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CASE REPORT

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"Caught by the Eye of Sound" – Epigastric Swelling due to Xiphisternal Tuberculosis

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Summary

Background: Common causes of an epigastric mass include hepatomegaly, pancreatic pseudocyst and epigastric hernia, less common causes being carcinoma of the stomach or pancreas, whereas diseases of the sternum presenting as an epigastric swelling is extremely uncommon. We report a case of tubercular infection of the sternum located in the xiphoid process resulting in its presentation as an epigastric swelling.

Case Report: A 30-year-old immunocompetent woman with complaints of an epigastric swelling and undocumented pyrexia for four months was referred for sonographic evaluation with a clinical suspicion of an incompletely treated liver abscess. The patient was examined with ultrasound, sternal radiographs, CT and MRI.

Ultrasound revealed a heterogeneous epigastric collection with linear echogenic components suggestive of bone fragments. These appearances suggested chronic infective osteomyelitis of the xiphoid process of the sternum. Lateral chest radiograph demonstrated lytic destruction of the xiphisternum. Tubercular etiology was considered and further evaluation with Multidetector Computed tomography (MDCT) and Magnetic Resonance Imaging (MRI) demonstrated erosive osteomyelitis of the xiphoid process with enhancing inflammation and collection in the adjoining soft tissue. Ultrasound-guided aspiration, PCR and Amplified Mycobacterium tuberculosis DNA test confirmed tubercular infection.

Conclusions: We report a new case of osteo-articular tuberculosis localized to the xiphisternum, a rare clinical entity with an extremely unusual clinical presentation as an epigastric mass. The role of ultrasound in primary diagnosis and as an interventional diagnostic modality for guided aspiration is highlighted.

MeSH Keywords: Magnetic Resonance Imaging • Multidetector Computed Tomography • Osteoarticular, Tuberculosis • Sternum • Ultrasonography • Xiphoid Bone

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Background

The conventional differential diagnosis usually considered for an epigastric mass is either related to pathology of subcutaneous tissue (hernia, abscess, lipoma), abdominal organs (pancreatic pseudocyst, carcinoma of the stomach or pancreas) or vascular system (aortic aneurysm). The differential diagnosis of sternal masses includes pyogenic infection, lymphoma, metastasis and granulomatous lesions (tuberculosis, sarcoidosis). Rarely isolated cases of congenital anomalies of the xiphisternum have also been reported as a cause of an epigastric swelling [1]. Therefore, in majority of clinical settings, Xiphisternal infection is unlikely to be suspected as a possible etiology of an epigastric mass. Sternal tuberculosis on the other hand, has been the subject of a few case reports in the literature including a case-series by the authors themselves [2–11].

We report an extremely rare manifestation of sternal tuberculosis presenting as a gradually enlarging painful epigastric swelling due to its localization in the xiphoid process. The patient was referred for an abdominal ultrasound by the surgical team who suspected an incompletely treated liver abscess. Ultrasound and further correlation by CT revealed osteomyelitis of the xiphisternum, which was confirmed to be of tubercular etiology.

Case Report

A 30-year-old female patient presented to the surgery outpatient clinic of our institution with complaints of non-radiating epigastric pain accompanied by mildly painful epigastric swelling which had been gradually progressing for the past 4 months. There was a history of undocumented/unconfirmed episodes of pyrexia. There was no history of trauma, significant weight loss, chronic medical illness or family history of tuberculosis. On examination, a mildly fluctuant and tender midline epigastric swelling, 3×2.5 cm in size, was seen in the epigastric region. Overlying skin was unremarkable. Axillary examination was normal. The patient was sent for an abdominal ultrasound as a suspected case of an incompletely treated liver abscess.

Ultrasound of the abdomen using curvilinear transducer (3–5 MHz) revealed no evidence of hepatomegaly or liver abscess or any other abdominal pathology. Examination of the epigastric region using a high-frequency transducer (7–9 MHz) revealed subcutaneous tissue thickening with an irregular hypoechoic collection measuring 9×9.8×10 mm in the lower plane. The hypoechoic collection showed linear echogenic bone fragments located on its posterior aspect (Figure 1). Osteomyelitis of the xiphisternum likely to be of tubercular etiology was considered at this stage. Simultaneously, blood samples were obtained and laboratory examination showed marginally raised total leucocyte count (13600/cumm) with lymphocytosis (42%) and raised erythrocyte sedimentation rate (85 mm at the end of the first hour using Wintrobe's method) and C-reactive protein levels. Patient was HIV-negative. Mantoux test was positive (20×20 mm) after 72 hours.

Figure 1. Sonogram of the epigastric region using a high-frequency transducer shows increased thickness and echogenicity of soft tissue. Focal area of hypo-echogenicity (red arrow) is seen in the deeper plane with linear echogenic foci (white arrows) on its posterior aspect. These appearances were suggestive of bone fragments with surrounding cold abscess.

Figure 2. Lateral chest radiograph showing complete destruction of the xiphoid process (white arrow).

Subsequently, Lateral chest radiographs focused at the distal sternum were obtained, demonstrating lytic destruction of the xiphisternum (Figure 2). Contrast enhanced Multidetector computed tomography (MDCT) of the thorax and abdomen was obtained to exclude mediastinal/abdominal extension of the disease. CT examination of the thorax revealed almost complete erosion of the xiphoid process of the sternum. The surrounding soft tissue revealed poorly-enhancing inflammatory changes in the form of stranding (Figure 3). The lung window view showed patchy fibrotic nodules in both lungs. Additionally, traction brochiolectasis

Figure 3. CT thorax: sagittal reformatted bone window view, shows complete erosion of the xiphisternum with surrounding soft tissue stranding (white arrow).

was observed in the right upper lobe and left lower lobe suggesting an old infective etiology (Figure 4). There was no other focus of tubercular infection in the chest and abdomen on CT scan. Contrast-enhanced MRI demonstrated abscess formation in the soft tissue of the xiphisternal region (Figure 5A, 5B). MRI also helped to exclude concurrent spinal tuberculosis.

Sonography-guided antigravity aspiration was carried out on two occasions which revealed scant blood mixed aspirate. The samples were subjected to microbiological and pathological analyses. Microscopic findings were suggestive of non-specific inflammation. The aspirate did not

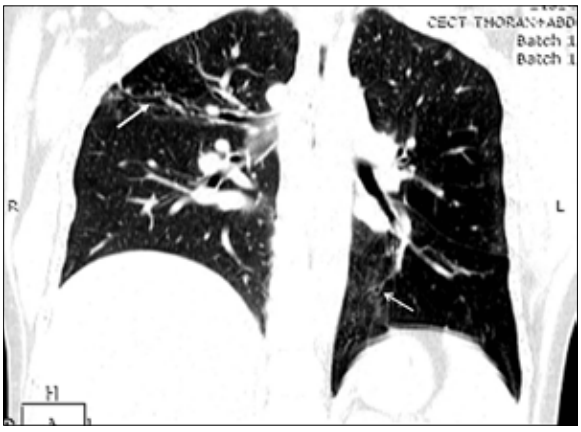

Figure 4. CT thorax: coronal reformatted lung window view, shows traction bronchiolectasis along the horizontal fissure in the right lung and posterior basal segment of the left lung (white arrows) with multiple fibrotic nodules in bilateral lung parenchyma.

show pyogenic organisms on gram's staining or acid-fast bacilli on Ziehl-Neelsen staining. ADA levels were 367 IU/L in the tissue aspirate. Culture for pyogenic organisms was negative after 48 hours of incubation. Polymerase Chain Reaction (PCR) for *Mycobacterium tuberculosis* and Amplified Mycobacterium tuberculosis DNA test (AMT-DT) were also performed and were positive for tuberculosis. The sputum examination was negative for acid-fast bacilli. Enzyme-linked immunosorbant assay (ELISA) was negative for HIV I & II antibodies. The patient's immune status was normal with no other focus of infection either clinically or radiologically.

Standard multidrug antitubercular chemotherapy (Isoniazide 5 mg/kg; Rifampicin 10 mg/kg; Pyrazinamide 25 mg/kg; Ethambutol 15 mg/kg; along with pyridoxine 20 mg) was administered to the patient. The constitutional symptoms and pain subsided over the next 12 weeks and the size of swelling gradually decreased over 6 months.

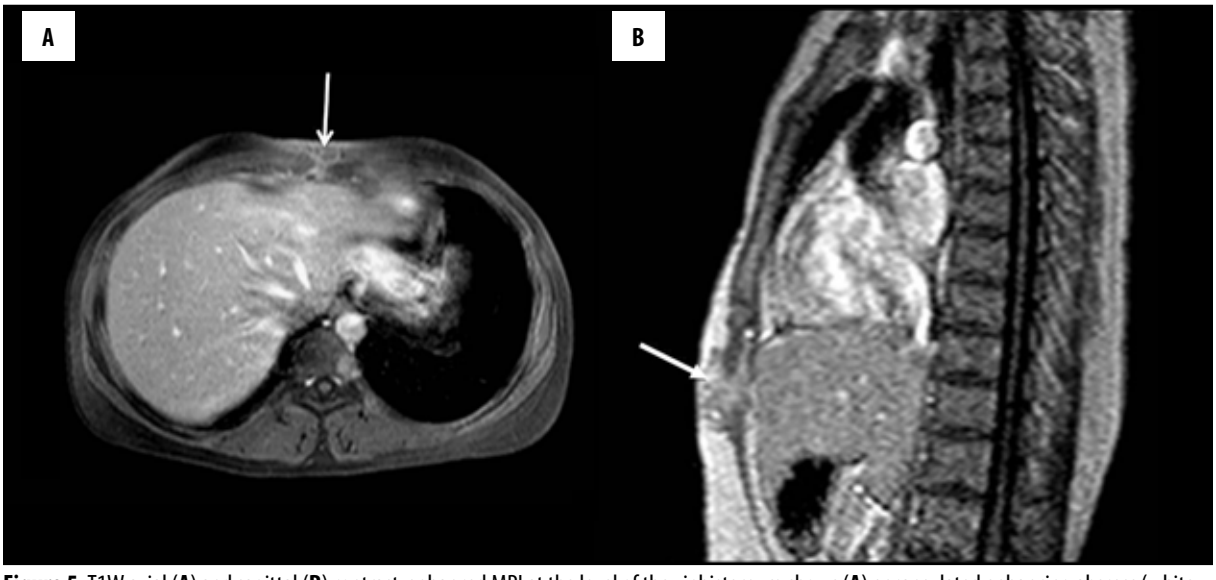

Figure 5. T1W axial (**A**) and sagittal (**B**) contrast-enhanced MRI at the level of the xiphisternum shows (**A**) encapsulated enhancing abscess (white arrow) with (**B**) surrounding soft tissue stranding (white arrow).

The drug therapy was continued for a period of 12 months. The patient was asymptomatic when last seen in the outpatient department, which was 18 months post therapy. The patient was informed that data concerning her case would be submitted for publication, and therefore a written, informed consent was obtained.

Discussion

Primary sternal osteomyelitis is strikingly rare, accounting for 0.3% of all types of osteomyelitis [3]. The sternum is traditionally considered resistant to infections and therefore, an infrequent site of osteomyelitis [4]. Osteomyelitis of the sternum is usually pyogenic in nature with the most common organisms isolated being Staphylococcus aureus and Pseudomonas aeruginosa [5]. Pyogenic osteomyelitis of the sternum usually occurs as a complication of sternotomy, chest trauma, mediastinitis or subclavian vein line insertion [6]. Tubercular involvement of the sternum is extremely rare. Sternal and sternoclavicular tuberculosis accounts for 1–2% of musculoskeletal tuberculosis, which in turn constitutes 1–2% of total cases of tuberculosis [2]. Most of the peer-reviewed literature shows tuberculosis of the sternum generally limited to the manubrium and in few cases, the body of the sternum [2–11]. A recently made PUBMED search with key words "xiphisternal tuberculosis" and "tuberculosis xiphoid" did not reveal any reports of isolated xiphisternal tuberculosis.

Tubercular sternal osteomyelitis is usually caused by reactivation of latent foci formed during hematogenous or lymphatic spread of primary tuberculosis [2,7]. Most of the published data of sternal tuberculosis have shown active or dormant foci of disease in other organs [2]. Our patient also showed evidence of lung involvement. Tubercular osteomyelitis is common in the younger age group, affecting more males than females. The clinical features of the disease are often subtle and diagnosing the condition at an early stage requires a high index of suspicion [8]. Patients with sternal tuberculosis generally present with soft tissue swelling, bone pain not responding to analgesics, bone deformity, fracture and draining sinus or fistula [3]. In contrast, patients with pyogenic osteomyelitis follow a fulminant course [4].

Imaging forms the backbone for evaluation of sternal tuberculosis. Imaging modalities used are radiography, sonography, contrast-enhanced CT and MRI. Chest radiographs may be normal in early stages. Most common findings are bone destruction, sclerosis, periosteal reaction and soft tissue swelling [2,10]. In our patient, there was lytic destruction of the xiphisternum demonstrable on sternal radiographs.

There is relative paucity of literature highlighting the use of ultrasound as a cost-effective diagnostic modality in the evaluation of a cold abscess associated with tuberculosis of the thoracic cage [2]. Ultrasound elegantly demonstrated presence of a cold abscess along with associated bone destruction in our present patient and in previous series as well [2].

CT clearly demonstrates osseous destruction and areas of sclerosis [2]. Surrounding soft tissue involvement, abscess formation and involvement of the lungs and mediastinal lymph nodes and other organ involvement is ascertained with CT, which further helps in defining the duration of anti-tubercular therapy. Old imprints of tubercular infection in the lung are frequently seen, which is hypothesized to be one of the causes of sternal tuberculosis occurring as sequelae of pulmonary tuberculosis [3]. Our patient showed abscess formation and soft tissue inflammatory changes along with erosive destruction of the xiphoid process and lung involvement.

MRI has a role in early detection of bone and joint tuberculosis especially for evaluation of soft tissue inflammation, abscess formation in osteomyelitis and synovial involvement in joint tuberculosis [10]. Its role remains unsurpassed in spinal tuberculosis for its unique ability to document intraspinal and paraspinal extension. In tubercular osteomyelitis, the T1W sequences show low signal intensity with high signal intensity on T2W sequences suggesting bone edema [10,11]. Contrast-enhanced MRI (and ultrasound), in our patient was superior to CT in demonstrating the cold abscess.

Anti-tubercular therapy is the mainstay of treatment of sternal tuberculosis as for other sites of bone and joint tuberculosis. Previous investigators have reported that patients with discharging sinus or necrotic bone benefit from debridement in addition to extended anti-tubercular therapy, which is also believed to prevent its recurrence [2–5,10–12]. However, surgery for sternal lesions may be complicated by problems of skin closure and secondary mediastinal spread, requiring reconstructive procedures (rotational flaps, vacuum assisted closure) to cover a chest wall defect [3,13]. Our patient showed good response with anti-tubercular chemotherapy and we were able to reach a favorable outcome without surgical intervention.

Conclusions

The unusual presentation of xiphisternal tuberculosis as an epigastric mass is reported in the present case. The patient was referred to radiology department for sonographic evaluation of the epigastric mass. Imaging features favored xiphisternal infection due to tubercular etiology and a definitive diagnosis of tuberculous osteomyelitis was arrived at after sonographic-guided aspiration. Our report highlights the importance of sonography, both as a diagnostic and interventional modality for guided aspiration in sternal tuberculosis. High index of suspicion and experience of radiologist may be pivotal in arriving at a correct diagnosis without delay.

Conflict of interest

None.

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