	0.29	75	1.13	15	0.23	9	0.14	24	0.36	99	1.49
TOTAL	109	1.64	35	0.53	144	2.17	40	0.60	15	0.23	55	0.83	199	3.00

incidence of cervical rib.

The present study was undertaken to determine the incidence of cervical rib in the adult Anatolian population.

MATERIAL AND METHOD

Posteroanterior (PA) chest and anteroposterior (AP) cervical radiographs of a total of 6630 patients, taken for various reasons

results are given in Table 1.

In this study, the prevalence of incomplete cervical rib was three times higher than the prevalence of complete ones and the female/male ratio was 3:1. The incomplete unilateral cervical rib (Fig.1) was twice and the incomplete bilateral one was three and a half times higher in females. The complete unilateral cervical rib (Fig.2) was two and a half times higher on complete bilateral one was two times

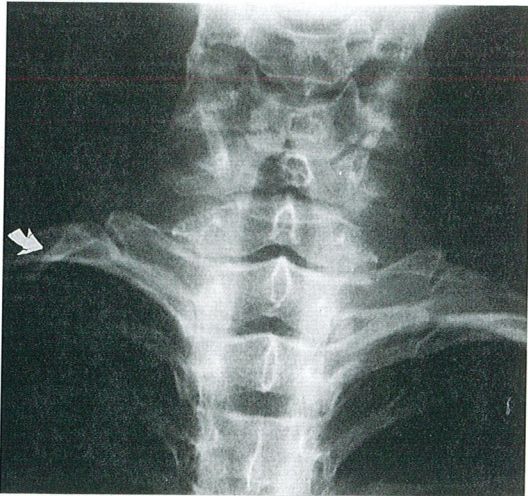


Fig - 1: Unilateral incomplete cervical rib on the right.

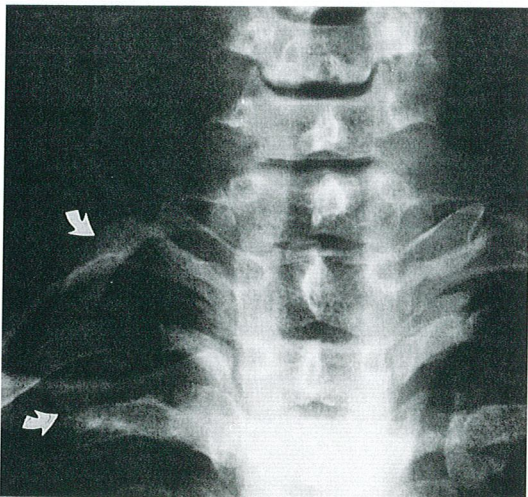


Fig - 2: Unilateral complete cervical rib on the right.

the right side, and also it was two times higher in females.

DISCUSSION

The importance of cervical ribs lies in their involvement in neurovascular compression syndromes of the upper extremity. These conditions in order of importance are: thoracic outlet syndrome (3, 8, 9, 10), subclavian artery aneurysm (11), arterial thrombosis (4), upper extremity venous thrombosis (12), distal and cerebral thrombo-embolism (13) and pruritis (14). Though 5-10 % of people with cervical rib experience symptoms (3,8), it is important to know the incidence of cervical rib for differential diagnosis and treatment.

The following types are described (2, 6, 10):

1. The majority of cervical ribs are incomplete, but are attached to the first thoracic rib with a fibrous or fibromuscular band which implants on the scalene tubercle.
2. A complete rib attached to the thoracic rib with a joint formed between the two.
3. An incomplete rib ending blind in the soft tissue.

Fibrous or fibromuscular bands are generally not visible on X-rays because they contain no calcium, but are visible on MRI (2, 9).

In our study the prevalence of cervical rib in the Anatolian population was 3% and the female/male ratio was 3:1. Both of these values were higher than those in other reports (1, 3, 4). The incidence of bilateral cervical rib we obtained in this study was similar to others reported in the literature (1, 3, 5). In the literature the incidence of the incomplete ribs were also reported to be higher than the complete ones (6, 9). In our study the incidence of incomplete cervical ribs was found to be three times higher than the complete ones. Furthermore unilateral incomplete cervical rib incidence was two times higher in females compared to males, bilateral incomplete rib was three and a half times higher in females. Unilateral complete rib was two and a half times and bilateral complete rib was two times higher in females. However, no ratio was reported for complete and incomplete cervical ribs in the literature. In this study the most frequent cervical rib was the bilateral incomplete type, detected in females (0.84%) whereas the rarest type was the complete cervical rib detected in males (0.03%). Unilateral cervical rib was more frequent on the right side. This was similar to the results reported by McNally et al (5) and Roos (10).

It is important to know the incidence of cervical rib as it may cause neurologic, arterial, venous or combined symptoms. Usually, no treatment is necessary in asymptomatic or mild cases. When a cervical rib is symptomatic, the rib, the fibrous or fibromuscular band should be excised together with the periosteum (6, 9-11, 13, 14).

In conclusion, we found the incidence of cervical rib to be three times higher in Anatolian population compared to the others reported in the literature.

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