

Spontaneous drainage of a Bezold neck abscess into the middle-ear cleft: a rare incident

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Bezold's abscess is a neck abscess, arising as a complication of acute mastoiditis or active chronic otitis media and cholesteatoma. This condition is rarely reported in the recent literature. A very rare case is presented of spontaneous drainage of Bezold's neck abscess into the middle ear. Pertinent review of the literature is illustrated.

Keywords:

Abscess, Bezold's abscess, Cholesteatoma, Mastoiditis

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Introduction

Friedrich Bezold (1824–1908) was a German otologist. In 1881, he reported the classic Bezold abscess in a case of coalescent mastoiditis, following a cadaver study in which pus was found to extend from the medial side of the mastoid process through the incisura digastrica. The pus was prevented from reaching the surface by the neck musculature but tracked along fascial planes of the digastric and sternocleidomastoid muscles, forming a neck abscess [1].

Following the widespread use of antibiotics and modern otological techniques, Bezold's abscess is now rare, with a few cases having been reported in the recent literature. Bezold's abscess may complicate acute coalescent mastoiditis or active chronic otitis media and cholesteatoma [2]. The management of Bezold's abscess requires abscess drainage and mastoidectomy [3].

In this report, a quite rare case is presented, where a Bezold neck abscess drained spontaneously through the middle-ear cleft into the ear canal, and neck surgery was not required. A PubMed search did not reveal any previous record of such an incident.

Case report

A 19-year-old male laborer presented to the outpatient department with a painful left-sided neck swelling, fever, anorexia, and malaise. The neck swelling had been progressively enlarging and had become increasingly painful over the 4 days before presentation. The patient reported that both ears had been discharging an offensive discharge since childhood. His hearing acuity was impaired, but there was no vertigo. There had been no previous history of ear surgery.

On examination, his temperature was found to be 39.2°C and the pulse rate was 110/min. The patient

had evident torticollis, with contraction of the left sternocleidomastoid muscle. There was a nonfluctuant, firm, tender neck swelling, about 10 cm in diameter, which extended from below the left ear to the middle zone of the neck. The skin overlying the neck swelling showed signs of acute inflammation. There was limitation of neck movement, but there was no evidence of cranial nerve or peripheral nerve affection. There was no spontaneous nystagmus. Otomicroscopy revealed an offensive, purulent discharge in both ear canals. After suctioning of the discharge, bilateral subtotal tympanic membrane perforations were evident. Keratinous debris was seen filling both middle-ear cavities, confirming a diagnosis of bilateral mesotympanic cholesteatoma. Swabs were taken from the discharge in both ears and sent for aerobic and anaerobic microbiological culture.

Urgent imaging with neck ultrasonography and contrast-enhanced computed tomography (CT) scanning of the neck, temporal bones and brain was arranged. The neck ultrasound showed irregular cavitation with hypochoic fluid contents below the left mastoid process, suggesting a neck abscess. The neck CT scan revealed an abscess with irregular cavitation and peripheral contrast enhancement reaching deep up to the upper part of the left sternocleidomastoid muscle, suggestive of a left Bezold abscess (Fig. 1). Also evident on the neck CT scan were multiple, enlarged deep cervical lymph nodes below the abscess. The temporal bone CT scan revealed complete destruction of the bony septae in the right mastoid process, with exposure of the right sigmoid sinus. The left mastoid process, which was highly cellular, revealed erosion of the bony septae, extending to the mastoid tip. Both middle-ear clefts were occupied by soft-tissue density masses. There was evidence of destruction of the ossicles in the right middle ear; however, the ossicles were preserved in the left middle ear (Figs. 2 and 3). The brain CT scan was normal.

Figure 1



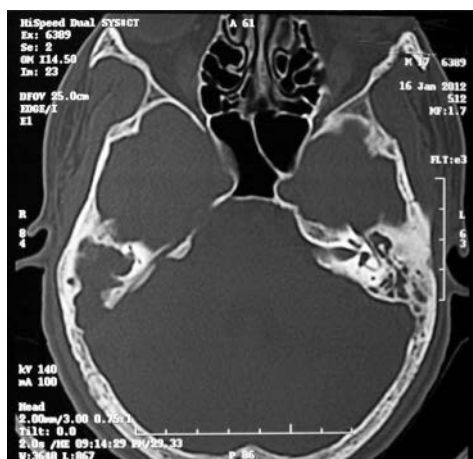
Axial computed tomography scan of the neck showing a left Bezold abscess.

Figure 2



Coronal computed tomography scan of the temporal bones showing complete destruction of the septae in the right mastoid process and erosion of the septae in the left mastoid process by cholesteatoma.

Figure 3



Axial computed tomography scan of the temporal bones showing exposure of dura and sigmoid sinus in the right temporal bone by cholesteatoma.

The patient was admitted and empirical intravenous cefuroxime and metronidazole were administered, pending the results of culture and sensitivity. Pure-tone audiometry revealed a symmetrical 45-dB conductive hearing loss in both ears. Hematological investigations revealed leucocytosis and elevated C-reactive protein levels.

Twenty-four hours later the patient was seen to be still experiencing severe pain, and a repeat CT scan revealed progression of the cavitation in the neck abscess. Arrangements were therefore made for surgical drainage of the abscess and exploration of the left mastoid the following morning. However, before the planned surgery, the patient reported marked relief of the neck pain and copious discharge from his left ear. Otomicroscopy of the left ear revealed spontaneous, copious discharge in the left ear canal, emanating from the tympanic membrane perforation. Pressure on the neck swelling resulted in a gush of pus from the ear canal. Accordingly, surgical drainage of the neck abscess was suspended. The patient subsequently regained his appetite and his neck movements were restored. Two days later, the neck swelling disappeared. The results of the microbiological culture showed a polymicrobial growth, including MRSA and Gram-negative bacilli, with high sensitivity to amikacin. Accordingly, intramuscular amikacin was added to the antibiotic regimen.

Six days after admission, a left modified radical mastoidectomy was performed through a postauricular incision. The cholesteatoma was excised from the middle-ear cleft. During surgery, a 4-mm defect in the medial aspect of the mastoid cortex, near the mastoid tip, was confirmed. The malleus and incus, which were eroded, were excised. A large temporalis fascia graft was applied in the mastoid cavity, over the head of the stapes and under the tympanic membrane remnant. A wide meatoplasty was fashioned. Three weeks later, the right mastoid was explored. After the postauricular incision, pus was seen extruding from a 7-mm defect in the bony cortex at the root of the zygomatic process. A large cholesteatoma was excised from the middle-ear cleft. At surgery, the dura and the sigmoid sinus were found to be exposed. The facial nerve canal was dehiscence in the tympanic and mastoid segments, but there was no evidence of a labyrinthine fistula. The malleus, incus, and stapes superstructure were absent. A large temporalis fascia graft was used to line the operative cavity and a wide meatoplasty was performed. Regular postoperative visits revealed the cessation of discharge from both ears. At the most recent follow-up, 15 months after surgery, the mastoid cavities were seen to be epithelialized and dry. The most recent audiogram revealed stabilization of hearing levels.

Discussion

Cholesteatomas are cyst-like epithelial inclusions that develop in the middle ear and mastoid, usually as a consequence of chronic otitis media. They are capable of eroding bone through different mechanisms, including the release of proteases, cytokine-mediated inflammation, and recruitment and activation of bone osteoclasts [4]. Infected cholesteatomas are more aggressive than uninfected ones in destroying adjacent bone, and manifest as persistent otorrhea [5]. Perforation of bone through the inferior medial aspect of the mastoid process results in pus dissecting along the digastric and sternocleidomastoid muscles into the neck, forming a Bezold abscess.

Diagnosis of a Bezold abscess should be part of a clinician's differential diagnosis in patients presenting with neck pain and swelling, as its depth makes palpation difficult. Ultrasonography is a useful initial investigation, as it can demonstrate fluid collections in the neck [6]. Contrast-enhanced computed tomography is the method of choice for detection of a Bezold abscess [7,8]. Computed tomography can also provide reliable details of temporal bone anatomy and bone destruction in the context of suppurative ear disease [9]. MRI can detect subtle changes in the central nervous system in patients with cholesteatoma and after mastoid surgery [10]. It is important to obtain specimens from the purulent discharge, at presentation, for aerobic and anaerobic culture and sensitivity studies, especially if intracranial complications are imminent [11,12].

The commonly recommended conventional approach for the management of a Bezold abscess is described as an open incision and drainage of the cervical abscess through a transcervical approach, combined with a mastoidectomy to address the mastoiditis [3]. In the presented case, however, drainage of the neck abscess through a cervical incision was not required because of the spontaneous drainage of pus into the middle-ear cleft. The mechanism for this spontaneous drainage can only be speculated. A proposed mechanism for this incident is as follows:

- (1) Increased liquefaction of the purulent exudate occurred with time [13].
- (2) In the setting of destruction of the bony septae within the cellular mastoid, a cavity was created in the mastoid that communicated with the middle-ear cavity.
- (3) A sequestrum of devitalized bone, as a result of osteomyelitis, developed around the original path of communication between the mastoid and the neck.
- (4) Extrinsic pressure by the contracted sternocleidomastoid muscle dislodged this

sequestrum and forced the pus from the neck abscess into the mastoid, middle-ear cavity, through the tympanic membrane perforation, into the external ear canal.

- (5) As a result of the spontaneous drainage of the pus, the local and systemic symptoms were ameliorated.

In cases of extensive cholesteatoma, as in the presented case, excision of the disease is best performed by means of a canal-wall-down technique. Long-term follow-up of cases of extensive cholesteatoma, operated on using the canal-wall-down technique, has shown low recurrence rates and more stable ears, compared with canal-wall-up techniques, in addition to the preservation of hearing [14]. Fortunately for the presented case, there were no intracranial complications, despite the dural exposure by the cholesteatoma in the right temporal bone. Bezold reported that the dura 'may be bathed in pus for weeks without sustaining any damage' [15]. This resilience of the dura had been referred to by Spiegel *et al.* [15] in a case series of extracranial complications of mastoid abscesses. The resilience of the dura is further emphasized by the fact that meningoencephalic herniation into the middle-ear cleft remains an uncommon occurrence, despite bone destruction and dural exposure in cases of advanced cholesteatoma [16].

Conclusion

A case of Bezold's abscess in the context of an infected cholesteatoma is presented. Spontaneous drainage of pus from the neck abscess into the middle-ear cleft occurred during hospitalization of the patient. This is a rare incident and, as far as the author is aware, it has not been previously described in the literature.

Summary

- (1) Bezold's abscess is a neck abscess that is the result of a complication of acute mastoiditis or infected cholesteatoma.
- (2) The management of Bezold's abscess requires drainage of the neck abscess through a cervical incision and mastoidectomy.
- (3) A rare case is presented, where the neck abscess drained spontaneously into the middle-ear cleft and surgical drainage of the abscess was not required.

Acknowledgements

Conflicts of interest

None declared.

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