

FREQUENCY OF CERVICAL RIBS AMONG ADULT MALES SEEKING EMPLOYMENT IN PAKISTAN ARMY

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ABSTRACT

Objective: To determine the frequency of cervical ribs among adult male population seeking employment in Pakistan army.

Study Design: Cross sectional study.

Place and Duration of Study: Department of Diagnostic Radiology, Combined Military Hospital, Hyderabad cantt from 1st October 2012 to 31st March 2014.

Material and Methods: The study was conducted on chest radiographs of 4337 adult males who reported for recruitment in Pakistan Army irrespective of ethnicity.

Results: The prevalence of cervical ribs among adult males of Pakistan was 6.11% with 4.29% bilateral, 1.13% right sided and 0.69% on left side.

Conclusion: Pakistani adult male population was observed to have 6.11% prevalence of cervical ribs, thus justifying initial screening chest radiographs of all candidates for military recruitment that can pick up all cases of cervical ribs in addition to exclusion of cardiopulmonary pathologies.

Keywords: Cervical rib, Chest radiograph, Elongated C7 transverse processes, Prevalence.

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INTRODUCTION

Cervical rib is a supernumerary rib which arises from the seventh cervical vertebra. It is congenital abnormality located above the normal first rib. This condition is present in approximately 1-2% of the population^{1,2}. It is usually attached to the first rib, close to the insertion of scalenus anterior muscle (Figure-1). It may consist of a complete rib, but often the bone is present only for a variable distance, the anterior part being made of a fibrous band. Unlike a cervical rib, an elongated C7 transverse process is fused with the C7 vertebra³.

Cervical rib is usually asymptomatic and is detected as an incidental finding when a chest or neck x-ray is taken for some other purposes. The neurovascular symptoms in the upper limb were

initially associated with a "cervical rib syndrome". Later on, many fibrous, bony, and muscular abnormalities were described as causes of neuromuscular compression at the thoracic outlet^{4,5}. This has led to the term "thoracic outlet syndrome"⁶, still used in current publications. 10% of patients having thoracic outlet syndrome were found to have cervical rib⁷.

It was felt to study a section of Pakistani population to assess the usefulness of chest radiographs to detect the cervical ribs before induction in Pakistan army.

The purpose of this study is to know the prevalence of cervical ribs in Pakistani adult male population and to detect this pathology on the basis of chest radiographs.

MATERIAL AND METHODS

This cross-sectional study was conducted from 1st October 2012 to 31st March 2014 in the Diagnostic Radiology department of Combined

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Military Hospital, Hyderabad cantonment, Pakistan. 4337 chest radiographs of adult males, ranging from 17 years to 23 years age, were taken for induction in Pakistan army. Sample size for the study was calculated by WHO

1. The rib must abut the seventh cervical vertebral transverse process, which is seen to project horizontally or caudally from the spine (figure-2).

2. It must have no connection with the

Table-1: The number of cervical ribs in the study population.

Total cases studied	4337
Number of cervical rib cases	265 (6.11%)
Bilateral cervical rib	186 cases (4.29%)
Right side	49 cases (1.13%)
Left side	30 cases (0.69%)

sample size formula for proportion studies⁸. Two experienced radiologists reviewed these radiographs. All radiographs were exposed on X-ray system 660 mA, Villa Systemi, Italy and x-

manubrium sterni, thus distinguishing a cervical rib from rudimentary first rib.

3. The cervical rib must be separate from, but articulate with, the transverse process of C7. If

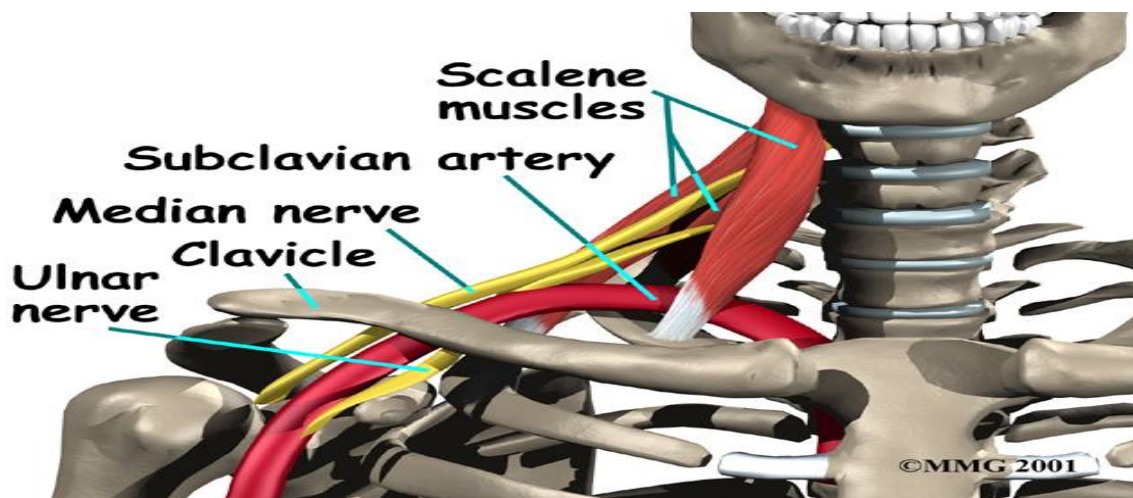


Figure- 1: Costo-scalene triangle, showing the anatomical structure.

ray films were processed on Fuji Automatic Film Processor, FPM-4200 Japan. All technically inadequate images were repeated to identify the presence or absence of cervical ribs. In 265 individuals with suspicion of cervical ribs, Anteroposterior projection of the cervical spine was performed to confirm the presence of cervical ribs.

The following criteria to identify the presence of a cervical rib on chest radiographs were used:

fused with the vertebra, it was classed as an elongated transverse process. Elongated C7 transverse processes were also noted which were classified as any C7 transverse process longer than the T1 transverse process.

RESULTS

In our study, 4337 cases were examined for cervical rib. Median age was 19 years with age range of 17 years to 23 years. 265 cases were positive with an overall prevalence of 6.11%. Of the 265 individuals with cervical ribs, 30 were on the left, 49 on the right and 186 were bilateral

(table-1). A total of 451 cervical ribs were found in our 265 cases. Of the fifty-two individuals with long transverse processes giving an overall prevalence of 1.20%, thirty-five were bilateral, ten on right side and seven on left side. A total of 87 elongated C7 transverse processes were found in our 52 cases.

DISCUSSION

We found overall prevalence rate of cervical rib to be 6.11% which is too high as compared to 0.42% in the London study conducted on 1352 males⁹, 0.49% with bilateral predominance in the Indian study conducted on 7,272 males¹⁰, and 1.36% in central India on 2500 males¹¹.

Erken et al reported a prevalence of 6.2% for cervical rib in a population sample from Turkey¹². Rakan F Bokhari et al in 2012 claimed a higher prevalence of cervical rib and elongated C7 transverse processes as 3.4% and 23% respectively, in a population in Jeddah, Saudi Arabia¹³. Two recent studies in Nigeria, first using anteroposterior cervical spine radiographs and second using posteroanterior chest radiographs, found 0.4% prevalence of cervical ribs in 245 males and 0.6% prevalence of cervical ribs in 617 males respectively^{14,15}.

“Radiographic evaluation of cervical spine” at Wah, Pakistan in year 2010 demonstrated 3.9% prevalence of cervical ribs in 1000 cases of mixed ages and both sexes¹⁶. The prevalence rate of enlarged C7 transverse processes was 1.20%, less than 2.21% noted for London population and 23% in a population in Jeddah, Saudi Arabia.

The reason for higher prevalence rate of cervical ribs in our study can be related to use of chest as well as cervical spine radiographs. There was no chance of missing rudimentary cervical ribs or misinterpreting elongated C7 transverse processes as rudimentary cervical ribs; as all cases with suspicious cervical ribs and enlarged C7 transverse processes were subjected to AP projection of cervical spine which confirmed the presence of both entities in 100%

cases. Study by Guelkon et al used cervical spine radiographs with additional oblique projections; even then their prevalence rate was less than our study¹⁷.

The use of CT imaging did not appear to increase the prevalence of cervical ribs, which was 1.4% in male population¹⁸. Cervical ribs were identified on 1.2% of MRI examinations, lower than CT, but MRI may equivalent anatomic explanation for patients' symptoms¹⁹. MRI and CT scans can identify cervical root injury from degenerative spurs, disc herniation, or other causes. MRI can identify distortion or displacement of the plexus in the thoracic outlet or supraclavicular space, usually from fibrous bands but also from clavicular abnormality. Doppler ultrasound and angiography are only useful in the presence of vascular clinical signs²⁰.

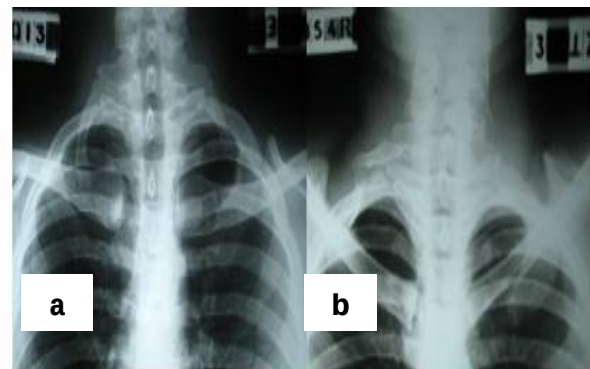


Figure-2: (a) Chest radiograph reveals bilateral cervical ribs. (b) X-ray chest demonstrates right cervical rib with pseudoarthrosis between proximal and distal segments.

Difference of prevalence of cervical ribs between different ethnic populations may suggest true differences in the rate of cervical ribs between populations. This suggests that genetic or environmental factors may contribute to the formation of cervical ribs. Our data includes the Hyderabad division of Sindh province which can be considered as cosmopolitan region representing Pakistani population; as it contains mixture of local Sindhis, and migrants from India and other parts of Pakistan with 5% Christians and 2% Hindu communities.

CONCLUSION

Our study found high prevalence rate of 6.11% of cervical ribs in Pakistani population but low prevalence rate of elongated C7 transverse processes of 1.20%.

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CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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