Case Report

TUBERCULOSIS OF STERNUM

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Introduction

Skeletal tuberculosis is the result of haematogenous dissemination of bacilli following primary infection. Any bone in the body can be a site for tuberculosis. Cold abscesses of surrounding soft tissues with subsequent contiguous sinus tracts often occur. A painless cold abscess may be the only presenting clinical feature for a prolonged period. The tuberculin skin test is positive in 95% cases, pulmonary involvement occurs in about 50%. New imaging techniques with computed tomography (CT), magnetic resonance imaging (MRI), and CT-guided fine needle aspiration biopsy have revolutionized the diagnostic approach and have resulted in more accurate results and much less invasive procedures than plain radiography and open biopsy. Open biopsy enhances the chances for bacteriologic confirmation in upto 90% cases. Polymerase chain reaction (PCR) has been used as a potentially valuable technique in rapid diagnosis of musculoskeletal tuberculosis. However, a presumptive diagnosis can be made with the presence of caseous granulomas on histology. Surgical drainage of abscesses should be undertaken only if it cannot be controlled by aspiration and chemotherapy alone [1].

Case Report -1

A 30 year old non-smoker soldier had insidious onset symptoms of cough with expectoration, fever, anorexia and weight loss of one month duration. He also noticed a painless swelling over left lower scapular region a fortnight later. General physical examination was unremarkable. Chest examination revealed few crepitations in right infraclavicular region. Mantoux was 15 mm. Sputum smear was positive for acid fast bacilli (AFB). Chest radiograph revealed non-homogenous opacities in right upper zone. He was subjected to anti-tubercular treatment (ATT). After 2EHRZ he developed a cold abscess in the right parasternal region, which gradually enlarged and ruptured 4 months later to form a discharging sinus. After completing nine months ATT he developed another cold abscess at lower end of sternum, which too

ruptured and left a discharging sinus. Three months later a third cold abscess developed over right 7th rib anterolaterally resulting in sinus later. At this time he was referred to us with a suspected diagnosis of drug resistant tuberculosis. On examination two ulcers with discharging sinuses over sternum measuring 5x7cm and 3x2.5cm, both with undermined edges and a third cold abscess over right 7th rib were evident (Fig-1).

Results of investigations revealed haemoglobin 9.8gm%, normal total and differential leucocyte counts. Sputum for acid-fast bacilli (AFB) was negative. His blood was negative for human immunodeficiency virus (HIV). Biochemical parameters were normal. Scraping from ulcers was negative for AFB. The cellular aspirate from cold abscess revealed necrotic material with cellular infiltrates comprising neutrophils, lymphocytes, macrophages along with epithelial cells, AFB were not seen on smear examination but pus culture grew *Mycobacterium tuberculosis* resistant to INH and Rifampicin (HR). Chest radiograph at this stage showed fibrocystic lesions at right upper zone and right mid zone and an erosive lesion over superior border of right 7th rib, erosion of sternum and soft tissue swelling over distal end of sternum. Ultrasonography showed a 15x35mm hypoechoic cystic area at lower end of sternum and a 30x20mm hypoechoic cystic region with debris behind sternum. CT confirmed erosion of anterior surface of sternum with adjacent soft tissue swelling and consolidation with infiltrative lesion in right lung. There was in addition pre and paravertebral abscess extending from D3 to D7 with erosion of D5

Fig. 1 : Showing two ulcers with discharging sinuses over sternum both with undermined edges and a third cold abscess over 7th rib below right nipple

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Fig. 2 : CT thorax showing erosion of sternum, vertebra with infiltrative lesion in right lung

vertebra (Fig2).

He was treated successfully with second line ATT comprising streptomycin, ethambutol, pyrazinamide, ethionamide and PAS with healing of all bony lesions and sinuses. Streptomycin was stopped after six months whereas rest of antitubercular drugs mentioned above were given for 18 months. No surgical intervention was done in this case.

Case Report-2

48 year old soldier was admitted with 2 weeks history of non-productive cough and fever. He was a non-smoker and suffered from no major illness in the past. Examination of chest showed kyphosis over thoracic spine but without any pain, tenderness or neurological deficit. Chest auscultation did not reveal any adventitious sounds. Other systems were essentially normal. Chest radiograph revealed infiltration in right mid zone. Radiograph of thoracic spine showed destruction of T₁₀ with loss of T₁₀₋₁₁ disc space and an adjacent paraspinal shadow suggestive of a paraspinal abscess. Mantoux was strongly positive. Sputum for AFB was negative. Haematological and metabolic profile was normal.

Treatment was started with four standard antitubercular drugs for the initial intensive phase followed by continuation phase. While on therapy, he developed pain and swelling over the sternal area. Skin overlying was normal. Radiograph of the sternum (lateral view) revealed a lytic lesion over the lower part of the sternum (Fig-3). Aspiration of the cold abscess revealed pus that was negative for AFB and culture also did not grow *M tuberculosis*. ATT was continued (3EHRZ/6HR) and abscess subsided with clinical improvement in the patient. There was progressive regression of the lesion on subsequent reviews and post treatment radiograph of the chest showed only minimal fibrotic streaks in right mid zone.

Case Report-3

41 year old patient was admitted with gradually increasing painless swelling over the anterior chest wall for past three months. He denied any history of trauma or accompanying constitutional symptoms. As there was no subsidence of the swelling he sought medical attention. General physical examination was essentially normal but auscultation of the chest revealed few crepitations in the left infraclavicular region. Chest radiograph showed non-homogenous opacities in all zones of left lung with cavitation

Fig. 3 : Chest radiograph (lateral view) showing bony erosion of sternum with soft tissue shadow of cold abscess

Fig. 4 : Showing healed tubercular sinus overlying sternum

in left mid zone and blunting of left costophrenic angle. Lateral view showed a lytic lesion over the lower third of the sternum. Needle aspirate of the swelling revealed frank pus and caseous material. Smear for AFB and *M tuberculosis* culture were however negative. All haematological and biochemical parameters were normal. Sputum smear for AFB was positive and Mantoux test too was positive. Patient was treated with standard ATT (2EHRZ/4HR). The swelling recurred after 4 weeks and it had to be aspirated second time. At third recurrence, 4 weeks later, since the abscess was large, it was managed with excision and drainage. Follow up at 6 months revealed sputum conversion, radiological regression with residual fibrosis and healing of cold abscess as well as sinus with a scar (Fig-4).

Discussion

All three cases of sternal tuberculosis mentioned in this article had associated pulmonary tuberculosis. All of them had cold abscess with sinus formation. Vertebral tuberculosis was associated in first two cases. Mantoux was strongly positive in all of them. Aspiration revealed pus with caseation in all three cases but smear for AFB was negative in all. Only in first case *M tuberculosis* was cultured which was resistant to INH and rifampicin (MDR-TB). Computed tomography done in first case demonstrated bone destruction involving sternum and vertebrae (Fig-2). All cases responded to ATT. First case required second line ATT, being a case of MDR-TB. Surgical drainage was required in third case only whereas first two cases responded well to repeated aspiration only.

Sternum is an infrequent site for localization in extra-pulmonary tuberculosis. A high index of suspicion is needed to overcome the diagnostic riddle especially if pulmonary tuberculosis is not associated. Lahiri et al in a large retrospective analysis of 1655 surgical procedures for thoracic tuberculosis revealed that osteomyelitis of ribs and sternum were the least common indications for surgical resection in 16 (0.9%) cases only [2]. Rasaretnam et al successfully managed two cases of sternal tuberculous osteomyelitis with ATT and surgical exploration. The diagnosis was confirmed in one and the clinical presentation was characteristic of tuberculous etiology in the second [3]. Hajjar et al excised manubrium sternum with three ribs and showed histologically caseating granulomatous affection in a parasternal sinus in an 81 year old man [4].

Mathlouthi et al opined that thoracic wall is an uncommon localization for tuberculosis, accounting for 1-5% of all cases of bone and joint tuberculosis, which themselves account for 15% of all extrapulmonary localization. They achieved cure in all four cases of chest wall tuberculosis involving sternum and ribs with cold abscess with multi-drug therapy. They concluded that surgical resection was rarely indicated [5]. All three cases in this series were managed with ATT and repeated needle aspiration. Only third case required excision and drainage for large rapidly accumulating pus.

Hemmen et al highlighted the importance of bone scintigraphy, MRI, CT and PCR in diagnosis of sternal and vertebral tuberculosis in their index case. Also,

their patient was resistant to INH and streptomycin thus requiring second line drugs. Pulmonary tuberculosis was not associated and abscess was drained and vertebral fracture surgically stabilized [6]. La Brocca demonstrated by CT studies, severe bone destruction of sternum and vertebra, caused by infiltration of caseating granulomas in a 75 year old woman having swelling of pre-sternal region [7]. The first case in our series had MDR-TB involving lungs sternum and vertebrae and was clearly demonstrated in CT of thorax (Fig-2). Contrast plain skiagram (lateral view) showed a poor radiological resolution of bony erosion due to overlying soft tissue shadows of fat, muscles and cold abscess (Fig-3).

Tuberculosis of the sternum is a rare form of flat bone tuberculosis. It is usually a part of disseminated tuberculosis. Most cases present with soft tissue swelling (cold abscess) or discharging sinus over anterior chest wall. Diagnosis is easy, as most cases have associated pulmonary tuberculosis; otherwise the clinical presentation is characteristic of a tuberculous aetiology. Bony destruction can be disclosed easily with newer radiographic techniques like CT and MRI. Antitubercular chemotherapy is the mainstay of treatment. Poor response to chemotherapy may indicate drug resistance. Some cases require repeated aspiration. Surgical resection is rarely required.

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