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Prevalence of Cervical Rib in a Tertiary Center : An Observational Study

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ABSTRACT

Background

Cervical rib is an accessory rib occasionally found where the prevalence varies from population to population. Prevalence of cervical ribs has been found to vary from 0.58% in Malaysian population to 6.2% in Turkish population. The presence of CR can result in thoracic outlet syndrome (TOS) and symptoms such as ipsilateral limb pain, weakness, numbness, or cold intolerance The present study is aimed to find the prevalence of cervical rib in tertiary center of Nepal.

Methods

This was an observational cross-sectional study that included 5000 x-rays of chest and c-spine of patient who visited radiology department of universal college of medical science, Bhairahawah, Nepal over a period of four-month time. Ethical clearance was taken from institutional review committee (IRC UCMS, Ref. No.: UCMS/IRC/060/24). Prevalence of cervical rib was observed and recorded. Data was analyzed using Microsoft excel 2016.

Results

Prevalence of cervical rib was observed in 130 cases (2.6%). Bilateral presence of cervical rib was seen 62(47.60%) cases. Right cervical rib was seen in 43(33.08%) and left cervical rib was seen in 25(19.23%) cases. Gender wise prevalence was seen 103(79%) in female and 27(21 %) in male.

Conclusions

Prevalence of cervical rib was more than documented in text books were there was more frequency in female as compared to male.

Keywords: cervical rib; prevalence; radiological; tertiary center.

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INTRODUCTION

Cervical ribs are the supernumerary, an anomalous, extra, or additional rib which arises mostly from the seventh cervical vertebrae.[1] The presence of a cervical rib was already mentioned in the works of Galen in the second century AD, and in sixteenth century by Vesalius.[2]Formation of ribs will start by end of fourth week when the cells of sclerotome convert into mesenchymal cells and then into ribs.[3] HOX gene are responsible for patterning of axial skeleton and its mutation results into cervical ribs.[3] The presence of cervical rib is asymptomatic, unless it causes compression and is generally diagnosed incidentally.[4] The presence of CR can result in thoracic outlet syndrome (TOS) and symptoms such as ipsilateral limb pain, weakness, numbness, or cold intolerance .[5,6] Patient who had experienced neurogenic symptoms in neck presence of cervical rib was one of the pathognomic feature.[7] Determining the true prevalence of CR as well as the breakdown on the basis of sex and laterality will allow for greater awareness and predictability of TOS resulting from the presence of CR Ample knowledge about prevalence of cervical rib is required prior to diagnosing various clinical condition associated with upper limb and cervical region, very less data regarding our population is available. [8]The present study is aimed to find the prevalence of cervical rib in tertiary center of Nepal.

METHODS

A descriptive cross- sectional study design was conducted to assess the prevalence of cervical rib in a patient visiting the radiology department of universal college of medical science for chest and c- spine x-ray, over the period of 1st June 2024 to 30th September 2024. Ethical approval was taken from Institutional Review Board of Universal college of Medical Sciences and Teaching Hospital, Bhairahawah, Rupandehi, Nepal (IRC UCMS, Ref. No.: UCMS/IRC/065/24). Informed consent was taken from the patient for taking x-ray. Presence of cervical rib was diagnosed by radio technician and separated in different folder for further verification. Patient who visited radiology department for chest x ray were included in the study The x-ray which has any history of trauma chest or spine was excluded for study. Children below the age of 15 years were also excluded from the study. Total five thousand x-ray were observed over a period of four months for presence or absence of cervical rib and length was measured to identify which side has longer cervical rib. Convenient sampling method was used. The minimum sample size was estimated using the following formula: $n= Z^2*p*q/e^2$, where n=Sample size, Z=1.96 for confidence interval at 95%, p=prevalence of patient visiting for chest x ray, q = 1-p, e=margin of error, 5%. All the collected data were entered into Microsoft excel and exported to SPSS version 22 for analysis. Simple frequency tables have been used to analyze data related to the study. Characteristics of the sample were categorized using mean and standard deviation. Prevalence of cervical rib and its variations was observed and recorded. All the collected data were entered into Microsoft Excel 2016. Point estimate at 95% Confidence Interval was calculated along with frequency and percentage.

RESULTS

Out of 5000 x-ray presence of cervical rib was seen in one hundred thirty x-ray (2.6%). Bilateral presence of cervical rib was seen in sixty two x-ray (1.24%) whereas unilateral presence of cervical rib was present in sixty eight x-ray (1.36%). Gender distribution in prevalence was seen as 27(21%) in male and 103(79%) in female (Figure 1).

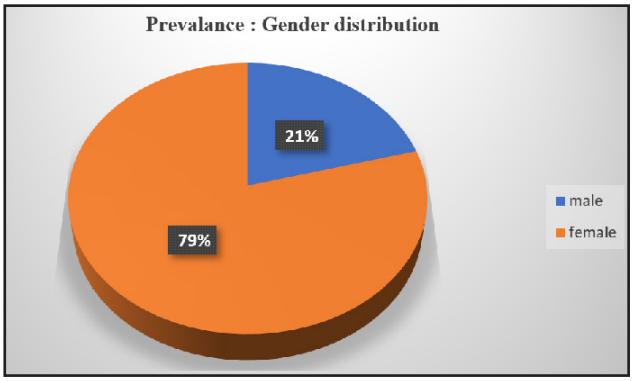

Figure 1. pie chart showing gender wise distribution of prevalence of cervical rib.

Out of 130 cases bilateral presence of cervical rib was seen in 62(47.60%). Unilateral presence of cervical

rib was seen in 68 (52.70%) cases. Prevalence was three times more in female as compared to male. The distribution and lateralization are listed in Table1.

Table 1. Distribution and lateralization of cervical rib. (n=130)

Presence of cervical rib	Male, n=27, n(%)	Female, n=103, n(%)	Total n(%)
Bilateral	19(14.61)	43(33.07)	62(47.60)
Right	4(3.08)	39(30)	43(33.08)
Left	4(3.08)	21(16.15)	25(19.23)

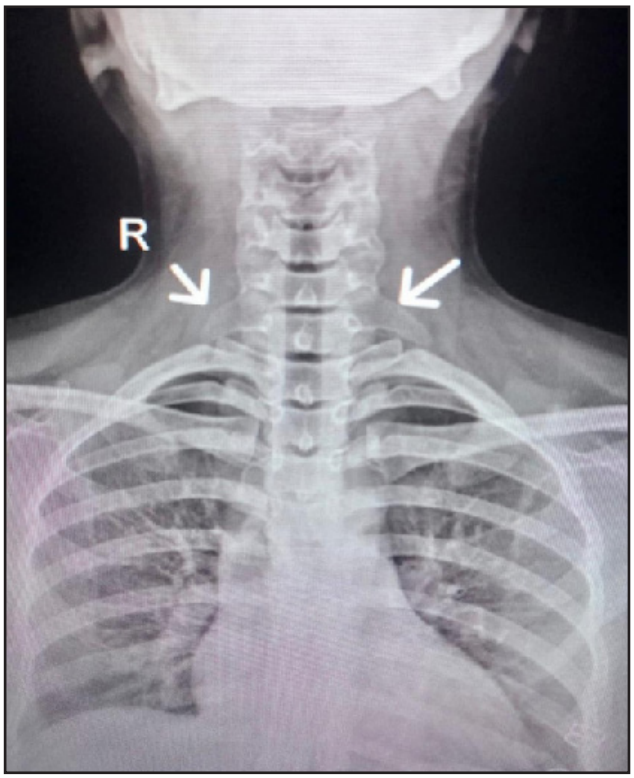

Figure 2. Bilateral presence of cervical rib.

DISCUSSION

In our study prevalence of cervical rib was observed in 2.6% which was quite high in compared to few other studies available from different regions of Nepal.It was also observed that prevalence of cervical rib was thrice high in female(10, 79%) as compared to male (27, 21%).

In a study done by ruku et al. in Central Nepal (Province: Bagmati), prevalence of cervical rib was found to be 1.50% with higher prevalence in male[8] whereas in our study prevalence of cervical rib was quite high in female as 2% compared to male ie 0.54%.

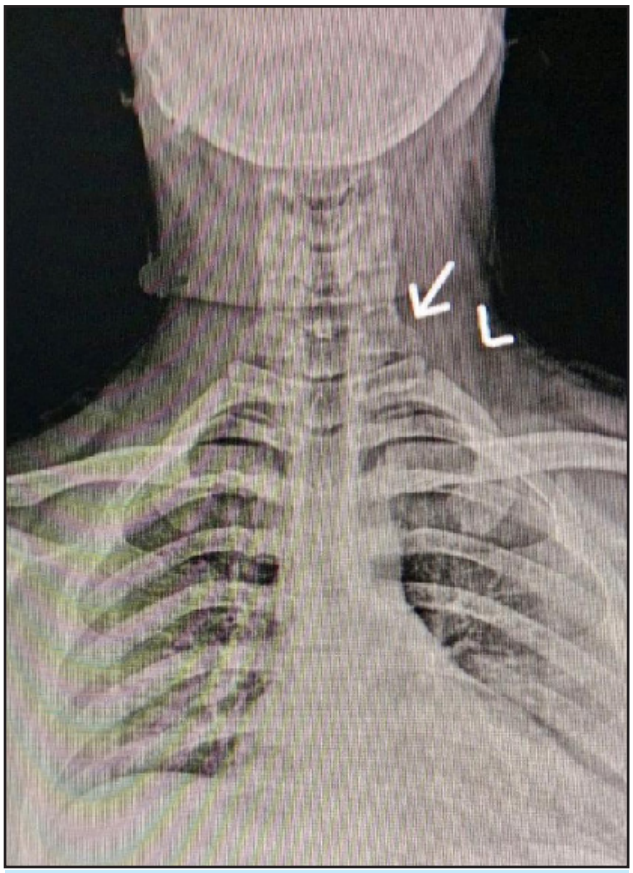

Figure 3. Unilateral presence of cervical rib.

This was supported by another study done in western population (Province: Lumbini) of Nepal by Lalchan S et al. Prevalence of cervical ribs was found to be 1.1 % with higher rate in females.[9] Similar prevalence of 2.67% was seen in a study done by Bhat H M in a Indian population.[10] They further stated prevalence of cervical rib was higher in females (3.1%) as compared to males (2.1%). Yadav AK did a case series on a five female in dhulikhel hospital with neurovascular compromise due to presence of cervical rib,[11] they also suggested higher prevalence of cervical rib in female. Henry MB did a metanalysis in prevalence of cervical rib in 131 cases where they also stated high prevalence of cervical rib in female.[6]

Comparison of previous studies showed that the highest prevalence was reported among the Turkish population (7.24%)[12] followed by the white British population (5.9%),[13] whereas the lowest prevalence was seen in the Nigerian population (0.7%).[14] Among study population of 1000 patients of Saudi Arabian population 490 were male and 510 were female.

The study was reported normal in 736 patients (376 males and 360 females). Cervical ribs were found in 34 patients, constituting a prevalence of 3.4% of study population.[15]A previous report highlighted that Asians are 5 times more likely to have cervical ribs when compared with the white British. In four Indian studies, the prevalence of cervical ribs were 1.22% in Central India[16], 0.6% around Lucknow,[17] 2.67% in Kashmiri[10] and 1.16% in Chennai population.[19]

In present study we also observed bilateral presence of cervical rib in 62(47.60%) cases and unilateral presence of cervical rib in 68(52.70%) cases. Among unilateral cases right lateralization was more in female as compared to male. All the other previous studies have suggested more prevalence in female as compared to male which was also a strong outcome of our study where 103 cases were female and only 27 cases were male. Ezeoforo SN further reported in there study a higher prevalence of 1.1% in females as compared to males .[14] The lateralization with female could be associated with the right dominant hand as maximum of our female participants were involved in house hold activities.

An interesting case was reported by pratek S Navandhar where they accidentally diagnosed cervical rib in a case of acute cholecystitis,[20] they highlighted the necessity for a comprehensive assessment of incidental findings to ensure holistic patient care as presence of cervical rib is also associated with thoracic outlet syndrome.[6,21] sometimes Cervical rib syndrome occurs when the interscalene triangle is occupied by a cervical rib, displacing the brachial plexus and subclavian artery forward, causing pain and muscle spasms. Immediate treatment of cervical rib syndrome is important to prevent long-term complications of neural and/or vascular compression.[22] Asymptomatic patients in whom a cervical rib is found as an incidental diagnosis should be given guidance on the symptoms of neurovascular compression, so that they can seek appropriate treatment rapidly in the event that symptoms emerge.

Limitations

The limitations of the study is it was done in only one tertiary center of province 5 only where maximum participants were from local habitat. Follow up of presence of cervical rib was not done, so follow up and multicenter study could have been done for more concrete result from overall Nepal.

CONCLUSIONS

The present study concluded prevalence of cervical rib in tertiary center of Nepal at 2.6% with a higher prevalence in female. Higher degree of prevalence will be of immense importance for diagnosing thoracic outlet syndrome and other condition associated with upper limb.

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