

PREVALENCE OF CERVICAL RIB AMONG SUDANESE POPULATION - A RADIOLOGICAL STUDY

Mohamed Abdel Aziz^{*1}, Yasser Seddeg Abdulghani² and Faisal Hasan Younis³

Keywords:

cervical rib, prevalence, elongated transverse process, Sudanese.

Abstract

Background: Cervical ribs are relatively common anomalies with a wide range of reported incidences (0.05%–3.0%) based on series using radiographs. Cervical ribs are associated with thoracic outlet syndrome (TOS) in approximately 10% of the affected populations. The prevalence of cervical ribs in the human population has been a source of uncertainty due to the degree of difficulty that comes in detecting this often subtle congenital variation. .

Objective: To describe the prevalence of the full spectrum of transverse process elongation and cervical ribs in Sudanese population .

Methods: A cross-sectional hospital based study was conducted at 5 major hospitals and diagnostic centers in Khartoum city . The study comprised a radiologic review of 250 chest radiographs of adults of both sexes looking for the presence of cervical ribs and elongated transverse processes.

Results: Of the 250 radiographs included in this study, cervical ribs were found in 2.0% (5/250) and elongated transverse process in 4.8% (12/250) .The study included 162 (64.8%) women and 88 (35.2%) men .Women were found to have cervical ribs more than twice as men, 2.5% (4/162) versus 1.1% (1/88) . Moreover, 80% of the patients with cervical ribs had a unilateral rib, while the remaining 20% of patients had bilateral cervical ribs. Regarding the elongated transverse process, also women have it nearly as twice as men, 5.6 % (9/162) versus 3.4 % (3/88). But it was more bilateral (66.7%) than unilateral (33.3%).

Conclusion: Prevalence of cervical rib in our population was 2% and that of elongated transverse process was 3.4%.Cervical rib and elongated transverse process is more common in women than in men. Unilateral cervical rib is more common than bilateral while the reverse is true for elongated transverse process.

INTRODUCTION

Cervical ribs are most often found incidentally on routine chest radiographs [1, 2]. The incidence of cervical ribs in the general population is 0.2% to 1.0% [3,4]. The majority of patients with cervical ribs are asymptomatic and therefore do not require resection [5]. By definition, cervical ribs originate from the seventh cervical vertebrae and vary in length from those that are <1 cm to those that extend across the thoracic outlet and fuse to the first rib [1, 2].

MATERIALS & METHODS

A cross-sectional hospital based study was conducted at 5 major hospitals and diagnostic centers in Khartoum city. The study comprised a radiologic review of Two hundred and fifty consecutive chest radiographs of adults from the digital database looking for the presence of cervical ribs and elongated transverse processes. The radiographs originated from all patients, regardless of their presenting symptoms, who had been to the inpatient and outpatient imaging services at the five centers . The criteria for cervical ribs were defined as in several previous studies(2,4) as follows:

1. The cervical rib must articulate with the C7 vertebra with a well-defined joint; if the rib was fused with the vertebra, it was considered an elongated transverse process.
2. The rib must not originate from the transverse process of the first thoracic vertebra, but rather the seventh cervical vertebral transverse process, which projects horizontally from the spine.

RESULTS

Out of the 250 samples included in this study, cervical ribs were found in 2.0% (5/250) and elongated transverse process in 4.8% (12/250) .The study included 162 (64.8%) women and 88 (35.2%) men .Women were found to have cervical ribs more than twice as men, 2.5% (4/162) versus 1.1% (1/88) . Moreover, 80% (4/5) of patients with cervical ribs had a unilateral rib, while the remaining 20% (1/5) of patients had bilateral cervical ribs. Regarding the elongated transverse process ,also women have it nearly as twice as men , 5.6%(9/162) versus 3.4%(3/88). But it is more bilateral (66.7%) than unilateral(33.3%)

Table (1): Gender distribution

Variable	Frequency
Male	88
Female	162
Total	250

Table (2): Prevalence of cervical rib and elongated transverse process

Variable	Frequency
Cervical rib	5 (2%)
Elongated transverse process	12 (4.8%)
Total	250

Table (3): Distribution of cervical rib and elongated transverse process within gender and laterality

Variable	Frequency
Cervical rib	
Male	1
Female	4
Total	5

Unilateral	4
Bilateral	1
Total	5
<i>Elongated transverse process</i>	
Male	3
Female	9
Total	12
Unilateral	4
Bilateral	8
Total	12

DISCUSSION

Previous studies have reported a wide range of values for the prevalence of cervical ribs in various populations, from 0.05% to 3.0% [6, 7]. Recently, Brewin et al^[9] examined 1352 radiographs and found a 0.74% rate of prevalence in a mixed sex and ethnicity population in London. Viertel VG et al reported prevalence of cervical rib to be of 2%.

In our region Bokhari RF et al, at King Abdulaziz University Hospital, Jeddah, Saudi Arabia showed that prevalence of cervical rib is 3.4% and elongated transverse process is 23%. It is higher in their population than that reported in other populations^[8].

In our study we determined the prevalence of cervical ribs on neck radiographs at five major hospitals and diagnostic centers in Khartoum city to be 2.0%. This figure is within the international rates.

As in previous studies^[6,9], we determined the prevalence to be greater in women than in men. And it is more unilateral than bilateral. Regarding the elongated transverse process, our study showed prevalence of 4.5% and it is more common in women than men, but tends to be bilateral more than unilateral.

So this normal variant may not be readily considered in fracture detection, yet it may certainly be a source of neck and arm pain. Therefore, enhanced attention as to whether there is an articulating bony structure attached to C7 (ie, a rib) as opposed to an elongated transverse process and considering a cervical rib as a source of upper extremity paresthesias, pain, and motor complaints will assist in making this diagnosis. When needed, CT scan with coronal reconstructions can help to visualize the cervical rib and vertebral body articulation.

The implications of this study is that, with such prevalence (2%), performance improvement in the detection of cervical ribs is warranted and in a patient with neck and upper extremity discomfort or sensorimotor symptoms, thoracic outlet syndrome and/or brachial plexus compression are important differential considerations. Therefore, the anatomical variation must be considered to prevent under diagnosis of cervical ribs as a causative factor.

REFERENCES

1. Bots J, Wijnaendts LC, Delen S, et al. Analysis of cervical ribs in a series of human fetuses. *J Anat* . 2011;219:403–09
2. Brewin J, Hill M, Ellis H. The prevalence of cervical ribs in a London population. *Clin Anat* .2009;22:331–36

3. *Galis F. Why do almost all mammals have seven cervical vertebrae? Developmental constraints, Hox genes, and cancer. J Exp Zool .1999;285:19–26*
4. *Merks JH, Smets AM, Van Rijn RR, et al. Prevalence of rib anomalies in normal Caucasian children and childhood cancer patients. Eur J Med Genet. 2005;48:113–29*
5. *Gulekon IN BC, Turgut HB. The prevalence of cervical rib in Anatolian population. Gazi Med J. 1999; 10: 149–52 .*
6. *Gulekon IN BC, Turgut HB. The prevalence of cervical rib in Anatolian population. Gazi Med J .1999; 10: 149–52.*
7. *Steiner HA. Roentgenologic manifestations and clinical symptoms of rib abnormalities. Radiology .1943; 40: 175–78.*
8. *Bokhari RF, Al-Sayyad MJ, Baesa SS. Prevalence of cervical ribs and elongated transverse processes in Saudi Arabia, Saudi Med J. 2012 Jan;33(1):66-9.*
9. *Brewin J, Hill M, Ellis H . The prevalence of cervical ribs in a London population. Clin Anat. 2009; 22: 331–36.*
10. *Viertel VG, Intrapiromkul J, Maluf F, Patel NV et al .Cervical ribs: a common variant overlooked in CT imaging. AJNR Am J Neuroradiol. 2012 Dec;33(11):2191-4.*