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# Clinical Communications: Adults

## BILATERAL MASTOIDITIS FROM RED TIDE EXPOSURE

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☐ **Abstract—Background: Bilateral mastoiditis in adults has previously been reported only in association with diabetes mellitus or immunocompromised patients. Objectives: To describe a case of bilateral mastoiditis in a healthy adult and to investigate the etiology. Case Report: A 53-year-old woman presented to the Emergency Department with bilateral otitis externa and mastoiditis after scuba diving during a harmful algal bloom, commonly known as a "red tide." The levels of coliform bacteria recorded at the time and location of her dive exceeded health regulatory limits and correlate with her atypical culture results. Conclusion: Elevated bacterial counts that result from harmful algal blooms may account for this rare infection.** © **2012 Elsevier Inc.**

☐ **Keywords—bilateral mastoiditis; bilateral otitis externa; harmful algal bloom; red tide; scuba diving**

### INTRODUCTION

Acute mastoiditis is an infection of the mastoid air cells of the temporal bone (1). It usually presents in children as a complication of acute otitis media (AOM). In adults, bilateral mastoiditis has been cited only in the setting of diabetes mellitus or immunocompromised patients (2–5). Harmful algal blooms are rapid proliferations of single-celled algae that adversely affect other organisms. They dramatically alter the water composition and concentration of organic material, which increases bacterial growth (6). The pathogens identified in this case were found to be elevated during the time and place of this patient's exposure, further supporting the correlation between the infection and the harmful algal bloom.

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### CASE REPORT

A 53-year-old woman presented to the Emergency Department (ED) for 2 days of gradually worsening bilateral ear pain and drainage. Four days prior, on September 20, 2009, she was scuba diving at Lover's Point Beach in Monterey County, California during a "red tide." She denied any pain or hearing loss before, during, or shortly after the dive. She was otherwise healthy, with no history of ear problems. The vital signs were notable only for a pulse rate of 105 beats/min. The physical examination revealed swelling and drainage of the right ear canal and minimal drainage in the left ear canal. The tympanic membranes (TMs) appeared normal. Both ears were tender to palpation of the tragus. A Pope Oto-wick (Medtronic Xomed, Inc, Jacksonville, FL) was placed in the right ear. She was diagnosed with bilateral otitis externa and discharged with neomycin/polymyxin/hydrocortisone otic drops. The patient returned the following day for worsening symptoms. Her pulse rate was 114 beats/min. On examination,

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she had erythema, swelling, and discharge in both ear canals that obscured visualization of the TMs. The erythema and swelling extended to both pinnae, which were diffusely tender. The Pope Oto-wick was absent. She was started on trimethoprim-sulfamethaxazole, cephalexin, and hydrocodone-acetaminophen orally and sent directly to the Otolaryngology clinic for further evaluation. The patient left the clinic before being seen. She returned to the ED again the following day for progression of the infection to her cheeks and behind the ears bilaterally. She denied fever, headache, and any focal numbness or weakness. She had been taking all her prescribed medications.

Vital signs in the ED were normal except for a pulse rate of 122 beats/min. The patient was alert and fully oriented, but seemed to be in severe pain. There was significant swelling, erythema, and tenderness of both pinnae extending 2 cm around both ears, including the mastoid process. Both ear canals were erythematous and so edematous that they were occluded at the opening on the left, and in the proximal canal on the right. Discharge was noted at the opening of each canal (Figure 1). The TMs could not be visualized. There was no conjunctival erythema or proptosis. Her cranial nerves were intact. The neck had tender lymphadenopathy but was otherwise supple. The remainder of the physical examination was unremarkable.

Laboratory studies revealed a leukocytosis of 23,000/$\mu$L, with 83% neutrophils and random blood glucose of 166 mg/dL. A non-contrast computed tomography scan of the head showed opacification of the mastoid air cells and middle ear canals bilaterally, consistent with otomastoiditis (Figure 2). There was no bony destruction or subdural collections.

In the ED, the patient was treated with normal saline, ceftriaxone, dexamethasone, and morphine sulfate. Otolaryngology was consulted; they suctioned and partially debrided the ear canals, placed a Pope Oto-wick in the right ear, and saturated both ears with ofloxacin otic drops. A wick could not be placed in the left canal due to its complete occlusion.

The patient was admitted for intravenous antibiotics and pain control. Infectious Disease was consulted, and her drug regimen was broadened to piperacillin-tazobactam and vancomycin. Dexamethasone and ofloxacin otic drops were continued. By hospital day 3, her tachycardia resolved, and the ear canals were improving. Her ear cultures grew heavy *Enterococcus* sensitive to ampicillin, gentamicin, and vancomycin, and *Pseudomonas aeruginosa* sensitive to typical anti-pseudomonal agents. There was no growth on the blood cultures. She was discharged on hospital day 5 with a 7-day course of intravenous piperacillin-tazobactam via a peripherally inserted central catheter, oral ciprofloxacin, and ofloxacin otic drops. The patient recovered from the infection without hearing loss, but had residual ear pain 6 months later.

**Figure 1. Right ear with diffuse swelling and erythema after a Pope Oto-wick was placed.**

## DISCUSSION

The normal external auditory canal flora includes *Staphylococcus albus* and *epidermidis*, *Corynebacterium* species, and small quantities of *Staphylococcus aureus* and *Streptococcus viridians*. Prolonged submersion from

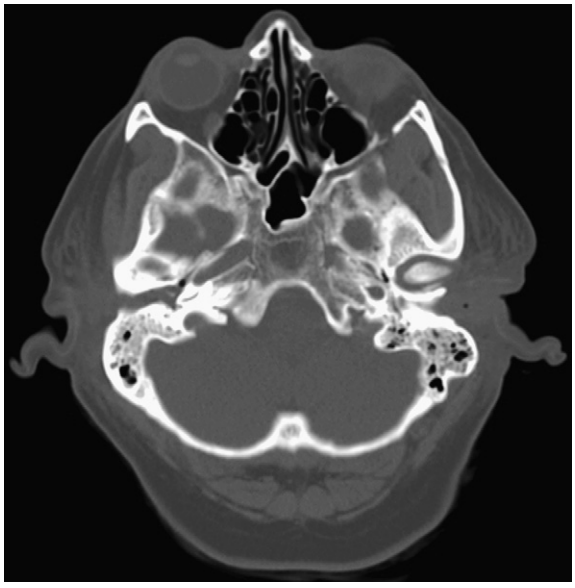

**Figure 2. Computed tomography scan showing opacification of the bilateral mastoid air cells.**