ULTRASOUND-GUIDED DIAGNOSIS OF OCCULT MANDIBULAR OSTEOMYELITIS

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Abstract—Background: Skin and soft-tissue infections (SSTIs) are common disease presentations to the emergency department (ED), with the majority of the infections attributed to community-acquired methicillin-resistant Staphylococcus aureus. Rapid and accurate identification of potentially serious SSTIs is critical. Clinician-performed ultrasonography (CPUS) is increasingly common in the ED, and assists in rapid and accurate identification of a variety of disease processes. Case Report: A 21-year-old female presented to the ED with chin swelling and “boils.” Although her visual examination was benign, CPUS of her facial swelling quickly established a more concerning disease process, which was eventually confirmed by aspiration and bone biopsy to be mandibular osteomyelitis. The causative organism, Serratia odorifera, is rarely associated with infections, and we are aware of no previously reported cases of osteomyelitis due to this species.

Why Should an Emergency Physician Be Aware of This?: In this case of mandibular osteomyelitis, CPUS rapidly and accurately identified abnormal bony cortex of the mandible and an associated fluid collection. CPUS of an otherwise benign presentation of a facial infection led to a maxillofacial computed tomography scan, aspiration and biopsy, and then elective debridement of the bone infection. Emergency physicians should be aware of the utility of CPUS and the need to carefully investigate SSTIs presenting to the ED. © 2014 Elsevier Inc.

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INTRODUCTION

Patients with skin and soft tissue infections (SSTIs) commonly present to the emergency department (ED), with the majority of the infections attributed to community-acquired methicillin-resistant Staphylococcus aureus (CA-MRSA) (1). In the United States, from 1997 to 2005, annual outpatient visits for complaints related to cellulitis or abscess increased from 4.6 million to 9.6 million (2). We present a case of an otherwise benign ED presentation for a facial skin infection in a healthy 21-year-old female to illustrate the value of clinician-performed ultrasonography (CPUS) in the eventual diagnosis of mandibular osteomyelitis. The causative organism, Serratia odorifera, is rarely associated with infections, and our review found no previous cases of osteomyelitis due to this species.

CASE REPORT

A 21-year-old female with no significant medical history presented to the ED with a history of chin swelling and
“boils.” One month before ED presentation, she was treated by her primary physician with ampicillin/sulbactam, and she described clinical improvement on the antibiotics, although with incomplete resolution of her chin infection. Her symptoms worsened 1 week before ED presentation. In addition to “pimples” and painful swelling to the chin, she complained of lower-teeth looseness. She denied fevers, chills, neck pain, difficulty swallowing, or a history of SSTIs.

On physical examination, the patient had normal vital signs, including a temperature of 37.0°C. Examination of the chin showed several pustular lesions with underlying erythema and mildly tender swelling (Figure 1). Lower incisors were slightly loose but nontender. The oropharynx was nonerythematous. The neck was nontender and without lymphadenopathy. The rest of the physical examination was normal.

A bedside ultrasound was performed to assess for an abscess or cellulitis (Figure 2, Video 1). The ultrasound revealed a fluid collection adjacent to the mandible, with an irregular cortical surface suggestive of osteomyelitis. Based on the ultrasound, maxillofacial computed tomography (CT) was performed (Figure 3). The CT revealed osseous destruction of the mandibular symphysis, consistent with osteomyelitis.

The oral/maxillofacial service (OMFS) then evaluated the patient in the ED and performed a bedside aspiration and incisional biopsy of cortical bone. The patient was discharged from the ED on clindamycin. At the time of her follow-up visit with OMFS, a definitive diagnosis of osteomyelitis was made based on the final pathology from the biopsy, and the culture demonstrated heavy growth of *S. odorifera*, sensitive to trimethoprim/sulfa-methoxazole. She then underwent elective debridement.
of alveolar bone under local anesthetic and was placed on trimethoprim/sulfamethoxazole for 6 weeks. Approximately 5 months later, follow-up cone beam CT (Figure 4) demonstrated bone fill and consolidation of the cortical plates, with resolution of the infection. The patient remained asymptomatic at that point, with no further skin lesions.

**DISCUSSION**

*Serratia* is a genus of Gram-negative, anaerobic bacteria of the Enterobacteriaceae family (3). In the hospital, *Serratia* species preferentially colonize the respiratory and urinary tracts, and account for up to 2% of nosocomial infections of the bloodstream (3). The most common species in the genus is *Serratia marcescens*, which is known to cause various SSTIs in adult patients. Osteomyelitis due to *S. marcescens* has been described as a result of intravenous drug use as well as surgery, trauma, or intra-articular injections (3). *S. odorifera*, on the other hand, is rarely associated with infections. There have been sporadic case reports of nosocomial infection secondary to this species, but our review found no cases of osteomyelitis due to *S. odorifera* described in the literature (4–6).

Upon presentation, the facial infection initially appeared to be consistent with a typical CA-MRSA folliculitis and cellulitis. A bedside ultrasound revealed underlying bony abnormalities and a fluid collection, which led to additional imaging and eventual tissue diagnosis. CPUS is increasingly used in the ED to diagnose acute life-threatening conditions, guide invasive procedures, and treat emergency medical conditions (7).

With regard to SSTIs, Squire et al. reported that ED bedside ultrasound had a higher sensitivity (98%), specificity (88%), positive predictive value (93%), and negative predictive value (97%) as compared to clinical examination alone (86%, 70%, 81%, and 77%, respectively) in detecting superficial abscesses (8). Tayal et al. reported that CPUS of patients with SSTI led to changes in management in approximately one half of the cases (9). In the study, ultrasound of presumed cellulitis commonly revealed fluid collections requiring drainage. Conversely, patients judged clinically to have abscesses did not undergo drainage when there was a lack of sonographic abscess collection.

Although magnetic resonance imaging and CT both have a higher sensitivity in the identification of osteomyelitis, several ultrasound findings are consistent with osteomyelitis. Deep soft-tissue swelling, periosteal elevation, subperiosteal fluid collections, cortical erosions, increased power Doppler signal of the involved perios- teum, and associated joint effusions are all potential sonographic findings (10,11). In this case, the perimandibular fluid collection and cortical irregularity were suspicious for a more involved infectious process, and additional imaging was obtained.

This was an unusual case of osteomyelitis due to *S. odorifera*, presenting as a seemingly benign facial cutaneous infection. CPUS rapidly identified a concerning underlying infection. CT, followed by aspiration and biopsy, provided a definitive diagnosis. ED providers are strongly encouraged to carefully investigate all SSTIs, particularly facial infections with unusual dental complaints. CPUS can play an essential role in the initial evaluation of SSTIs in the ED.
WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?

In this case of mandibular osteomyelitis, CPUS rapidly and accurately identified abnormal bony cortex of the mandible and an associated fluid collection. CPUS of an otherwise benign presentation of a facial infection led to a maxillofacial CT scan, aspiration, and biopsy, and then elective debridement of the bone infection. Emergency physicians should be aware of the utility of CPUS and the need to carefully investigate SSTIs presenting to the ED.

REFERENCES


SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at http://dx.doi.org/10.1016/j.jemermed.2014.06.029.

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