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Case Report

SYNOSTOSIS OF FIRST COSTOMANUBRIAL JOINT

J.Ratnapriyanka [1], Pradeep Kumar H Murudkar [2], Ravindra Kumar Boddeti [3], Ashwini [4], Nazeer Ahmed [5].

[1,2,4,5] Department of Anatomy, Khaja Bandanawaz Institute of Medical Sciences, Gulbarga, Karnataka, India.

[3] Lecturer, Department of Anatomy, IMS, Management & Science University, Malaysia.

ABSTRACT

The rare congenital anomaly of ribs was found incidentally during routine osteology classes. This type of abnormality of first rib May leads to compression of Neurovascular bundle and causes thoracic outlet syndrome.

We are reporting a case of Synostosis of first rib, which we come across during osteology classes at Department of Anatomy, KBNIMS, Gulbarga, Karnataka, India. The specimen showed fusion of first rib with sternum on both sides which is very rare. As far as the literature referred there was no such kind of anomaly reported. Knowledge of such anomalies is an important to know, especially for surgeons and radiologists for interpretation.

KEYWORDS: First Rib Fusion; Synostosis; Costomanubrial; Supernumery Ribs; Cervical Rib.

Address for Correspondence: Ms.J.Ratnapriyanka, Tutor, Department of Anatomy, Khaja Bandanawaz Institute of Medical Sciences (KBNIMS), Gulbarga, Karnataka, India. **E-Mail:** priyaratnaj@gmail.com

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INTRODUCTION

A bony joint, or Synostosis (SIN-oss-TOE-sis), is an immobile joint formed when the gap between two bones ossifies and they become, in effect, a single bone. Bony joints can form by ossification of either fibrous or cartilaginous joints. For example, An infant is born with right and left frontal and mandibular bones, but these soon fuse seamlessly to form single bones. In old age, some cranial sutures become obliterated by ossification, and the adjacent cranial bones, such as the parietal bones fuse. The epiphyses and diaphyses of the long bones are joined by cartilaginous joints in childhood and adolescence, and these become synostosis in early adulthood. The attachment of the first rib to the sternum also becomes a synostosis with age [1].

Congenital rib defects are classified into Numerical and structural defects. Numerical defects include supernumerary ribs i.e. cervical, lumbar, Pelvic or sacral ribs and 11 pairs of ribs found in Down syndrome and the structural defects of ribs include Short rib , bifid rib or forked rib, fused or bridged ribs, and pseudoarthrosis of first rib. [2](Fig. 1).

Anatomically in between the 1st rib and manubrium presents the Sychondrosis (a type of hyaline cartilage) is the joint, otherwise referred to as the first sternocostal joint. This type of joint also found in the epiphyseal plates of long bones prior to fusion [3].

CASE REPORT

We came across a very rare specimen at the Anatomy Museum, KBN Institute of Medical Sciences, Gulbarga, Karnataka, India. With bilateral fusion of the 1st Costosternal joint and refered for the detailed review of verious earlier reported similar cases. And reporting the various causes and age related changes for the present case (Fig. 2).

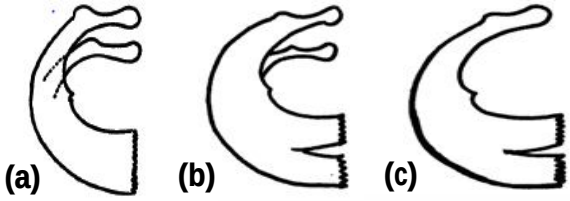

Fig. 1: Types of fusion anomalies of Thoracic ribs.
(a) Bicipital rib (b) Bridged rib (c) Forked rib

DISCUSSION

Costo-chondral anomalies at the upper end of thoracic cage are may be due to defects in the segmentation of bony tissue during early development of the life and may it may be associated with variations in the disposition of neuro-vascular structures [4].

Literature review showing that there were many reported cases over the first rib anomalies which include the floating rib, central defects bridged by ligamentous bands, rudimentary structure terminating in a synostosis or pseudoarthrosis with second rib, bifurcated first rib, Sternocostoclavicular hyperostosis etc. [5].

After the thorough search in the literature and anatomical records there were very few Unilateral and bilaterally cases of synostosis were reported but there will be no documentary evidence for it, The anatomical reports on the fusion of ribs described first rib as a rudimentary structure forming synostosis with the second rib [6,7,8,9,10].

In the present study, the fused first rib was of normal caliber and fused with the sternum at the usual site (Fig. 2).

While compared with the other species first rib instead of forming a synostosis may remain floating in soft tissue similar to those found in birds [9], or may be connected by a ligamentous band with the sternum [4,10].

Few clinical studies reported that neurological symptoms and vasomotor changes of Thoracic outlet syndrome (TOS) could be attributed to broad attachment of scalenus medius muscle [5,10,11].

Compression of neurovascular structures may occur while passing from neck to axilla through a narrow interval between scalenus anterior, hypertrophied scalenus medius and first rib [10,11].

First rib malformations such as rudimentary rib, fused ribs are commonly associated with post fixed brachial plexus with a large contribution from second thoracic nerve [5,9,10]. The contribution of second thoracic nerve may cause extra pressure on the groove [5,10].

Rib fusion with the manubrium may causes scoliosis and restriction of chest wall expansion [12,13], which may require surgical interventions to relieve the symptoms.

CONCLUSION

Awareness and precise knowledge about the skeletal abnormalities especially thoracic cage has an important clinical significance as its plays vital role in the respiratory movement besides the academic interest.

Fig. 2: Synostosis of first costomanubrial joint.

Conflicts of Interests: **None**

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