**How-to-do-it**

**Tuberculous osteomyelitis of the sternum: Successful management with debridement and vacuum assisted closure**

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Abstract

Primary Mycobacterial infection of the sternum is an exceedingly rare occurrence. We present a case of tuberculous osteomyelitis of the sternum successfully treated with surgical debridement and vacuum-assisted closure therapy.

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1. Introduction

Tuberculous osteomyelitis of the sternum is incredibly rare. We describe the utility of surgical debridement and vacuum-assisted closure therapy in the successful management of tuberculous osteomyelitis of the sternum.

The V.A.C.® Therapy system assists in wound closure by applying localised negative pressure to the surface and margins of the wound. This negative pressure therapy is applied to a special pressure-distributing wound dressing positioned in the wound cavity that is designed to remove tissue fluid.

2. Case study

A 27-year-old Sudanese male presented to a local hospital with a 4-month history of sternal discomfort and chest swelling. He lived in a hostel, had no co-morbidity and denied trauma or contact with tuberculosis. Clinical examination demonstrated a large 6 x 8 cm fluctuant pre-sternal swelling. A CT thorax demonstrated a large 6 x 8 cm fluctuant pre-sternal swelling. A CT thorax demonstrated partial destruction of the proximal sternum and erosion of the left third rib associated with a large pre-sternal fluid collection suggestive of sternal osteomyelitis (Fig. 1A). No pulmonary parenchymal foci were noted.

Mycobacterium tuberculosis was cultured from aspirated purulent material and anti-tuberculous chemotherapy commenced with referral to the regional thoracic surgery unit for consideration of surgical debridement and formal drainage. HIV and sickle cell testing proved negative.

Following initial abscess drainage and excision of sequestrum a two-stage procedure was envisaged. The first stage would involve application of a KCI vacuum pump device and the second, closure of the chest wall deficit with a rotational muscle flap.

3. Technique

The sternum was debrided under general anaesthesia. 120 ml of pus was aspirated from the abscess cavity before its incision and formal drainage via a longitudinal midline incision (Fig. 2A). Necrotic ends of the pectoralis muscles were debrided. A large unstable sequestration was encountered extending from the sternal angle to the third ribs. The sternum was divided transversely using diathermy and scissors and debrided to healthy bleeding bone edges. Haemostasis was achieved and the wound sealed with a vacuum-assisted closure device using layers of paraffin gauze (Jelonet; Smith and Nephew Medical, Hull, UK) at the bottom of the wound covering the posterior table of the sternum. A continuous negative pressure of 50 mmHg was applied (Fig. 2B).

The vacuum assisted dressing was changed periodically. Granulation tissue formed rapidly while on suction with very little exudate formation. This negated the need for an ambulatory V.A.C. device on discharge. After only 12 days, discharge was possible with a simple non-adherent dressing and combination anti-tuberculous chemotherapy. Although, we had planned a reconstructive procedure, the vacuum effect from the suction device coupled with rapid granulation of the remaining defect, rendered the procedure unnecessary.

Histological assessment of the debrided bone demonstrated extensive granulomatous inflammation, however no classical caesation or acid-fast bacilli were demonstrated. A total of 9 months anti-tuberculous chemotherapy was
administered (6 months of quadruple therapy with Rifater and ethambutol reduced to Rifinah only for a further 3 months).

Subsequent outpatient review at eight weeks confirmed a healthy discrete wound healed by second intention. A CT thorax performed 12 weeks post operatively confirmed resolution of infective and inflammatory changes with mature soft tissue coverage.

4. Discussion

Our case is an excellent example of a classical tuberculous sternal osteomyelitis.

A typical patient is young, male, free of co-morbidity and resident or recently immigrated from a country, where tuberculosis is endemic [1]. In addition the condition has been associated with intravenous drug abuse, immunodeficiency and BCG vaccination [2]. Atypical Mycobacterial infections of the sternum have long been reported to infect sternotomy wounds post cardiac surgery [1].

Mean symptom duration is nine months reflecting its indolent nature [1]. This feature helps distinguish tuberculous osteomyelitis from pyogenic osteomyelitis caused primarily by staphylococci or Gram negative organisms. The most common presentation, as in this case, is of pre-sternal swelling [1]. Constitutional upset, night sweats and weight loss are unexpectedly rare. Presentation with sternal fracture, chronically discharging sinus and even diagnostic confusion with metastatic breast carcinoma or lymphoma has been described [2,3].

Diagnosis is largely dependent on microbiological evidence gained by aspiration or excision biopsy (cultures positive for acid fast bacilli in 85% of cases) [1,4]. Tuberculin testing is a useful adjunct. Adjacent soft tissue and mediastinal changes are effectively characterised by CT scanning and used in addition to plain sternal radiographs for demonstration of osseous lesions [1]. MRI scanning has recently been proposed as an alternative and may provide a distinction between simple inflammatory soft tissue lesions with associated periosteal reaction and osteomyelitis [4]. A technetium bone scan is highly sensitive for osteomyelitis but gives far less anatomical detail [1,4].

The mainstay of treatment is early drainage and complete debridement of necrotic material with combination
anti-tuberculous chemotherapy, although a number of cases have been treated with antimicrobial agents alone [1,5]. Due to the often-extensive loss of soft tissue and bony integrity after debridement, rotational tissue flaps can be employed to cover the chest wall defect. A recent report details a single stage procedure, where the sternum was debrided and the defect filled with a tissue flap during the same procedure [6].

Vacuum-assisted closure therapy has been employed as a safe and reproducible therapeutic option in patients with postoperative deep sternal wound infection following cardiac surgery [7,8].

Our experience suggests that vacuum assisted therapy may have an extended role in wound management post debridement of tuberculous sternal osteomyelitis. The constant negative pressure helps prevent chronic sinus formation, reduces wound size, promotes granulation and potentially negates the need for a secondary reconstructive procedure.

References