

Fork Rib: A Rare Musculoskeletal Etiology of Chest Pain

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ABSTRACT

Chest pain is a common clinical presentation in daily practice. Musculoskeletal origin is a rare etiology of chest pain, compare to cardiorespiratory problem and often underrecognized. Fork-rib or bifid-rib is a rare anomalies which uncommonly present with clinical symptoms, since in most cases fork-rib incidentally found during cadaveric dissection. Here we report a 27 years old man presenting with chest pain and radiographic examination showing bifid rib of the fifth left rib, without any abnormalities from physical examination and electrocardiography. Patient treated with intravenous painkiller and anticonculsants. Fork-rib should be a considered as differential diagnosis for chest pain of musculoskeletal origin especially in young adults or chest pain precede with minor trauma.

Keywords: chest pain, musculoskeletal, fork-rib

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INTRODUCTION

Chest pain is a common clinical presentation in daily practice. Chest pain can be originated from several organ, cardiovascular, pulmonary, gastrointestinal, musculoskeletal, and psychological cause. In clinical settings, acute coronary syndrome should be excluded at any presentation of chest pain. Chest pain could be an emergency conditions, requiring immediate management. In the other side, non-emergency etiologies of chest pain also common.

The most common musculoskeletal origin of chest pain is costochondritis, counted 13 - 30% approximately of chest pain etiologic.^[1] In this report, we would like to report a rare cause of musculoskeletal chest pain in young adult. Fork rib is an anatomical variation where one rib separated or bifurcated, often in anterior part of rib. This anomaly can be symptomatic or asymptomatic, symptoms include anterior bulging and pain. Literature search found only

one report of fork rib presenting as chest pain in children, while most reports incidentally found on cadaver. It is important to identify this anomaly since it might be part of particular syndromes with another serious clinical manifestations.

CASE REPORT

Mr. A, 27 years old visiting internal medicine outpatient clinic with chief complain of chest pain in the lateral side of the left hemithorax. This is the first onset, experienced a day before, the pain was localized with excruciating characteristic, the pain does not radiate and not alleviated by strenuous activity or respiration. The pain was persistence during the night, slightly relieved with paracetamol given at emergency department visit a night before.

Physical findings showing no cardiopulmonary abnormalities, moderate pain with Wong-Baker face pain rating scale 8/10. Electrocardiogram performed with normal results. Chest radiography showing branching of the anterior part of left fifth ribs.

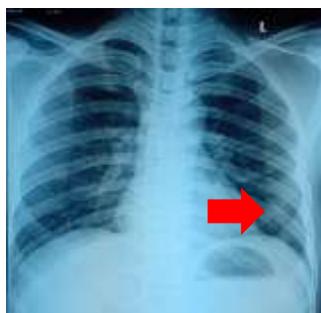


Figure 1. Chest radiograph showing branching of the anterior part of left fifth ribs (costae bifida, bifid costae, fork rib, bifurcated rib)

Patient finally diagnosed as fork rib of left fifth rib and was treated with tramadol infusion combined with gabapentin and discharged on the other day with ibuprofen and gabapentin, regarding possibility of neuropathic pain.

DISCUSSION

Chest pain of musculoskeletal origin can be caused by several aetiologies, i.e. costochondritis, Tietze syndrome, osteitis, fractures, strains, myofascial pain syndrome, or congenital anomalies of bones and adjacent structures. Costochondritis accounts for 13 – 30% cause of chest pain, results in the most prevalence cause of musculoskeletal chest pain.^[1]

Fork rib (or bifid costae or bifurcated ribs) is an anatomical abnormality of costae. These findings might be related to a particular syndrome or isolated abnormality. Often this abnormality does not manifest into a clinical problem, several reports found this abnormality in cadaveric dissection during medical students’ learning. While onset of clinical manifestation, when occur, ranging from early childhood into elderly. It is estimated that fork rib occurs in 28% of rib anomalies.^[2] Fork rib could be identified from plain radiography and yet confirmed by 3D reconstruction CT.^[3]

Several particular syndrome or complexes of abnormality reported shown in **Table 1**, while most of reports incidentally found fork ribs in cadaver. ^{[4-7][8-10]}

Table 1. Complex of Abnormalities Reported Associated with Fork Rib

Patients	Abnormalities	Bifid rib side	Bifid rib number	Reference
Male, 43 y.o	Intrathoracic ribs Supernumerary ribs Vertebral block Hypoplastic left lung	Left	3 rd rib	(11)

Female, 85 y.o (cadaver)	Suspected Gorlin's syndrome (nevroid basal cell carcinoma): Breast cancer Multiple brain tumours (craniotomised) Renal cysts Hysterectomised Cholecystectomised Hip fracture	Right	4 th rib	(6)
Female, 19 y.o	Unerupted 3 rd molar Congenital cataract Skin lesions	Left Right	3 rd , 4 th , 8 th ribs 4 th rib	(12)
Female, 30 y.o	Bilateral dental follicular cysts Multiple body papules		6 th rib	Reported in (2)
Male, 9 y.o	Epithelioma adenoids cysticum Dental cysts on the left mandible and maxilla	Bilateral	6 th rib	Reported in (2)
Female, 38 y.o 18 y.o	Multiple dentigerous cyst Multiple maxillary and mandibular cysts Multiple basal cell lesions on the skin	Left Bilateral	4 th rib 6 th rib	(13) Reported in (2)

Based on literature search, we found 3 cases reporting fork rib with chest pain as clinical manifestations, one report a 9 years old girl complaining chest pain after minor trauma, further evaluation showing fork rib in 5th right rib.^[14] Second case reporting 9 years old boy complaining chest pain after minor trauma, the chest pain was localized at left posterior axillary line projection, fork rib was found in 3rd left rib. In the third case, the patient was 23 years old soldier, also experience 1-meter fall and complaining chest pain in the left lateral side but from radiograph, fork rib was found in the 2nd right rib.^[15]

Of the three cases reported, minor trauma precedes the clinical manifestation of chest pain. Interestingly, in the third case, the pain was contralateral of the anomaly. Whether trauma triggered this manifestation remain unknown. The mechanism of pain suspected due to injury to intercostal nerve, intercostal nerve usually adjacent to the lower part of the branch ^[2,7], while anatomical variation may still occur such as nerve passing

the space between bone branches. Our patient treated with tramadol on admission due to severe pain, and was discharged with ibuprofen and gabapentin, unfortunately he did not come for further evaluation.

CONCLUSION

Fork rib is a rare anomaly, most of cases detected during cadaver dissection, without known history of clinical complaints. Some of cases might detect incidentally during radiologic examination as single clinical manifestation or part of certain syndrome. Chest pain might occur as clinical manifestation with suspected mechanism of intercostal nerve injury.

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