

# Primary Tuberculous Osteomyelitis of Rib in a Child

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## ABSTRACT

Although extremely rare, osteomyelitis has been reported in smaller bones like ribs. A 13-year-old male child presented with a one week history of chest wall swelling. Fine Needle Aspiration Cytology (FNAC) of the lesion and initial bacterial culture could not find the aetiology of the lesion. He underwent surgical resection of entire sixth rib for osteomyelitis and was subsequently diagnosed to have tubercular osteomyelitis. Diagnosis and treatment of rib tuberculosis is both difficult and controversial. Rib tuberculosis is often not successfully treated by medical management alone and consequently needs surgery.

## CASE REPORT

A 13-year-old male presented with complaint of swelling in right antero-lateral side of chest wall since one week. There was no history of fever, cough, breathlessness, chest pain, weight loss, anorexia or any other similar swellings in the body. The swelling was 5x5 cm in size, erythematous, non-tender, and soft in consistency with positive fluctuation test.

His total leucocyte count was 13900/ $\mu$ L and ESR and CRP of 37 mm and 39.2 mg/dl respectively. Cytological examination of the material aspirated from swelling showed acute inflammatory infiltrate comprised of many neutrophils and scattered macrophages on necrotic background, no granulomas were seen. Ziehl-Neelsen staining and mycobacterial culture for Acid Fast Bacilli (AFB) were negative (sensitivity of mycobacterial cultures is 70-80%) [1]. We could not do Cartridge Based Nucleic Acid Amplification Test (CB-NAAT) for mycobacterium tuberculosis due to non-affordability. On Gram staining only pus cells were present, no organism was seen. Patient was evaluated with chest skiagram showing bony thickening of sixth rib and osteolytic lesion with destruction of rib. Contrast enhanced CT of thorax revealed thickening and bony destruction with sclerotic changes in the entire right sixth rib (black arrow) with multiple area of cloacal opening in medial aspect of the rib with collection in soft tissue adjacent to anterior end of the rib [Table/Fig-1].

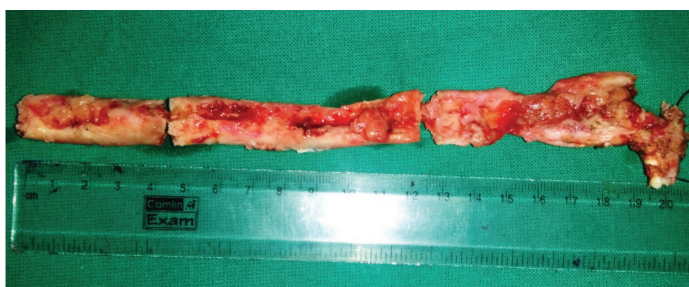
The patient underwent surgical resection of entire sixth rib with excision of abscess cavity. Intraoperatively few bony chips in abscess cavity along with a 2.5x2.5 cm sized necrotic area near costovertebral end with multiple small opening in the shaft of sixth rib was found. Medial aspect of bone was necrosed with granulation tissue in it [Table/Fig-2]. The histopathological examination of resected specimen showed few granulomas composed of central caseous necrosis (yellow arrow) with epithelioid, histiocytes, occasional giant cells (green arrow) and surrounded by a peripheral rim of lymphocytes suggestive of tubercular osteomyelitis [Table/Fig-3].

Postoperatively, patient was started with a combination regimen of isoniazid, rifampicin, ethambutol and pyrazinamide for two months and then isoniazid, rifampicin and ethambutol for nine months as per the Indian Academy of Paediatrics treatment protocol for bone tuberculosis. Postoperative period was uneventful and patient is doing well on his six monthly follow-up till date.

**Keywords:** Chest wall, Mycobacterium, Small bone



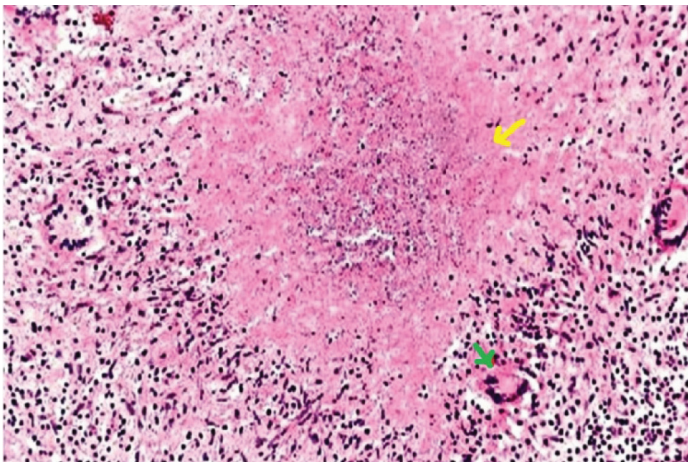
**[Table/Fig-1]:** Contrast enhanced CT of thorax showing thickening and bony destruction with sclerotic changes in the entire right sixth rib (black arrow).



**[Table/Fig-2]:** Excised specimen.

## DISCUSSION

Primary tubercular osteomyelitis of rib is extremely rare entity. The age of presentation is variable and presents more often between 15 to 35 years age group [2]. Tubercular osteomyelitis of rib can result from a contagious infection (e.g., empyema or pneumonia) or via haematogenous seeding from a distant focus of infection and also from penetrating trauma [3]. The mechanism of rib involvement is usually by lymphatic or haematogenous spread; direct extension from lung being less likely [4].



**[Table/Fig-3]:** Histopathological image of resected specimen showing few granulomas composed of central caseous necrosis (yellow arrow) with epithelioid, histiocytes, occasional giant cells (green arrow) and surrounded by a peripheral rim of lymphocytes (H&E 10X).

The initial presentation of rib involvement is usually subtle and nonspecific, which may delay diagnosis and appropriate management. In this index child, we are unaware of the genesis of the infection as he had no history of trauma, pneumonia, empyema or immunosuppression [4].

The history of close contact with people having sputum positive Tuberculosis (TB) is helpful to suggest the possibility of TB, though it is not always present. In various studies, this association is variable [5]. Index patient had no history of TB infection in past or close contact.

The rib shaft (60%) is the most common site of involvement [5]; followed by costovertebral junction (20%) and parasternal sites (20%). Our patient's lesion was also adhered to the rib shaft. The most common clinical presentations of tuberculosis of rib are palpable chest wall abscess, fever, chest pain and discharging sinus [4,6].

In the early stage of rib involvement, plain radiographs may not show any abnormality but with clinical progression, focal area of osteolysis with little or no surrounding reactive bone is characteristic finding and presence of osteopenia helps to diagnose tuberculosis. It is very difficult to differentiate both tubercular osteomyelitis and chronic pyogenic osteomyelitis due to similar findings of osteoporosis, bone lysis, sclerosis and periostitis on radiological investigations [7]. The chest skiagram of the index case also showed sclerotic lesions of sixth rib with osteolysis.

The identification of the causative agent is essential for establishing the diagnosis and its management. FNA from lesion may provide this valuable information. Sometimes only histopathological examination

of a bone biopsy with Ziehl-Neelsen staining is the only option for getting the accurate diagnosis of infection [8]. In our case, FNAC of the lesion could not find the aetiology of the lesion. Culture of the aspirated material was sterile and CB-NAAT was not possible because of non-affordability. CT scan also could not differentiate the lesions of chronic osteomyelitis with tubercular osteomyelitis as in our case [9].

Management of chest wall tuberculosis is controversial and no consensus exists on the optimal treatment. Some authors suggest that medical treatment alone is effective however others believe that surgical debridement with primary closure in addition to medical therapy is required. Surgical treatment not only helps in definite diagnosis by histopathology and culture of the material but also removal of almost all of the grossly diseased rib [5,6,10-12]. In the index case, the rib was resected and the histopathology was suggestive of tuberculosis. Our patient responded well to excision of rib and medical treatment.

## CONCLUSION

The diagnosis of tubercular rib osteomyelitis requires a high index of suspicion given its non-specific clinical manifestations that can easily mimic chronic osteomyelitis. Complete resection of the tubercular rib combined with anti-tubercular therapy leads to complete resolution without significant morbidity.

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Date of Submission: **Jan 04, 2017**

Date of Peer Review: **Jan 14, 2017**

Date of Acceptance: **Apr 12, 2017**

Date of Publishing: **Jul 01, 2017**

**FINANCIAL OR OTHER COMPETING INTERESTS:** None.