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Bifid Rib - A rare rib cage anomaly

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Abstract

A case of the bifid rib was found during a routine chest X-ray. The distal part of multiple ribs is bifurcated into two divisions with an angle of 60 degrees. Both divisions had their costal cartilage. Bifid rib otherwise known by the name bifurcated rib is a congenital abnormality of the rib cage and is usually asymptomatic, often discovered incidentally on chest X-ray.

Keywords: bifid rib, rib cage anomaly

Introduction

The occurrence of congenital rib abnormalities is mainly associated with structural changes. Cervical and bifid ribs are considered in the group of structural anomalies. A bifid or bifurcated rib is a congenital skeletal abnormality in which the affected rib has a forked sternal end. They are found to occur in 1.2% of the population and there may be a female and right-sided predilection [1]. The overall prevalence of the bifid rib is estimated at 0.15-3.4% (mean 2%), and it accounts for up to 20% of all congenital rib anomalies. Rib anomalies are noted in 0.31% of routine chest radiographs [1]. This is usually asymptomatic; however, it may cause musculoskeletal pain or intercostal nerve entrapment. A bifid first rib can be an uncommon cause of thoracic outlet syndrome. The sternal end of the rib is cleaved into two. It is usually unilateral [2]. Most commonly it occurs in 4th rib. The bifid rib is asymptomatic and often discovered incidentally by chest X-ray. A bicipital rib is different from the bifid rib and is seen about the first thoracic rib.

Case Report

An elderly patient was evaluated for left lower lobe pneumonia. His Chest X-ray showed an expansile lesion in the left 9th rib (**Figure 1A**). As part of the workup, a CT thorax was taken which reported the expansile lesion as benign osteoma. Interestingly bifid rib was noted in the 4th, 5th, and 7th rib on the left side (**Figure 1B**) and in the 4th and 7th rib right side (**Figure 2 A and B**). A 3D reconstruction of the bony cage demonstrated the multiple bifid ribs on either side. (**Figure 1 and 2**)

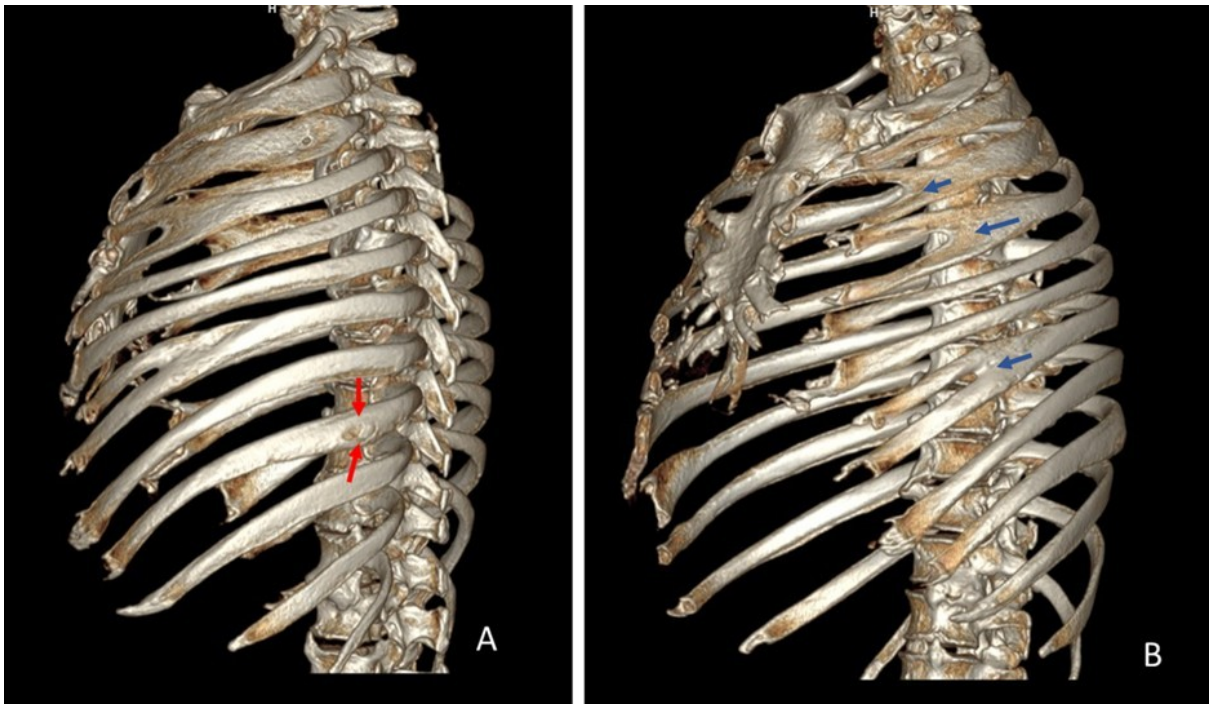
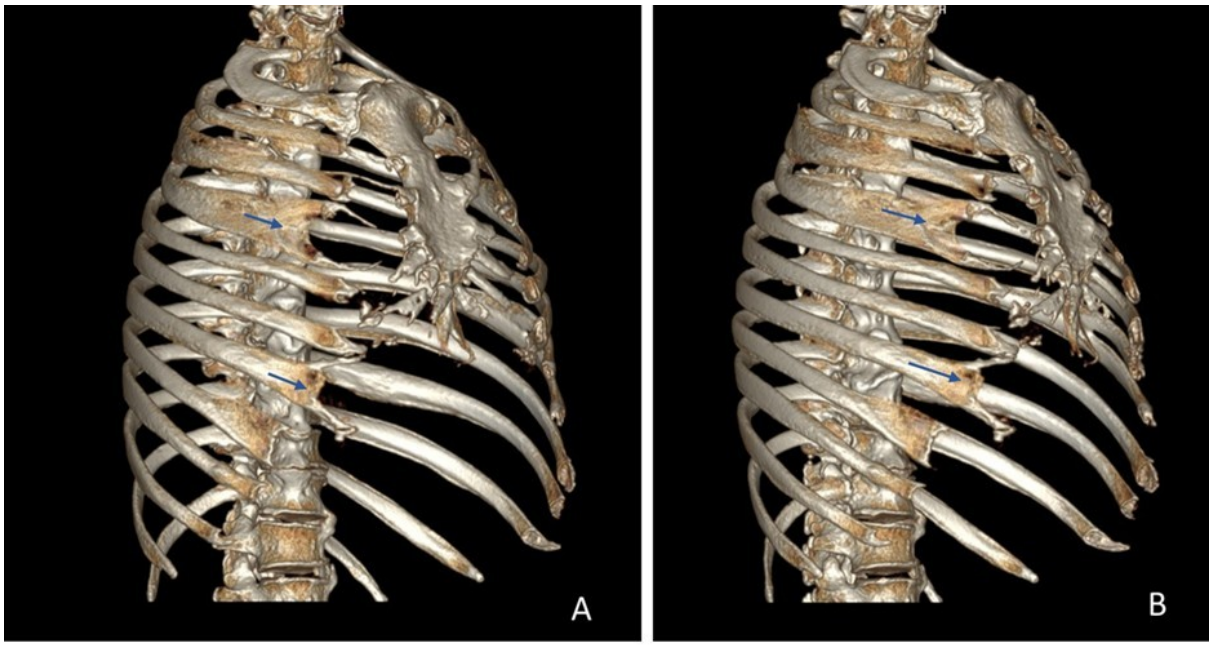


Figure 1A: Showing the expansile lesion on the left 9th rib (Red arrows). Figure 1B: showing the bifid 3rd, 4th and 7th rib on the left side (Blue arrows).



Figures 2 A and B show the bifid 4th and 7th rib on the right side (Blue arrows)

Discussion

Bifid rib is a rare structural abnormality and is often seen in the 4th rib on the right side. A bilateral bifid rib is very rare. The bifid rib is usually asymptomatic and detected incidentally during workup for some other illnesses. Rarely it can produce chest pain and intercostal nerve entrapment.

Few Clinical associations were also reported about the bifid rib. They are:

1) Gorlin-Goltz (basal cell nevus) syndrome (65-70% of patients),

2) Job syndrome

3) Kindler syndrome,

4) Malignancy in childhood (esp. Neuroblastoma).

Gorlin-Goltz Syndrome is known as Basal Nevoid Carcinoma Syndrome (NBCCS). It is a rare multisystem disease with an autosomal dominant inheritance pattern [3]. The main clinical manifestations include several basal cell carcinomas (BCC), Odontogenic maxillary keratocyst, palmar and plantar hyperkeratosis, skeletal abnormalities, abnormal intracranial calcification, and facial deformity (macrocephaly, cleft lip, palate, and severe eye abnormalities) [4]. Associated skeletal abnormalities include protrusion of the frontal or parietal area and dilated nasal root, hypertelorism, lateral displacement of the inner corner of the eye, and mandibular protrusion [5,6]. Other skeletal abnormalities include bifid ribs (more than one rib unilaterally or bilaterally), rib synostosis, kyphoscoliosis, vertebral fusion, cervical rib, spina bifida, shortened fourth metacarpal bone (Albright mark), and palmar and plantar pits [7].

Job Syndrome (Hyper-IgE syndrome) is a rare, primary immunodeficiency distinguished by the clinical triad of atopic dermatitis, recurrent skin staphylococcal infections, and recurrent pulmonary infections. The disease is characterized by elevated IgE levels with an early onset in primary childhood.

Kindler syndrome, a rare subtype of inherited epidermolysis bullosa, is characterized by skin fragility and acral blister formation beginning at birth, diffuse cutaneous atrophy, photosensitivity, poikiloderma, diffuse palmoplantar hyperkeratosis, and pseudosyndactyly. Mucosal manifestations are also common and include hemorrhagic mucositis and gingivitis, periodontal disease, premature loss of teeth, and labial leukokeratosis.

Conclusion

Rib anomalies can occur in isolation or as part of vertebral malformations. Knowledge of bifid ribs is necessary for the differential diagnosis with other diseases, such as tumors of the chest wall or costal fracture. Various types of bifid ribs are present with diverse appearances on normal chest X-rays.

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