Rib anomalies – A case and an overview of the literature

Razvojne anomalije reber – Primer diagnosticiranja in pregled literature

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Abstract

Anatomic rib variants (numeric and structural) are reported to occur in less than 2 % of the general population and are rarely of any clinical significance. Frequently noticed developmental rib anomalies include fused and bifid ribs, cervical ribs and rib dysplasia. Occasionally they can cause problems when interpreting chest radiographs, therefore it is important for radiologists to be familiar with them and consider rib variants in differential diagnosis.

The following case report presents an 88-year old female with a left bifid intrathoracic rib.

Izvleček

Anatomske razvojne različice reber (številčne in strukturne) prizadenejo manj kot 2 % populacije in so le redko klinično pomembne. Najpogosteje opažene razvojne različice so zraščena in razcepljena rebra, vratna rebra in displazije reber. Spremembe lahko povzročajo težave pri oceni rentgenograma pljuč, zato je za radiologe pomembno, da jih poznajo in vključijo v diferencialno diagnozo.

Prikazani primer obravnava 88-letno bolnico z ugotovljenim levim razcepljenim intratorakalnim rebrom.

1 Introduction

Anatomic rib variants (numeric and structural) are reported to occur in less than 2 % of the general population and are rarely of any clinical significance (1,2). Intrathoracic rib is one of the rarest rib anomalies, with only around 50 cases reported in English literature since Lutz first noted it in 1947 (1-6). The origin of intrathoracic rib might be the rib itself or the vertebra. Additionally, there might be a combination of intrathoracic rib and vertebral anomalies.

Patients are usually asymptomatic and the intrathoracic rib is usually diagnosed as an additional finding at chest radiography (1).

2 Case report

An 88-year-old female was admitted to our hospital with acute cardioembolic stroke and with symptoms of upper respiratory tract infection and cough. She had a history of chronic hypertension, atrial fibrillation, glaucoma, osteoporosis and stent in the right internal carotid artery.

The neurologic examination revealed dysarthria and left hemiparesis. Labora-

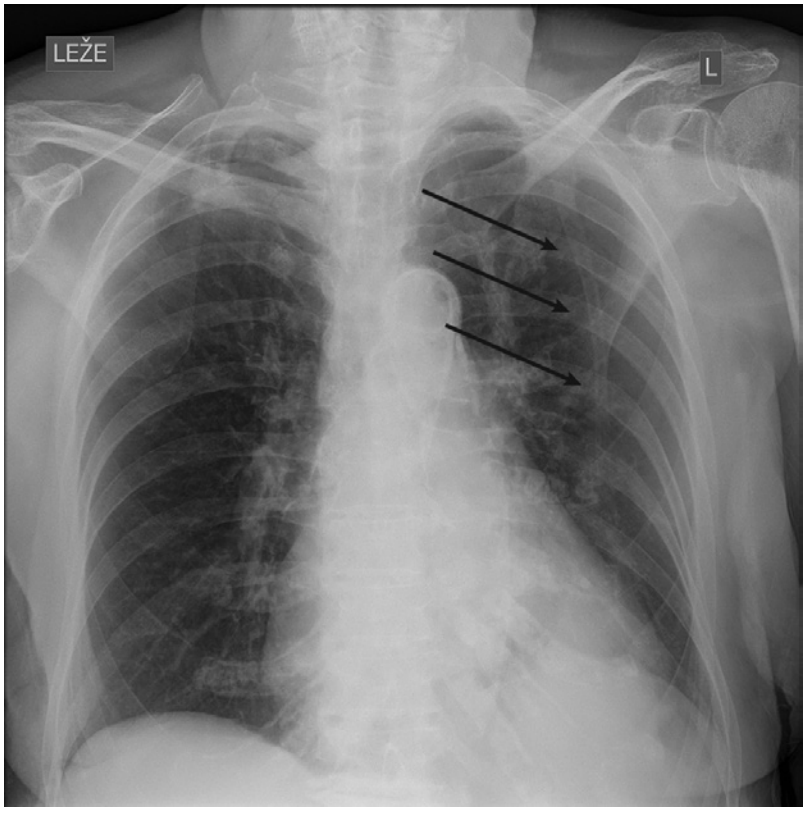

Figure 1: A chest radiography. Anteroposterior view demonstrating vertical bone structure joining the third rib posteriorly on the left side. Progressive reduction of the craniocaudal diameter of the structure is noticed.

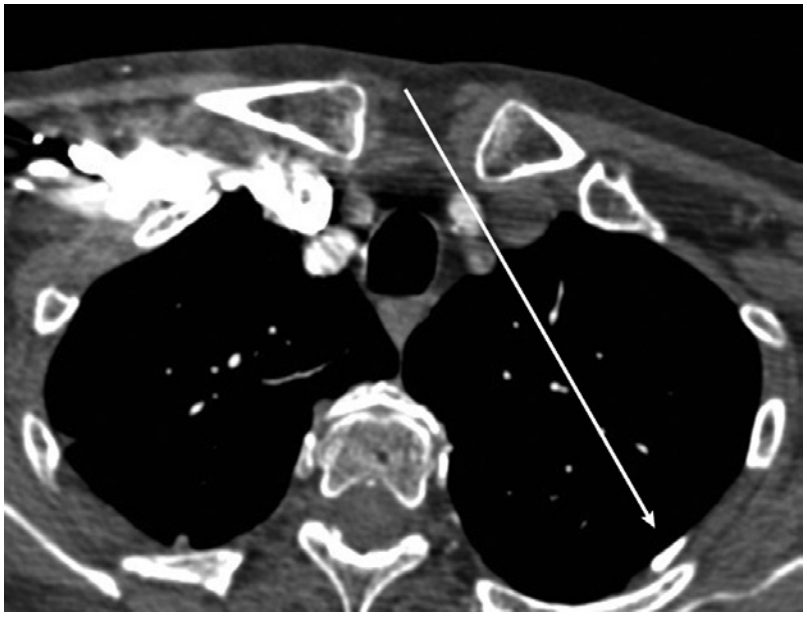

Figure 2: Axial CT demonstrated an extrapleural bone structure in the left hemithorax.

tory tests revealed an elevated C-reactive protein (CRP).

A chest radiograph (Figure 1) was performed at the emergency department and a left lower lobe consolidation was suspected. There was also a vertically oriented structure similar in density to adjacent bone, located in the upper and middle thirds of the left hemithorax, with progressive craniocaudal reduction. This finding was consistent with a bifid intrathoracic rib.

The patient was given antihypertensive drugs and anticoagulation therapy with dabigatran. Pneumonia was treated for 10 days with Amoxicillin/clavulanic acid.

The patient had undergone repeated computed tomography (CT) of the brain and CT angiography (CTA) for quantification of carotid artery stenosis (Figures 2 and 3). Head CT showed demarcated infarction in right basal ganglia region, CTA showed stent in the right internal carotid artery and 70 % stenosis of the left internal carotid artery.

On CTA images we were able to better determine the origin and extension of the vertical bone structure described on the chest radiograph and we also ruled out lung parenchyma lesion or other pulmonary complications related to the structure. A bifid intrathoracic rib that originated from the posterior arch of the third rib on the left side was diagnosed. It was vertically orientated and extended caudally along the posterior chest wall, extra pleural and not in contact with lung parenchyma.

After 1 month the patient recovered and was discharged to home care.

3 Discussion

An intrathoracic rib usually presents as an isolated incidental finding with either a normal rib, an additional acces-

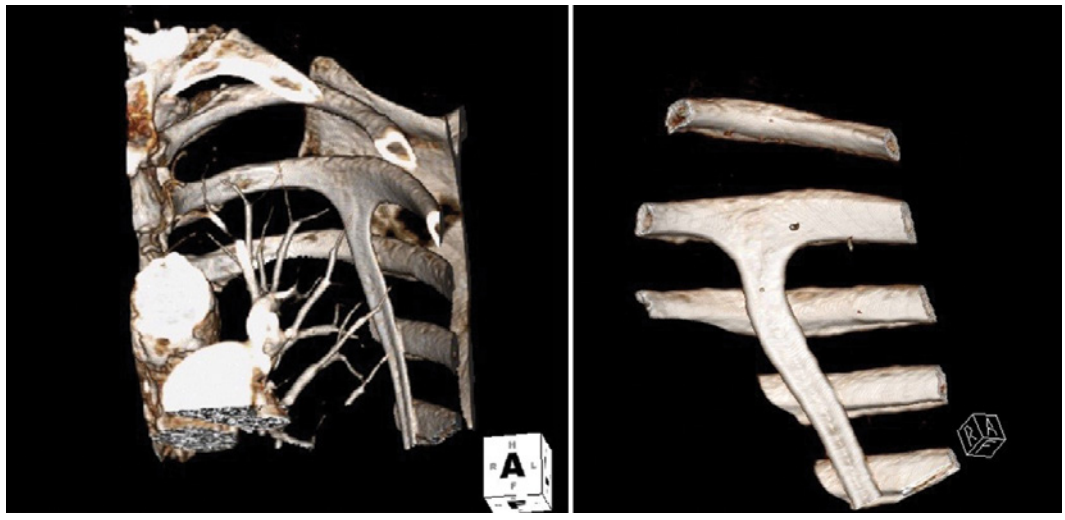

Figure 3: CT 3D reconstruction shows left bifid intrathoracic rib of the third rib.

sory rib or prolonged arm of a bifid rib with anomalous location inside the thoracic cavity (3). It may originate from incomplete fusion between the cranial and caudal processes of sclerotome segments in the course of embryogenesis between the fourth and sixth week of fetal development. By one hypothesis, defects in gene expression could also be the causative factor in overall patient's picture (1,3,4).

Morphological structure as well as shape of the intrathoracic rib is normal. It is usually described as unilateral, right-sided incidental finding between the third and eighth rib with no sex predilection. There may be increased extrapleural fat or other soft tissue positioned alongside the anomalous rib to compensate for depressed deformity of the chest wall (3,5). Roughly 30 % of them are reported in children (1,5,6). Although the chest radiograph is usually the first radiological modality in the diagnosis of intrathoracic rib, it can easily be missed or mistaken for other pathologic formations inside the thoracic cage, either a pleural lesion, consolidation of lung parenchyma, chest drain or other bony lesion (2,5,6). Patients are usually asymptomatic with possibility of slight chest pain, dyspnea and hemoptysis. Adhesions between different organs and intrathoracic rib are the main reason for symptoms to occur (2,3,5,7). In the event of chest trauma there is a strong correlation with the risk of pulmonary injury (2). The introduction of spiral CT scan is of vital importance for definite identification and evaluation of this rare rib anomaly to avoid any other additional future diagnostics or procedures.

Kamamo et al. published the first classification of intrathoracic ribs in 2006 (Table 1) (6). In 2013 Mahajan et al. wrote in his case report that out of 50 cases of intrahoracic ribs in the published literature only three were classified as type II (5). To our knowledge, the presented case is the fourth case of type II intrathoracic rib. Our case is similar to the case reported by Carvalho and Lopes in 2012, but we did not perform thoracic CT scan for better evaluation of the rib.

Table 1: Kamamo et al. classification of intrathoracic ribs.

I-a	Extra normal rib originating from vertebral body
I-b	Supernumerary intrathoracic rib originating from a portion of rib next to vertebral body
II	Intrathoracic rib originating from a bifid rib
III	Rib depressed inside the thoracic cavity

4 Conclusions

In conclusion, our case is a rare presentation of an intrathoracic rib, which must be considered as a normal finding and in most cases there is no need for further diagnostic procedure.

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