CERVICAL RIB VARIANT IN A NIGERIAN POPULATION

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ABSTRACT

Background: *Cervical ribs often go unnoticed or are incidental findings in frontal chest radiographs of individuals. The prevalence of this congenital variant in our environment has not been documented hence the need for such study.*

Objective: *The objective of this study is to determine the prevalence of cervical rib in a Nigerian population and to describe prevalence in relation to sex.*

Methodology: *Successive technically adequate postero-anterio chest radiographs of adults taken over a period of seven months were scrutinized for the presence or absence of cervical ribs. The results were analyzed thereafter using Epi-Info.*

Results: *A total of 1384 conventional radiographs of adults were analyzed comprising 617(44.6%) males and 767(55.4%) females. 9 patients were found to have cervical ribs: prevalence of 0.7%. A higher occurrence was found in females with 5 cervical ribs (55.6%) and sex specific prevalence of 0.7% compared to males with 4 cervical ribs (44.4%) and sex specific prevalence of 0.6%.*

Conclusion: *The prevalence of cervical rib variant in our environment compares well with that seen in other places but could be higher if digital radiography is employed.*

Introduction

A cervical rib is a supernumerary rib which arises from the seventh cervical vertebra. It is a congenital variant located above the normal first rib. These are mostly of no clinical significance and often go unnoticed or are occasional incidental findings in the frontal chest radiographs on Radiologists reporting desks. They may be unilateral or bilateral.

Cervical ribs vary in their lengths and could be well developed or complete in which case they are separate but articulating with the transverse process of the seventh cervical vertebra (C7). They may conversely be partially developed or incomplete and fused with the C7 transverse process forming an elongated transverse process.[1]

The distal portions of a cervical rib may end freely in the soft tissues of the neck or articulate with the first rib. A fibrous band may be present connecting the tip of the cervical rib to the adjacent first rib below.[2]

The presence of a cervical rib and other associated anomalies including fibrous bands and abnormalities of the scalene muscles may lead to narrowing of the costo-scalene triangle compressing on the lower trunk of the brachial plexus and the second part of the subclavian artery in 'Thoracic Outlet Syndrome'.[2]

Previous studies have shown the prevalence of cervical rib to be between 0.2 and 3%. These include studies in United States population,[3] Indian population,[4] Italian population[5] and Turkish population.[6] There is poverty of manuscript on the prevalence of cervical rib variant in black Africa populations.

The objective of this study is to determine the prevalence of cervical rib variant in a Nigerian population of patients and to describe prevalence in relation to sex as a risk factor.

Methodology

A prospective study was carried out using successive technically adequate postero-anterior chest radiographs of adults taken between May 2008 and November 2008 in the Radiology Department of Jos University Teaching Hospital, Jos. The radiographs were assessed for the presence or absence of cervical ribs.

The following criteria were used to identify a cervical rib:

(1) The rib must abut the transverse process of the 7th cervical vertebra which is seen to project caudally or horizontally from the vertebra rather than the transverse process of the 1st thoracic vertebra which extends diagonally upwards from its point of origin.

(2) A well developed cervical rib must be separate from but articulate with the transverse process of C7. If fused with the vertebra and longer than the T1 transverse process, was classified as poorly developed or incomplete.

(3) It must have no connection with the manubrium sterni, although it may form a synostosis with the 1st rib thus distinguishing a cervical rib from a 'rudimentary 1st rib'.

Radiographs of children less than 14 years were not used. Repeat radiographs of individuals were screened out.

The radiographs with evidence of cervical rib were identified from the daily pool and were further carefully scrutinized by a Consultant Radiologist following the above criteria.

For each radiograph, the name, age, sex, presence or absence of cervical rib, side/sides of occurrence as well as measure of development (well or poorly developed) were recorded. The data was entered into a computer and analyzed using Epi-Info for windows version 3.5.1. The results were presented in form of tables and graphs.

Results

A total of 1384 radiographs of patients were analyzed comprising of 617 (44.6%) males and 767 (55.4%) females; (Fig 1). The mean age of the patients was 39.35 ± 14.22 with a range of 14-99 years; mean age of male study population was 40.48 ± 14.83 while that of female group was 38.45 ± 13.66 (p= 0.0084). The statistical significance may be as a result of the higher proportion of females in the study population; who more of the times utilize services routinely when compared with males.

9 patients were found to have cervical ribs, giving an overall prevalence of 0.7%. A higher occurrence was found in females with 5 cervical ribs (55.6%) and sex specific prevalence of 0.7% compared to males with 4 cervical ribs (44.4%) and sex specific prevalence of 0.6% (p= 0.3532); Table 1 and Fig 2

Of the 9 individuals with cervical ribs, 4 were on the right, 2 were on the left and 3 were bilateral. All the cervical ribs found were well developed.

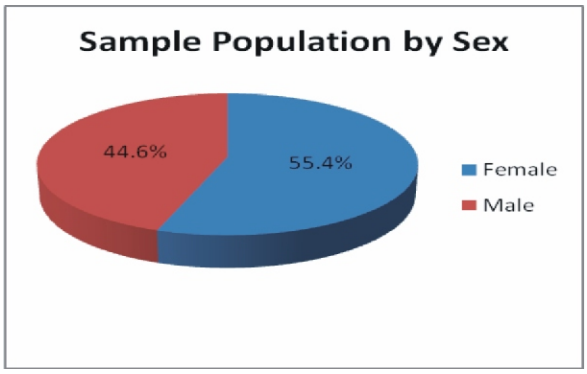
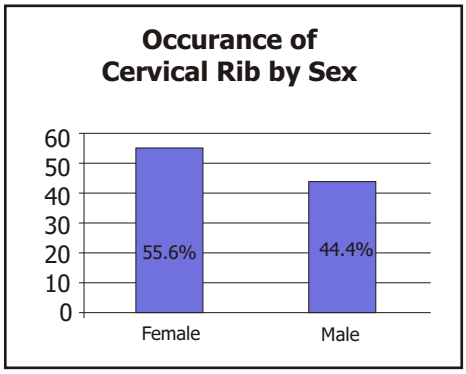


Table 1: Classification of Cervical Rib by Sex and Side

Cervical ribs	Male	Female	Total (prevalence)
Left	0	2	2 (0.1%)
Right	3	1	4 (0.3%)
Bilateral	1	2	3 (0.2%)
Total (Sex)	4 (0.6%)	5 (0.7%)	9 (0.7%)

P = 0.3532

Table 2



Discussion

Cervical ribs when present could lead to trapping of the inferior branches of the brachial plexus and or subclavian artery causing vascular and neurologic symptoms. Approximately about 10% of patients with cervical ribs develop symptoms; conversely, only 8 to 10% of patients requiring an operation for thoracic outlet syndrome are found to have cervical ribs.[7,8,9]

The overall prevalence of 0.7% in this study compares well with that found in studies in London population with a prevalence of 0.74%.[10] The study by Palmer and Carini[5] obtained an overall prevalence of about 2.4% but this was done with a fewer population comprising only 724 adults. The study by Palmer and Carini found a prevalence of about 2.5%.

The observation of more females (55.6%) than males (44.4%) amongst persons with cervical ribs and sex specific prevalence of 0.7% (females) and 0.6% (males) in our study also agrees with what has been seen in all other enquiries on the subject. This

was however not statistically significant at both instances; p= 0.9934 and p= 0.3532 respectively. There were also more unilateral cervical ribs than bilateral which occurred more on the right than on the left as previously established in other studies.[3,4,5] Cervical ribs cannot be confidently diagnosed in young children as the costal process of C7 may not fuse with the C7 vertebrae until the age of 10years.[11] Apparent 'cervical ribs' in this age group may actually be C7 transverse processes that have not yet fused. We have therefore excluded children less than 14 years in this study.

The type of radiograph used is likely to affect how accurately a cervical rib can be diagnosed, and thus influence prevalence rates in radiological studies. Most recent studies in Europe and America on the subject including the study in London population mentioned above were done using digital radiography.

Digital radiography enables the investigator to manipulate the images such that a larger view of the region of interest can be obtained. Also brightness and contrast can be altered. This enables a clearer distinction of the costo- transverse articulation at C7 to ascertain fusion or not. In the absence of digital radiography facility in our center, our study was conducted using the conventional analogue chest radiographs of patients. Thus the possibility of an even higher prevalence than 0.7% can be envisaged if this study was carried out employing digital radiography. Its superiority in the distinction of well developed from poorly developed cervical ribs is also noted and may explain the absence poorly developed cervical ribs in our study.

In conclusion, the prevalence of cervical rib variant seen in chest radiographs in our environment compares well with what obtains in other studies and could be higher if the study was conducted using digital radiographs. Further studies on this subject in our environment should seek to make use of digital radiography.

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