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Case Report

BIFID RIB – A CASE REPORT

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ABSTRACT
Ribs (L. costae) are curved, flat bones that form most of the thoracic cage. They are remarkably light in weight yet highly resilient. Each rib has a spongy interior containing a bone marrow. Abnormalities of the ribs are relatively common. Bifid ribs are usually asymptomatic. It can present as an isolated abnormality or be associated with pathologic malformations and are often discovered incidentally by chest X-ray or during routine cadaveric dissection. It is necessary for the clinicians to know about this malformation because this may cause confusion during counting the ribs for some surgical and diagnostic procedures. It is also necessary for the differential diagnosis with other diseases, such as costal fractures and chest wall tumours.

Keywords: *Bifid Rib, Thoracic Cage*

INTRODUCTION
The ribs are elongated curved flat bones that form most of the thoracic cage which protects the thoracic viscera and some abdominal organs (Moore and Dalley, 2010). The first 7 pairs of ribs are connected to the sternum by costal cartilage and are referred as true ribs, the remaining 5 ribs are false ribs. The cartilages of 8^{th} to 10^{th} rib usually join the superjacent costal cartilage where as 11^{th} and 12^{th} ribs which are free at their anterior end are called floating ribs (Standring, 2008). The first two and last three ribs present special features and are known as atypical where as remaining presents a common features which are typical (Standring, 2008). Ribs develop from the costal process of thoracic vertebrae and thus are derived from the sclerotome portion of paraxial mesoderm (Sadler, 2009). Congenital abnormalities of the rib are relatively common particularly lumbar, cervical and bifid rib. A bifid rib or sternum bifidum is a congenital abnormality of the anterior chest wall, with the sternal end of rib cleft into two. It is frequently asymptomatic and a most common normal incidental finding discovered on chest radiography (Kapeli, April 2010).

CASES
During routine osteology classes for the phase1 (2011-2012 batch) in department of Anatomy M R medical college Gulbarga. A typical rib of right side where the sternal end was split into two was found. The division was found to be about 3cm from the lower division of sternal end.
Following are the measurements taken:

- Breadth-1.5cm
- Breadth of rib at the point of division-3.7cm
- Both upper and lower divisions of the rib were having the costal facets at their end.

DISCUSSION
Common congenital rib anomalies can be classified into numerical and structural. Numerical anomalies include supernumerary ribs like cervical, lumbar, pelvic or sacral and sometimes deficiency in total number of ribs where as structural abnormalities include short ribs, bifid ribs, fused or bridged ribs and pseudoarthrosis of first rib (Murali *et al.*, March 2014). Bifid rib occurs in approximately 0.15-3.4% (mean of 2%) population and it accounts for 20% of all congenital rib anamolies (Kaneko *et al*., 2010). The incidence of bifid ribs is more frequent in males than females. It is more common in the third and fourth ribs (degree of incidence - third > fourth > fifth > sixth > second) (Song *et al.*, April 2009). Comparatively it is more prevalent on the right side of the chest than on the left side (Osawa *et al*., 2002).

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It is usually unilateral. Bifid ribs are frequently asymptomatic. A single bifid rib is most commonly a normal incidental finding discovered on chest radiography (Kapeli, April 2010).

Fily *et al*., in 2001 reported bifid rib in a man buried around 3400 B.C. Wattanasirichaigoon *et al*., in 2003 described various patterns of rib defects in 47 cases with bifid rib accounting for 28% of cases. Oostra *et al*., in 2006 reported a case with multiple bifid ribs, interpedicular fusion and malsegmentation of vertebral laminae at various upper thoracic levels in a skeleton of a newborn infant. Al- Anazy *et al*., in 1997 reported a case of bifid rib presented along with calcified falx cerebri and a cystic mass occupying left maxillary sinus protruding into nasal cavity. As a structural abnormality bifid rib is usually asymptomatic. But may present as a lump in anterior chest wall (Dhana *et al*., April 2014). Kaneko *et al*., in 2010 reported a bifid rib in 9 children (5girls & 4boys) with a mean age of 4.2yrs. In all cases a unilateral bifid rib was found among that 7 patients presented with chest wall mass and 2 patients were asymptomatic and were incidentally detected on chest radiographs.

Song *et al*., in 2009 found a bifid right 4th rib in 3 male cadavers. In all the 3 cases the upper intercostal spaces were narrowed where as the lower intercostal were widened. The intercostal muscles were present in the bifid spaces in all the cases and it is supplied by 3rd intercostal artery from the internal thoracic artery. In 2 cases the 4th intercostal nerve was found to run along the inferior margin of the 4th bifid rib and innervated the muscles of bifid space where as in the 3rd case there was another branch from the 3rd intercostal nerve supplying the muscles of bifid space as well as the 4th intercostal nerve.

Conclusion

Figure 1: Bifid rib: Showing sternal and vertebral end

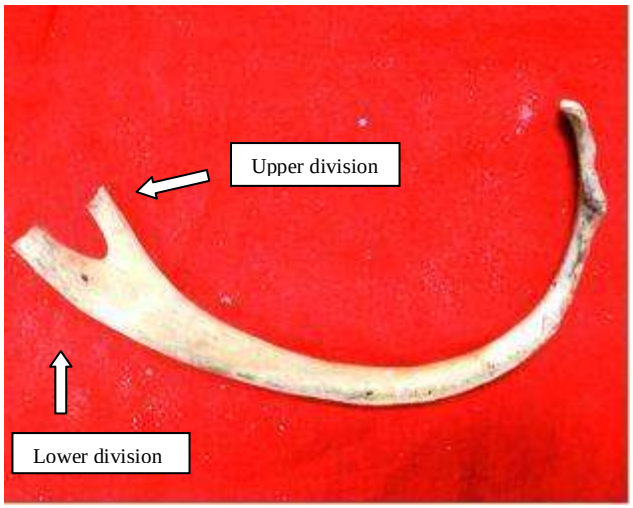

Figure 2: Bifid rib: Showing Upper and Lower division.

Figure 3: Bifid rib showing the costal facets on both the divisions of sternal end.

Bifid rib is a congenital abnormality of the anterior chest wall with the sternal end of rib, cleft into two with an overall prevalence of 0.15% to 3.4% and it accounts for up to 20% of all congenital rib anomalies. Bifid rib is usually asymptomatic and is most commonly normal incidental finding discovered on chest radiography, sometimes it may present as a lump in anterior chest wall. Knowledge of this malformation is needed for the differential diagnosis with other diseases such as a chest wall tumor or costal fracture because various types of bifid rib are present with diverse appearance on chest X-ray.

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