Cold abscess of Sternum: Reports of two cases

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ABSTRACT

Sternal bone affection by *Mycobacterium tuberculosis* is a rare entity. Clinical manifestations can vary widely. There are only a few isolated case reports of tubercular sternal osteomyelitis in both endemic belts and otherwise. We report tubercular abscess of sternum in apparently two healthy young individuals with no predisposing factors, who presented to us with chief complains of chronic anterior chest pain. Diagnosis was confirmed by histo-pathological and microbiological work-up. Combined surgical drainage and anti-tubercular drugs gave satisfactory outcomes. A high index of suspicion for tuberculosis is necessary whenever unusual sites are encountered in order to facilitate early diagnosis and prompt management.

KEY WORDS: **Tuberculosis**, **Cold abscess**, **Sternum**, **Chest pain**, **Drainage**

Introduction

Sternal involvement is seen in less than 1% of skeletal tuberculosis. Sternal TB was first reported in 1918 [1] and until 2007, fewer than 35 cases are documented in English literature [2]. Even in tubercular endemic belts, there are only limited and isolated case reports [3]. We report two cases of tubercular abscess of sternum in otherwise healthy individuals. Both cases were diagnosed relatively early in the course of the disease and responded well to a combined medical and surgical treatment with no recurrence or complications at one year follow up.

Case 1

A 22 year old student was referred to the Orthopedics department with history of dull aching and left sided anterior chest wall pain of six months duration. She had apparently consulted a general practitioner for this complaint, but the diagnosis was elusive, as the chest X-ray was apparently normal and clinical picture did not fit into any medical or gastroenterological disorder. There was no history of trauma or constitutional symptoms. There was a ~3x2cm, firm, non-transilluminant swelling with mild tenderness arising from the body of the sternum. There was no regional lymphadenopathy and systemic examination was normal. CT thorax revealed irregular lytic destruction of sternal body at level of 3rd costochondral junction with an ill-defined abscess measuring 3.3x2.2x2.2cm (Figure 1).

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Case 2

A 31 year old architect presented to OPD with chief complains of vague anterior wall chest pain of four months duration. Patient also noticed a localized bulge over the medial aspect of right clavicle for past one month. There was no history of trauma or constitutional symptoms. On local examination, a solitary, ~5x6cms, firm swelling over the manubrium sterni with moderate tenderness was noted. The chest x- ray was apparently normal and the rest of systemic examination was also normal. CT of thorax revealed a multi-loculated collection measuring 5.1x1.9x8.5cms suggestive of an abscess overlying the manubrium sterni and an ill-defined osteolytic lesion with sclerosis of superior half of manubrium sternum communicating with the collection (Figure 2).

Clinical and radiological diagnosis favored the possibility of cold abscess in both scenarios and a formal incision and drainage was performed. The purulent material and necrotic tissue samples were sent for histopathological and

microbiological analysis which confirmed the tubercular pathology. The investigational work up of the two cases is compared in Table 1. Both patients were started on anti-tubercular regimen [four drugs for two months followed by two drugs for 10 months daily]. Patients recovered completely at the end of 12 months of a close follow-up with no recurrence or complications.

Table 1: A Comparison of investigational work up of the two cases.

INVESTIGATIONS	CASE 1	CASE 2
Hb	12.0 g/dl	11.2 g/dl
TLC	$6.4x10^3$ /µL	$8.7x10^3$ /µL
DLC	Lymphocytes-15.7% Neutrophils-71.6%	Lymphocytes-19.7% Neutrophils-68.2%
ESR	44 mm/hour	63 mm/hour
CRP	3.0 mg/L	70.3 mg/L
HIV 1&2	Negative	Negative
RBS	88 mg/dl	96 mg/dl
AFB (pus)	Not seen	Scanty growth
PCR (nested)	Positive	Positive
Biopsy	Granuloma	Granuloma

Hb- Hemoglobin; TLC- Total Leucocyte Count; DLC- Differential Leucocyte Count; ESR- Erythrocyte Sedimentation Rate; CRP- C-Reactive Protein; AFB- Acid Fast Bacilli; PCR- Polymerase Chain Reaction.

Figure 1. CT scan sagittal view of case 1 showing involvement of body of sternum and presence of sequestrum.

Figure 2. CT sagittal view of case 2 showing involvement of manubrium sterni and cold abscess tracking to subcutaneous plane

Discussion

Tubercular affection of the sternum is known to occur in less than 1% of all skeletal tuberculosis [2]. Mechanism of involvement is either lympho-hematogenous spread from the primary pulmonary foci or direct contiguous spread from the hilar lymph nodes. Typically, in the event of immunosuppressive states such as HIV/AIDS, diabetes, chronic kidney disease, corticosteroid/chemotherapy use, alcohol abuse, severe malnutrition and low socio-economic levels, a dormant infection gets reactivated and disseminates resulting in osteoarticular involvement. Sternal TB has also been reported in two exceptional conditions: after sternotomy for cardiac surgeries [4] and following BCG vaccination in infants [5]. Clinically, patient can present with anterior chest wall swelling, pre/retrosternal dull aching pain or in long standing cases, indolent ulcers/discharging sinuses over anterior chest wall and sternal fracture. Presence of constitutional symptoms can be variable. Differential diagnosis includes numerous diverse disorders such as granulomatous diseases (sarcoidosis), chronic infections (fungal/parasitic) and various malignancies (lymphomas and metastasis).

Serological markers of inflammation like ESR, CRP and TLC are neither specific nor entirely reliable [7]. In the chest x-ray (PA and lateral views), it is difficult to appreciate the sternal affection. Moreover, radiological signs occur much later than the presenting clinical features, and abscesses or sinuses are present much before the focus is detected [3]. CT scans define the extent of bone destruction, while MRI is useful to determine soft tissue extension. However, neither can confirm the diagnosis and only biopsy is the gold standard. It is possible to ascertain the

diagnosis by fine needle aspiration cytology or marginal biopsy from an established sinus tract. Under the microscope, extensive areas of caseous necrosis surrounded by lymphocytes and epitheloid cells are typically observed. PCR for M. tuberculosis complex is a rapid test that shows good correlation with histological findings, with an 85% sensitivity and 80% specificity [6]. The surgical role in sternal TB encompasses the drainage of abscess, sequestrectomy, sinus tract excision and flap reconstruction for sternal defects besides an open biopsy. A structured regimen comprising of four drugs [Isoniazid (300mg), Rifampicin (450mg), Pyrazinamide (750mg) and Ethambutol (800mg)] is the mainstay of treatment. It is usually initiated with all four drugs daily for two months in the intensive phase followed by a maintenance phase with Isoniazid and Rifampicin daily for 10-18 months. However, there is no consensus in terms of drug combinations as well as duration of the regime especially in osteo-articular TB even in endemic belts. Generally, combined clinical and radiological signs of improvements are taken into consideration to decide about termination of the regimen. Clinical signs of improvement include weight gain, decrease in pain and swelling, and healing of sinuses. Radiological signs of healing, however, usually lag behind clinical improvement by several weeks and are all the more difficult to appreciate in the sternum. Possible complications of sternal tuberculosis include secondary infection, fistula formation, spontaneous fractures of the sternum, compression or erosion of the large blood vessels, compression of the trachea and migration of tubercular abscess into the mediastinum, pleural cavity or subcutaneous tissues [8]. A close follow up is also essential to monitor response to treatment, patients' compliance, drug resistance and adverse side effects.

Conclusion

Tubercular abscess of sternum is a rare clinical entity but can be detected early owing to its superficial location. Anterior chest pain and swelling are early manifestations, which unless appropriately evaluated can lead to serious complications which are difficult to manage. Exclusion of tuberculosis should not be prejudiced based upon age, sex or immunity status. Long term medical management is the mainstay of treatment supplemented with surgical drainage of the abscess. A periodic follow-up is warranted to monitor the response to treatment and look out for complications. Informed consent from both patients has been obtained for publication.

Conflict of Interest

We declare that we have no conflict of interest.

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