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Sternoclavicular Osteomyelitis in an Immunosuppressed Patient: A Case Report and Review of the Literature

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Patient: Male, 62
Final Diagnosis: Sternoclavicular osteomyelitis
Symptoms: —
Medication: —
Clinical Procedure: Debridement
Specialty: Infectious Diseases

Objective: Rare disease

Background: Sternoclavicular osteomyelitis is a rare disease, with less than 250 cases identified in the past 50 years. We present a rare case of sternoclavicular osteomyelitis in an immunosuppressed patient that developed from a conservatively treated dislocation.

Case Report: A 62-year-old white man with a history of metastatic renal cell carcinoma presented to the emergency department (ED) with a dislocated left sternoclavicular joint. He was managed conservatively and subsequently discharged. However, over subsequent days he began to experience pain, fever, chills, and night sweats. He presented to the ED again and imaging revealed osteomyelitis. In the operating room, the wound was aggressively debrided and a wound vac (vacuum-assisted closure) was placed. He was diagnosed with sternoclavicular osteomyelitis and placed on a 6-week course of intravenous Nafcillin.

Conclusions: Chemotherapy patients who sustain joint trauma normally associated with a low risk of infection should be monitored thoroughly, and the option to discontinue immunosuppressive therapy should be considered if signs of infection develop.

MeSH Keywords: Antineoplastic Agents • Osteomyelitis • Sternoclavicular Joint

Full-text PDF: http://www.amjcaserep.com/abstract/index/idArt/895803

Background

Sternoclavicular osteomyelitis is a rare disease, with less than 250 cases identified in the past 50 years [1]. Conditions that suppress the immune system can increase the risk of developing this disease. These include chemotherapy, alcoholism, diabetes mellitus, HIV/AIDS, and long-term use of steroids.

We present a rare case of sternoclavicular osteomyelitis in an immunosuppressed patient that developed from a conservatively treated dislocation. This report demonstrates the possible ramifications of continuing immunosuppressive therapy in patients who sustain joint trauma, even if the risk of infection is minor.

Case Report

A 62-year-old white man presented to his primary care physician with a complaint of left chest discomfort, localized superolaterally to the manubrium. The onset was a few hours earlier, while he was moving heavy equipment, which caused him to feel a "pop" over the left chest. The patient denied previous episodes or any exacerbating or alleviating factors. Otherwise, review of systems was negative.

The patient had a history of hypertension, hyperlipidemia, and gastritis. Of note, he was diagnosed with right-sided renal cell carcinoma in 1994, which was surgically managed by nephrectomy. In 2009 he was found to have metastasis to the mediastinum, for which he was subsequently placed on chemotherapy consisting of Pazopanib (800 mg). The patient denied alcohol, tobacco, and intravenous drug use. Family history consisted of leukemia and lymphoma. Based on these findings he was referred to the emergency department (ED).

At the ED, radiography revealed dislocation of the left sternoclavicular joint (SCJ). An orthopedic specialist suggested conservative management consisting of pain control and avoiding bearing weight in the affected limb. The patient was discharged and instructed to follow up at the clinic.

However, over the subsequent days the patient began to experience dull pain that was worsening at the same location. He described symptoms of fever, chills, and night sweats, which caused him to present to the ED again.

On examination, the temperature was 38.6°C, the blood pressure 111/60 mm Hg, and the pulse 140 beats per minute. The patient appeared pale, diaphoretic, and cachectic. There was leukocytosis and electrolytes were within normal limits. Other laboratory test results were negative.

Transverse helical computed tomography (CT) without contrast of the left shoulder revealed inflammatory changes anterior to the SCJ, with articular erosions. Within the subcutaneous tissue, anterior to the joint there was a soft tissue mass measuring 7×2.5 cm, likely an abscess. A bone scan revealed increased uptake of the SCJ space. Blood cultures grew *S. aureus*. Based on this, the patient was diagnosed with sternoclavicular osteomyelitis and bacteremia.

The patient was emergently taken to the operating room. The SCJ underwent aggressive debridement, the clavicular head was excised and a wound vac was placed. Under suspicion of malignant infiltration, histopathological examination was obtained and did not show the presence of malignant cells. The patient was placed on intravenous Nafcillin for 6 weeks. Ultimately, he did well and was able to return to work and normal daily activities.

Discussion

Septic arthritis and osteomyelitis are 2 distinct entities. Septic arthritis involves direct invasion of the joint space, most commonly by bacteria [2]. Osteomyelitis involves an infection of the bone that can occur due to hematogenous seeding or direct extension. In this case, findings on imaging suggested osteomyelitis. A 7×2.5 cm abscess was present anterior to the SCJ, which is frequently seen in SCJ osteomyelitis [1]. Additionally, a bone scan revealed increased uptake, consistent with osteomyelitis.

The literature was reviewed in detail and, to the best of our knowledge, this is the first case of sternoclavicular osteomyelitis in a patient taking Pazopanib. We reviewed 7 cases [3–8] of sternoclavicular osteomyelitis specific to patients that were on immunosuppressive therapy (anti-cancer therapy and steroids) (Table 1). In our patient, the SCJ was dislocated traumatically as previously discussed. The standard of care in open wounds is discontinuation of immunosuppressive therapy, due to high risk of infection. Due to the low risk of infection present with minor trauma and dislocation, the drug was continued in this patient.

In the cases reviewed, osteomyelitis occurred without trauma specifically mentioned (Table 1). This is in comparison to our patient in which trauma occurred. It has been theorized that if trauma to a joint space occurs, the reactive vascular response increases the chance of hematogenous seeding to the area [6]. Therefore, if Pazopanib was discontinued early, osteomyelitis may have been prevented in our patient.

Pazopanib is a vascular endothelial growth factor (VEGF) and platelet-derived growth factor inhibitor (via inhibition of tyrosine kinase) indicated for advanced renal cell carcinoma and soft tissue sarcoma [9]. Major adverse effects of this medication

Table 1. Sternoclavicular osteomyelitis of patients on immunosuppressive therapy.

Author	Year	Microbiology	Immunosuppresive therapy	Malignancy	Trauma – microtrauma	Fever	Diabetes mellitus	IV drug abuse	Treatment
Spencer JD [3]	1986	*P. aeruginosa*	Intra-articular steroids	None	None	Low grade	No	No	Gentamicin, Azlocillin
	1986	*S. aureus*	Prednisolone	None	None	100.4°F	No	No	Unspecified
Ochiai N, et al. [4]	2003	*Scedosporium apiospermum*	Cytarabine, Idarubicine	AML	None	High grade	No	No	Itraconazole, Amphotericin B
Vu TT, et al. [5]	2009	*S. pyogenes*	Carboplatin, Paclitaxel	SCC, NHL	None	Moderate	Yes	No	Meropenem
Tickell KD, et al. [6]	2012	*S. enteritidis*	Prednisolone, Azathioprine	None	None	None	–	No	Amoxicillin, Ciprofloxacin
Gehani N, et al. [7]	2013	–	Cisplatin, 5-Flourouracil	SCC	None	None	Yes	No	Unspecified
Atexiou E, et al. [8]	2015	*S. aureus*	Unspecified (anti-cancer treatment)	Prostate Cancer	None	101°F	No	No	Vancomycin

AML – acute myelogenous leukemia; SCC – squamous cell carcinoma; NHL – non-Hodgkins lymphoma.

include hepatotoxicity, QT interval prolongation, impairment of wound healing, and increased risk of infection; however, the effect of tyrosine kinase inhibitor (TKI) on wound healing is unclear [9–11]. We reviewed the literature in detail and did not find a clinical trial assessing the effect of TKI on wound healing. Therefore, warnings and adverse effects listed for this drug are similar to other TKIs, including immunosuppression. Infections in uncommon locations can occur, so it is advised to discontinue the drug if the risk of infection is high. It should be stopped 1 week prior to any surgery, and stopped in any patient with a healing wound [9,12].

Common infections associated with chemotherapy-induced immunosuppression include viral (HSV, CMV, EBV), bacterial (*S. aureus*, gram negative organisms), and fungal infections (*Candida, Aspergillus*) [13]. The most common cause of sternoclavicular osteomyelitis is *S. aureus*; however, when this is coupled with immunosuppression, the causes are diverse. In the literature the causes described include *S. aureus, P. aeruginosa, N. gonorrhea, S. pyogenes, S. enteritidis, Scedosporium apiospermum,* and *C. albicans* (Table 1).

Although no established consensus is evident, multiple theories exist as to the pathophysiology of introduction of bacteria into bone. There are always situations in which bacteria are introduced into the blood transiently, known as transient bacteremia [14]. Common examples include brushing teeth and flossing [14]. Transient bacteremia has also been linked to trauma [15,16]. Immunocompetent individuals quickly clear transient bacteremia. However, in immunosuppressed patients with impaired healing, osteomyelitis can occur more readily [14].

Due to the known immunosuppressive effect of chemotherapy agents, it is becoming increasingly important to monitor immunological function during therapy [13]. Humoral immune function can be assessed through quantitation of serum immunoglobulins (serum electrophoresis, immunoelectrophoresis) and specific antibodies (agglutination, ELISA), and testing the immune response to mitogens [13]. Cellular immune function can be assessed through quantitation and response to mitogens, and Dihydrorhodamine flow cytometry testing can be used to assess neutrophil function [13].

Immunosuppressed patients who sustain joint trauma can be assessed by these immunologic parameters. Normal values will assure the clinician that the patient is able to mount an adequate immunological response. Additionally, if signs of infection develop (e.g., fever or leukocytosis), immunosuppressive therapy must be discontinued.

Conclusions

This case demonstrates the effect of chemotherapy on the immune system and how rare infections can develop as a result. It is important to consider the ramifications when continuing immunosuppressive agents in patients who sustain joint trauma, even when the risk of infection is low. Immunosuppressed patients sustaining joint trauma should be monitored thoroughly and the option to discontinue immunosuppressive therapy should be considered if signs of infection develop.

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