

Rare intrathoracic rib: Significance and associations in and adult

Intrathoracic rib is rarely encountered congenital abnormality of the thoracic rib cage. As it usually does not cause any clinical symptoms, the incidental demonstration might cause unnecessary further evaluation or misdiagnosis. We present multidetector computed tomography (MDCT) features of an incidentally detected supernumerary intrathoracic rib and its associated findings to increase the awareness and significance of this uncommon entity.

A 43-year-old female with a recent diagnosis of endometrioid carcinoma of the uterus was evaluated for the presence of metastasis. Physical examination of the respiratory system was unremarkable. The patient did not report any respiratory symptoms, smoking history, or prior thoracic surgery. Contrast-enhanced chest MDCT was performed, and multiplanar and three-dimensional reconstructions of the chest were created. No lung parenchymal or intrathoracic lymph nodal or osseous metastases were detected. Incidental note was made of a supernumerary intrathoracic corticated osseous rib originating from the proximal part and head of the right posterior fifth rib and extending inward and inferiorly along the posterior costal surface of the right hemithorax [Figure 1]. An additional small thin vertically projecting bony styloid-like process from the inferior edge of the proximal part of this supernumerary rib was present [Figure 2a and b]. Associated findings included mild levoscoliosis of the thoracic spine, asymmetric enlargement of the head of the right fifth rib [Figure 3a], excessive focal extrapleural fat tissue between the supernumerary rib and rib cage [Figure 3b], and triangular soft-tissue density suggestive of fibrous bands extending caudally from the inferior margin of the supernumerary rib to the

posterior right hemidiaphragm [Figure 3c]. Moreover, anomalous drainage of the left superior pulmonary vein to the left innominate vein creating a left-to-right shunt was detected [Figure 4a-c]. Our patient was conservatively managed for this rib finding and associated intrathoracic abnormalities.

Supernumerary intrathoracic ribs are rare congenital abnormalities of the rib cage caused by fusion abnormalities of the sclerotomes in the embryologic life.^[1] Less than fifty case reports have been published in the literature about intrathoracic rib since its first detection in 1947.^[2] It is usually demonstrated on the right side and arises between the third and eighth ribs with no gender predilection.^[3] Scoliosis is the only associated skeletal deformity with intrathoracic ribs as per the previous studies.^[3,4]

Kamano *et al.* had suggested a classification system including four different types depending on the location and course of the intrathoracic rib.^[5] Type I intrathoracic rib represents the supernumerary rib originating from the vertebral body (Ia) or proximal part of the rib (Ib). Type II is also named as a bifid rib caused by a supernumerary rib extending from the distal part of the normal rib. Type III is not an actual supernumerary rib and is caused by a locally depressed rib. Finally, Type IV is a combination of Type II and III. According to this classification, our patient demonstrated the features of both Type Ib and Type II intrathoracic rib that was previously reported only in one case in the literature.^[4]

The fibrous attachment to the diaphragmatic or mediastinal pleural surface causing pleural tenting or diaphragm elevation has been previously described in only a few cases.^[6-8] Similarly, in our case, a fibrous tissue connecting

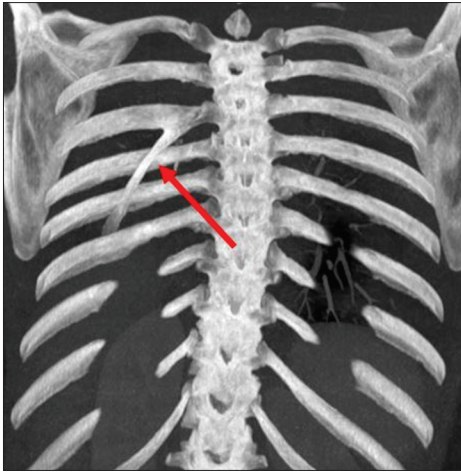


Figure 1: Coronal maximum intensity projection image from the chest computed tomography shows the intrathoracic rib (arrow) arising from the proximal part and head of the right fifth rib with a blind end

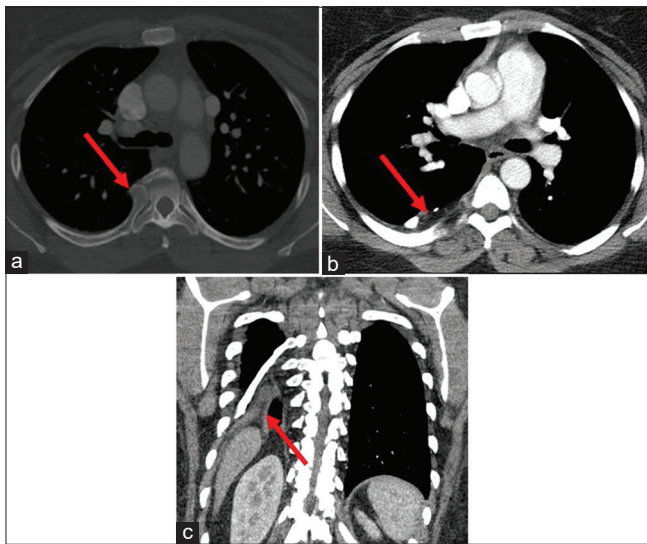


Figure 3: (a) Axial chest computed tomography image in the bone window reveals the asymmetric enlargement of the head of the right fifth rib (arrow). (b) Axial chest computed tomography image in soft-tissue window shows the focal extrapleural proliferation of fat tissue (arrow) between the intrathoracic rib and normal rib cage. (c) Coronal reformatted computed tomography image in soft-tissue window demonstrates the additional triangular soft-tissue density fibrous bands (arrow) arising from the supernumerary rib and connecting to the right diaphragm resulting in the right diaphragm elevation

supernumerary rib and posterior diaphragm was detected, which resulted in the pleural tenting and elevation of the right hemidiaphragm.

In brief, this case report reveals the unique appearance of the intrathoracic osseous rib and its associated findings of fibrous attachment to pleura and scoliosis. The new finding of partial anomalous pulmonary venous return in our patient could be an additional association or an incidental finding. Hence, paying careful attention and acknowledgment of these findings on computed

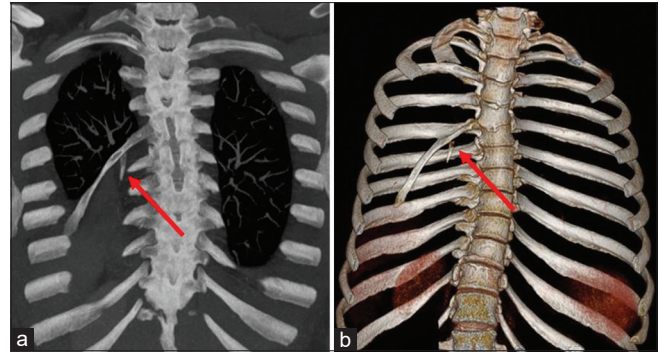


Figure 2: Coronal maximum intensity projection (a) and three-dimensional volume rendered (b) computed tomography images demonstrate the right-sided intrathoracic rib giving rise to additional vertically projecting small osseous rib (arrows), resulting in its bifid appearance

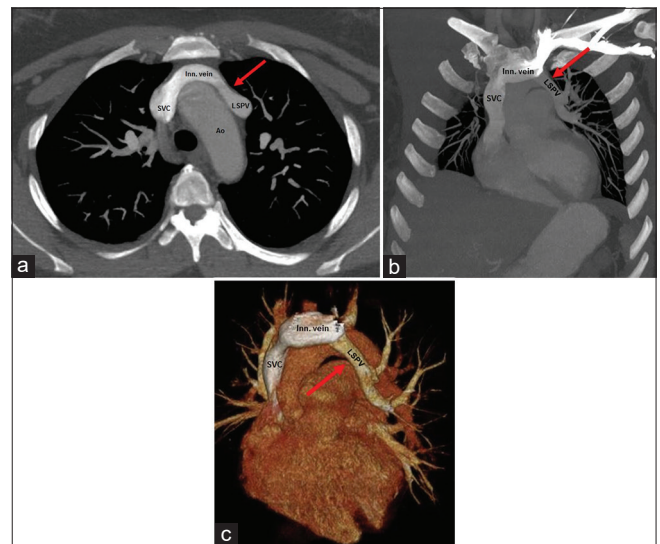


Figure 4: Axial (a), coronal (b) maximum intensity projection, and three-dimensional volume-rendered (c) images show the abnormal drainage of the left superior pulmonary vein into the innominate vein (arrows). Ao: Aorta, PA: pulmonary artery, SVC: Superior vena cava, LSPV: Left superior pulmonary vein, Inn. Vein: Innominate vein

tomography scan is required to avoid unnecessary investigations and ensure appropriate management.

This is a rare case of incidental intrathoracic rib and its associated findings in an adult woman. Although it does not cause any worrisome symptoms, the detection and radiological diagnosis of the intrathoracic rib and its associated findings might prevent unnecessary further evaluation and procedures.

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Conflicts of interest

There are no conflicts of interest.

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REFERENCES

- Weinstein AS, Mueller CF. INTRATHORACIC RIB. Am J Roentgenol Radium Ther Nucl Med 1965;94:587-90.
- Lutz P. Uber eine ungewohnliche rippenanomalie zugleich ein beitrag distalen rippengabelung. Wien Klin Wochenschr 1947;59:846-849.
- Kelleher J, O'Connell DJ, MacMahon H. Intrathoracic rib: Radiographic features of two cases. Br J Radiol 1979;52:181-3.
- MacEneaney P, Visweswaran A, Fennessy J, Masterson J. Supernumerary intrathoracic ribs: Imaging features of two cases. J Thorac Imaging 2001;16:123-6.
- Kamano H, Ishihama T, Ishihama H, Kubota Y, Tanaka T, Satoh K. Bifid intrathoracic rib: A case report and classification of intrathoracic ribs. Intern Med 2006;45:627-30.
- Trigaux JP, Sibille Y, Van Beers B. Intrathoracic rib: CT features. J Comput Assist Tomogr 1990;14:133-5.
- Peterson MS, Plunkett MB. CT demonstration of an intrathoracic rib. AJR Am J Roentgenol 1993;160:895.
- Laufer L, Schulman H, Hertzanu Y. Intrathoracic rib demonstrated by helical CT with three-dimensional reconstruction. Eur Radiol 1999;9:60-1.

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