Symptom: Intermittent Ear Drainage

By Hamid R. Djalilian, MD

A 38-year-old patient comes into the office complaining of intermittent drainage from the front of his ear. He states that he has had drainage from both the front and the back of his ear since childhood.

The patient also has experienced intermittent swelling of the area in front of and behind his ear, which has required treatment with antibiotics. On two occasions, he had abscesses that needed to be drained. On one occasion, he had an infection and was unable to see a physician in time, so he used a surgical blade and drained the abscess on his own in a mirror!

The patient states that he "milks" white material from the opening once a day and the material has a "cheesy smell." An image of his ear is shown on the right.

This image of the patient's auricle shows an opening inferior to the tragus (arrow).

What is your diagnosis? See page 6 and find out if you're right!

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Dr. Djalilian is the director of neurotology and skull base surgery and an associate professor of otolaryngology and biomedical engineering at the University of California, Irvine.

Diagnosis: Branchial Cleft Fistula

By Hamid R. Djalilian, MD

During embryogenesis, structures of the head and neck are formed from a series of tissues called branchial or pharyngeal arches. Derivatives of these arches give rise to the auricle, external auditory canal, middle ear ossicles (except for the stapes footplate), and other structures.

Six surface hillocks together form the auricle. The first three auricular hillocks are from pharyngeal arch 1 and create the tragus, helix, and cymba concha. The second arch derivatives form the fourth through sixth hillocks, which create the concha, antihelix, and antitragus. Different errors in the fusion of these hillocks will lead to a malformed ear (microtia), malrotated ear, low-set ear, periauricular tags (extra tissue), or preauricular pits (burying of tissue under the skin surface).

Preauricular pits are found in many individuals but are more common in African-Americans and Asians. These pits are openings to a channel leading to a larger pocket a few centimeters away. The tissues that form the ear are covered by skin. When this tissue is buried under the surface during embryogenesis, it will still function in a similar fashion to normal skin.

For example, like the skin outside the body, buried skin is constantly in a state of turnover, generating new skin and shedding the dead skin layer (keratin layer). On the outer surface of the body, the keratin layer is washed away. When skin is buried, though, the dead skin accumulates. It generally will find its way through the tract to the preauricular pit, from which it will exit, appearing white. Occasionally, virulent bacteria can enter these areas and grow uncontrollably in the keratin, creating an infection that requires antibiotics or drainage.

In our patient with a branchial cleft fistula, this dead skin layer had become colonized by bacteria and fungi that normally live on the skin, creating the "cheesy" odor. Preauricular pits are distinct from branchial cleft fistulas. Branchial arches

The patient would intermittently develop edema and erythema in the postauricular area where portions of the cyst were located (arrow).

give rise to the muscles, bones, and neurovascular structures of the head and neck. Branchial clefts are the spaces between these arches. Errors in the formation of the branchial clefts can lead to branchial cleft fistulas, which connect buried tissue with the outside surface. The first branchial cleft fistula usually opens around the ear, almost always below the level of the tragus, while preauricular pits open anteriorly and above the tragus.

On this normal ear, the arrow points to the usual location of a preauricular pit opening of a cyst/fistula tract that is not involved with the facial nerve (above the tragus).
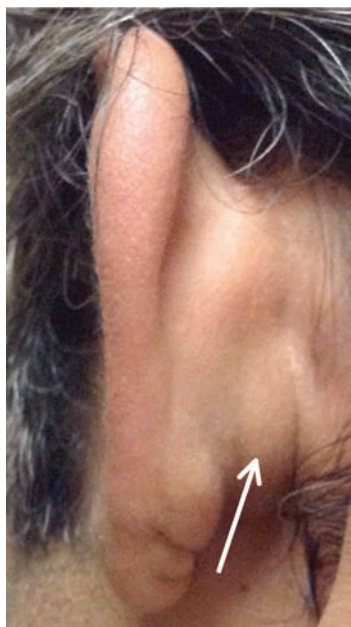
First branchial anomalies are uncommon and, when they occur, are usually closely related to the ear canal. Generally, a type I anomaly is a duplication of the external auditory canal, running anterior or inferior to the ear canal, while a type II anomaly presents as a mass at the angle of the mandible and ends in the conchal bowl, anterior to the tragus, or in the external canal. The type II lesions are more common and are associated with the parotid gland.

The facial nerve, which travels through the parotid gland, can also be intimately involved with the branches of the first branchial anomaly. While the opening of the first branchial cleft fistula is generally inferior to the tragus anteriorly, it can also be located on the floor of the external auditory canal. Some of these lesions can be managed conservatively with daily "milking" of the fistula tract to clear the accumulated keratin layer. In some patients, these branchial cleft fistulas are recurrently infected and need to be removed. Given the possibility of an intimate relationship with the facial nerve, the removal of these lesions has to be done by experienced head and neck surgeons.

Computed tomography (CT) imaging is necessary to outline the extent of the fistulous tract. The surgical excision is performed by first outlining the facial nerve as part of a superficial parotidectomy. Facial nerve monitoring is performed to assist in locating and preserving the nerve during dissection. The fistula tract is generally filled with a blue color to allow its tracing through other tissues. In experienced hands, the incidence of facial nerve weakness is very low.