CASE REPORT

Extradural Pneumatocele: An Unusual Cause of Pulsatile Tinnitus

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ABSTRACT—Our objective is to heighten the awareness of the clinician to the unusual features of iatrogenic, pulsatile, yet nonvascular tinnitus. We present the case of an elderly white male with pulsatile tinnitus immediately following microvascular trigeminal decompression. Computed tomography revealed an extradural air collection and mastoidal fistula. The patient noticed resolution of tinnitus with digital pressure over the mastoidal operative site. Treatment included exposure of the aerocele with resection of the lateral wall, fistula obliteration with wax, and abdominal fat graft. The patient noted complete resolution of his tinnitus in the recovery room. The etiology of pulsatile tinnitus can be suspected based on history and can be confirmed with corroborative imaging techniques.

The retrosigmoidal approach to the trigeminal ganglion is a well-established technique, allowing vascular loop separation in the treatment of tic douloureux. We present a case of a 68-year-old white male who noted the onset of roaring pulsatile tinnitus following a vascular loop separation procedure. His symptoms began in the recovery room following a sneezing episode. He noted that the symptoms remitted with digital compression over the bony drilling site. Computed tomography revealed an air collection connected via a small fenestration to the mastoid air cell system. At surgery, the air containing sac was noted to be extradural. Gelfoam and wax obliteration of the mastoidal fenestration followed by fat obliteration of the sac lumen resulted in the immediate resolution of symptoms in the recovery room.

CASE REPORT

Mr. S is a 68-year-old white male with a history of tic douloureux diagnosed in 1991. The neurology work-up at that time revealed no specific neurologic losses, and an MRI showed no other intracranial anomalies, save for an old watershed infarct in the left middle cerebral artery distribution. His past medical history was

significant for a myocardial infarction followed by revascularization surgery in 1986. His facial pain was triggered by pressure over a small area of approximately two square centimeters located above the left lip in the region of the philtrum. The character of the pain was described as "shooting into the eye . . . (feeling) like an ice pick." Tegretol then Baclofen were sequentially administered but the patient maintained the same pain with only slight touch, such as washing his face.

In June of 1994 he underwent an uncomplicated Janetta procedure. Intraoperatively, a vascular loop was identified and separated from the underlying ganglion with a 4 × 4 mm piece of dacron. During the craniectomy, a small mastoidal air cell was opened but quickly waxed closed. Postoperatively the patient had good relief from his facial pain. In the recovery room, he "felt his ear stop up" and proceeded to blow his nose vigorously. He heard a "pop" and immediately experienced the roaring pulsatile tinnitus. His ear also began to ooze a small amount of blood, which quickly resolved without intervention. He was discharged with improved facial pain but bothersome pulsatile tinnitus.

One month following the procedure he began to have pain provoked by the stimulation of his previously described trigger point. His pulsatile tinnitus was still a

nuisance, and he returned to the neurosurgical service with these complaints.

Because the patient described resolution of the pulsatile tinnitus with pressure over the craniectomy site, a CT was obtained of this site. His ear exam at this time was normal with no evidence of fluid in the middle ear to suggest a spinal fluid leakage. The CT revealed a 3 × 3 cm aerocele with fusiform apices, the anterior component of which was based on the most posterior mastoidal air cell. Placement of the patient's finger over the site resulted in remission of the tinnitus, and the CT showed occlusion of the mastoidal fenestration with the finger in place as well (Fig. 1). A preoperative audiogram confirmed the absence of fluid in the middle ear.

Following a second trial of Tegretol, with markedly better results in pain control, consent was obtained for the exploration of the previous surgical site and obliteration of the aerocele.

Access to aerocele was obtained via the previous surgical incision. Minimal dissection revealed a transparent, fibrous tissue surface with a blue cast, suggesting underlying air. Sharp incision of this layer allowed entrance into the aerocele cavity. The neurilon dural closure suture was evident in the medial wall of the aerocele. The lateral wall was excised and submitted for permanent pathology, though no obvious mucosal tissue or mucus was evident within the aerocele. The mastoidal fenestration was identified, and old wax was removed from the entrance to allow identification of the opened air cell. Following the placement of a small amount of gelfoam, fresh wax was applied and a small abdominal fat graft was used to obliterate dead space. No mucosal tissue was noted to have grown over the inner surface of the aerocele. A two layer closure completed the case. The patient awoke uneventfully and noted resolution of the pulsatile tinnitus in the recovery room. He was discharged on Tegretol on postoperative day three.

Figure 1. Axial computed tomography shows the aerocele occluded by digital compression. The bony fenestration is seen posteriorly in the mastoid sinus.

DISCUSSION

Intracranial air is most commonly seen following trauma, infection, or neoplasm.¹ Iatrogenic causes are also a very common source of intracranial air.² Air can also localize to the intracerebral, subdural, epidural, or intravascular spaces as well as within the dural sinuses.³ Extradural air is generally the result of an infectious, neoplastic, or barotraumatic/ballistic penetration of the mastoid air cell system. Our case is unusual in that the symptoms completely subsided with digital compression of the fenestration site, and the efficacy of this maneuver is corroborated by the CT scan. We present the case as an unusual cause of pulsatile tinnitus.

CT FINDINGS

The contrasted CT scan revealed a fusiform, air containing site in the anterolateral epidural space underlying the occipital bone. The aerocele was contiguous with a small fenestration in the posterior mastoid apex. There was no evidence of CSF collection in the mastoid or middle ear.

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