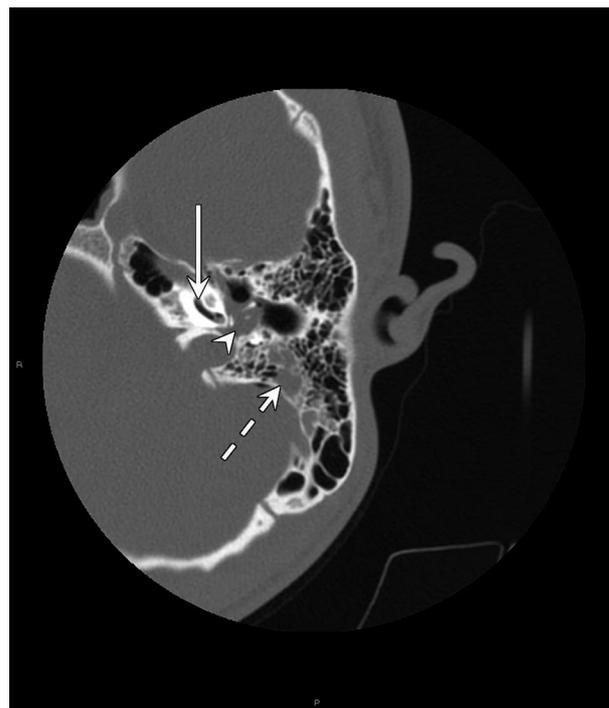


**Figure 1.** Axial view of the bilateral temporal bones at the level of the semicircular canals, demonstrating the fracture line traversing the left otic capsule (solid arrow), which is the dense osseous portion of the bone that surrounds the inner ear organs, as well as air within the vestibule (dashed arrow).



**Figure 2.** Axial view of the left temporal bone, demonstrating air within the basal turn of the cochlea (solid arrow), left mastoid air cell effusion (dashed arrow), and fluid within the middle ear (arrowhead) surrounding the ossicles. No fracture or dislocation of the ossicular chain was observed.

[Ann Emerg Med. 2019;74:e15-e16.]

A 16-year-old adolescent presented to the emergency department after falling 6 feet from a stepladder, striking his head on concrete. He experienced loss of consciousness and one episode of emesis. He subsequently developed vertigo, left-sided hearing loss, and tinnitus. Vital signs were within normal limits. Examination result was unremarkable except for a small left-sided hemotympanum. Computed tomography (CT) of the temporal bone was obtained (Figures 1 and 2).

*For the diagnosis and teaching points, see page e16.  
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## IMAGES IN EMERGENCY MEDICINE

*(continued from p. e15)***DIAGNOSIS:**

*Pneumolabyrinth.* Pneumolabyrinth is defined as air within the cochlea, vestibule, or semicircular canals.<sup>1,2</sup> The presence of pneumolabyrinth implicates a perilymphatic fistula, a communication between the air-filled middle ear spaces and the inner ear. Causes of pneumolabyrinth include temporal bone or ossicle fracture, barotrauma, or cochleostomy as a complication of surgery.<sup>2-4</sup> Clinical manifestations of pneumolabyrinth and perilymphatic fistula include hearing loss, tinnitus, and vestibular symptoms.<sup>1-5</sup> CT of the temporal bones is the modality of choice in evaluating for pneumolabyrinth. The primary concern is irreversible hearing loss, which has been observed in greater than 50% of cases.<sup>2,5</sup>

Because of the rarity of pneumolabyrinth and perilymphatic fistula, consensus on treatment guidelines has yet to be established. Conservative management consists of corticosteroids, antibiotic therapy, bed rest, and observation with follow-up imaging to confirm resolution. Surgical treatment entails exploratory tympanostomy with repair of the perilymphatic fistula.<sup>2-4</sup> The patient was admitted to the pediatric ICU for observation and bed rest, and was discharged the following day, receiving a course of oral steroids. At the follow-up visit 3 months later, the patient reported resolution of his vertigo but no improvement in his left-sided hearing loss and tinnitus.

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