

## Rare Anomaly of Bifurcated Rib and Costal Cartilage: A case study

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### ABSTRACT

The study of bifurcated rib and costal cartilage was done at S. R. T. R. Medical College, Ambajogai. Total 30 cadavers were studied during 1997 to 2001. Bifurcation of rib and costal cartilage was found in one cadaver. Left third rib bifurcated and joined with its bifurcated costal cartilage to create an additional intercostals space. This additional intercostals space bears the intercostals muscles. The muscle fibres were in two layers and in the direction of that of the external intercostal and internal intercostal muscles respectively. These intercostal muscles were supplied by a branch of left third intercostal nerve. This bifurcated rib and costal cartilage created an additional intercostals space, which is important for the forensic expert while doing post mortems examination & describing the thoracic injuries. It may prove very useful for a forensic expert to establish identity of a person.

**Key words:** Rare Anomaly, Bifurcated Rib, Costal Cartilage, intercostals space, forensic

### INTRODUCTION

The various developmental anomalies are found during the routine dissection of the body for demonstration of the undergraduate students. The anomalies of the soft tissues like tributaries of the veins, branches of the arteries, formation and course of the nerves and external features of various organs are commonly seen. But the anomalies of the bones are less common to find. The anomalies of the ribs found are cervical rib, lumbar rib and bifid rib. The bifid rib may be found isolated or may be associated with other pathologies.<sup>1</sup>

The most of the cases of bifid ribs reported so far are from radiological findings.<sup>2</sup> Hence detailed morphological study including the muscles, vessels and nerves of the additional space created was not possible. Very few cases have been reported in a cadaver.<sup>2</sup> In the present case, during dissection of the cadaver, it was observed that the left third rib and costal cartilage was bifurcated to create an additional intercostals space.

### Case Study

The present case study was done at S. R. T. R. Medical College Ambajogai. Six cadavers dissected per year and were observed for the rib anomaly, over a span of five years from 1997 to 2001 during which 30 cadavers were dissected. Bifurcated rib and costal cartilage was found in one cadaver. The third rib on the left side bifurcated near its anterior end to form one superior and one inferior parts of the third left rib. Also the third left costal cartilage bifurcated laterally to form one superior and one inferior part of third left cartilage. The superior part of third

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left rib fused with the superior part of the third left costal cartilage and the inferior part of the third left rib fused with the inferior part of the third left costal cartilage. Thus an additional intercostals space was created anteriorly between the second and the third intercostals space. The dimensions of this additional intercostals space were 6.4 cm transversely x 1.7 cm vertically.

This additional intercostals space thus formed showed – muscles, vessels and nerve. The muscle fibres were in two layers and in the direction that of the external intercostal and internal intercostal muscles respectively. That is the fibres of the superficial layer directed medially and downwards and that of the deep layer directed laterally and downwards.

The left third intercostal nerve passed over the lower part of bifurcated rib and entered the additional intercostals space, gave branches to the muscles and again re-entered the 3<sup>rd</sup> intercostals space.

The third rib and costal cartilage on the right side were found to be normal. Also all other ribs and costal cartilages on both sides were normal. No other anomaly was found in the remaining axial skeleton.

## DISCUSSION

The bifid rib may be seen as an isolated anomaly, where it remains asymptomatic and its existence is revealed either by radiograph or at dissection. On the other hand bifid rib may be associated with Gorlin-Goltz syndrome<sup>3</sup> often presents itself in an early age. Multiple basal cell carcinomas and multiple P-OKC are the main hallmarks of this syndrome; however, there are other manifestations that are grouped into the following five categories. (A) Cutaneous anomalies (B) Dental and osseous anomalies (C) Ophthalmic anomalies (D) Neurological anomalies (E) Reproductive system anomalies.<sup>3</sup>

Bifid ribs are more common in males than females, and occur most frequently in the third and fourth ribs (incidence: third > fourth > fifth > sixth > second).<sup>4</sup>

In the present case, as no other anomaly of the Gorlin-Goltz syndrome was found, case must be of isolated asymptomatic type. This anomaly is formed due to the anomalous development of costal cartilage and the rib. The third left costal arch formed by the left costal element of the third thoracic vertebra grows first laterally then forwards and medially.<sup>5</sup> Here, the medial end of the left third costal arch has bifurcated and reunited to form the above mentioned anomaly.

The bifurcated costal cartilage and rib to create an additional intercostals space is an important developmental anomaly from the point of view of a forensic expert. The presence of an additional rib and intercostal space can mislead in rib and intercostals space counting during the post mortem examination & may lead to incorrect interpretation especially while describing the thoracic injuries. The presence of an additional rib may prove very important identifying point while establishing the identity of a person especially in cases where other identification points like facial features are lost.

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