Pneumocephalus causing pulsatile tinnitus

Case illustration

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A 56-year-old woman had a ruptured arteriovenous malformation (AVM) in the right temporal lobe, which was totally removed in March 1993. During surgery, the right mastoid air cells were inadvertently opened and closed with bone wax. In September 1997, just after she had been treated for a cavity in a right upper tooth, she noticed pulsatile tinnitus. In August 1998, microscopic otological examination revealed pulsatile movement of the tympanic membrane. This movement was synchronous with the patient’s heartbeat, as recorded on an electrocardiogram. Computerized tomography and magnetic resonance imaging revealed epidural pneumocephalus in the right middle fossa and no residual AVM. Later that month, a repeated craniotomy revealed air leakage around the bone wax. The fistula was closed using a muscle fragment. Postoperatively, the patient’s pulsatile tinnitus ceased and her pneumocephalus disappeared.

Pulsatile tinnitus can have a vascular or a nonvascular cause.1,2,4 Among nonvascular causes of pulsatile tinnitus, palatal myoclonus has been reported to induce pulsatile movement of the tympanic membrane that is not synchronous with the heartbeat.3,4 To our knowledge, the present report is the first to document pulsatile tinnitus due to pneumocephalus. It is speculated that dislodgment of the bone wax created a communication between the epidural space of the middle fossa and the middle ear cavity. This caused the dura mater and tympanic membrane to function like drumheads, which generated a rolling sound (Fig. 1).

References