Case Report

Chronic suppurative otitis media complicated by subdural and Bezold abscesses: A case report

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ARTICLE INFO

Article history:
Received 24 December 2021
Revised 8 January 2022
Accepted 12 January 2022

Keywords:
Chronic suppurative otitis media
Bezold abscess
Subdural abscess

ABSTRACT

Complications of chronic suppurative otitis media (CSOM) are divided into intracranial and extracranial complications. Bezold abscess is a very rare extracranial complication with an incidence of 1.5% of the total complications of CSOM in a study conducted in China, similarly subdural abscess is a rare intracranial complication with an incidence of 0.3% in the same study. If not given proper and immediate treatment, these complications can be fatal. Head and neck computed tomography (CT) scan is the main modality for diagnosing complications of CSOM. We report the case of a 15-year-old girl with CSOM who suffered from multiple rare and life-threatening intracranial and extracranial complications. CT scan of the head and neck revealed multiple complications, including cholesteatoma with the destruction of the ossicles, a Bezold abscess inferiorly and a subdural abscess intracranially. Surgery was performed twice to remove the abscess, accompanied by antibiotic therapy according to the type of bacterial culture.

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Introduction

Chronic suppurative otitis media (CSOM) is a persistent infection involving the middle ear and mastoid air cells. Complications of CSOM are among the many health problems that increase morbidity and mortality. CSOM complications are divided into intracranial and extracranial complications. Currently, mortality and morbidity have decreased drastically due to the discovery of modern antibiotic therapy, but with the increasing number of multidrug-resistant pathogens, the incidence of complications has increased again [1].

In a retrospective study conducted over 22 years (1987-2008) by Fang Wu et al. at the University Hospital, China, 285 (12.1%) patients with acute and chronic otitis media with and without cholesteatoma had intracranial and extracranial complications. A total of 253 (88.8%) patients had one complication, 29 (10.2%) patients had two complications and 3 (1.0%)...
patients had more than two complications. The intracranial complications observed were meningitis (16 cases), brain abscess (42 cases), sigmoid sinus involvement (29 cases), extradural abscess (8 cases), subdural abscess (1 case) and hydrocephalus (2 cases). The most common extracranial complications were labyrinthitis (90 cases), mastoid abscess (79 cases), facial paralysis (47 cases), Bezold abscess (5 cases), and pyramidal apsis (1 case) [2]. Another retrospective study conducted by Yorgancilar et al. for 10 years (2000-2011) at a tertiary referral university hospital in Turkey identified 121 CSOM patients with complications. A total of 57 patients (47.1%) had extracranial complications, 37 patients (30.6%) had intracranial complications and 27 patients (22.3%) had multiple complications [3].

Cases of CSOM with multiple intracranial and extracranial complications such as co-occurring Bezold abscess and subdural abscess are rare. Bezold abscess that is not treated properly has the potential to spread to the mediastinum, which can lead to mediastinitis, which increases the mortality rate to 70% [4]. Proper diagnosis is needed so that appropriate treatment can be provided to prevent fatal complications. Here, we present the case of a 15-year-old girl suffering from CSOM with multiple intracranial and extracranial complications.

Case Description

A 15-year-old Malayan Mongolian girl came to the emergency department for surgery in the ear, nose and throat–head and neck (ENT-HN) unit at the Dr. Soetomo General Hospital in Surabaya, Indonesia. Her main complaint was swelling with pain behind the ear in the week before admission to the hospital. The swelling extended to the left neck area and was accompanied by reduced neck movement. Headache, fluctuating fever, slanted face and inability to close the left eye for the past week were reported. The patient complained of purulent

Fig. 1 – Axial CT scan soft tissue window shows soft tissue density filling the external acoustic canal to the middle ear (arrow).

Fig. 2 – Axial CT scan bone window shows destruction of the left mastoid air cell with the Trautmann triangle (arrow head) which provide access for intracranial spread of infection. Coronal section shows erosion and destruction of the left mastoid tip (arrow), which provides access to the spread of infection to the perivertebral space muscle.
discharge from the left ear for three years, with the discharge worsening in the previous week. There was hearing loss, but the family was not sure when it started.

The results of laboratory tests were leukocytosis of 13.210/μL, haemoglobin (8.2 g/dL), neutrophils (81.7%) and hypoalbumin (2.67 g/dL). Computed tomography (CT) scan without contrast revealed that the external acoustic canal was covered with soft tissue density, which extended to the middle ear and auditory bone and indicated left mastoid air cell destruction, with multiple abscesses formed around it (Fig. 1 and 2). In the neck, there was an abscess in the perivertebral space muscle (Fig. 3). A subdural abscess was found intracranially in the posterior fossa (Fig. 4).

The management of the patient included two surgical operations. The first operation performed drainage of the Bezold abscess and extraction of the left acusticus canalis externus granulation. There was approximately 10 mL of pus in the posterior sternocleidomastoid muscle (Fig. 5). The second operation consisted of canal wall down (CWD) mastoidectomy and
evacuation of the subdural abscess (Fig. 6). During the operation, there was total destruction of the posterior wall of the external acoustic canal; cholesteatoma in the epitympanum; and destruction of the dura mater, mastoid bone and sigmoid sinus, resulting in the formation of a fistula that served as a pathway for intracranial infection to cross. A CT scan of the head with contrast was performed 4 hours after the procedure. It was found that the subdural abscess has decreased substantially, although there was still a hypodense area that was reducing in size (Fig. 7).

The results of culture and sensitivity examinations on samples from the incision and drainage of the Bezold abscess did not show any culture results. The culture results on pus samples from CWD mastoidectomy surgery and subdural empyema evacuation revealed Achromobacter species culture. The results of the sensitivity test revealed cultures that were resistant to Amikacin, Gentamycin, Aztreonam, Amoxicillin – Clavulanic acid, Ampicillin, Cefazolin, and Cefixime. The cultures were sensitive to Piperacillin, Piperacillin-Tazobactam, Ceftazidime, Ceftriaxone, Cefoperazone-Sulbactam, Cotrimoxazole, Chloramphenicol, Levofloxacain, Imipenem and Meropenem. Left facial nerve paresis improved five days after CWD mastoidectomy surgery. Postoperative care for open evacuation of subdural abscess was provided, and there were no signs or symptoms of increased intracranial pressure.

**Discussion**

The age of the patient in this case was 15 years. This is in accordance with the literature, which states that complications in CSOM occur in patients between 4 and 72 years of age, with a mean age of 15-24 years [3]. Moreover, Sharma N et al. found that the majority of cases of CSOM with complications occurred in the 5-20 year age group [5].
The diagnosis of CSOM is based on physical examination and supporting examinations. Head and neck CT scan is an important preoperative modality, as CT scans have been proven to be able to detect deep abscesses that are not clinically visible [6]. This patient had a soft tissue density image that filled the external acoustic canal to the middle ear with evidence of erosion and partial destruction of the auditory ossicles and mastoid bone. The destruction of the mastoid tip is a route for infection to spread to the neck area, and the right side of the prevertebral muscle area showed a hypodense area in the middle of the muscle. This is in accordance with the results of the study by Al-Baharna et al., which showed that pus in the mastoid destroys the area with the lowest resistance, namely the inferior and medial mastoid tips. Pus can spread through these pathways and form abscesses deep in the neck muscles [7].

Subdural abscess is an intracranial complication in this case. When there is suspicion of intracranial complications, the CT scan modality becomes the gold standard, as the sensitivity of CT scanning in assessing intracranial complications is reported to be 87%-100% [8]. Erosion and destruction of a portion of the bone in Trautmann’s triangle is the access point for intracranial infection (Fig. 2). The literature states that the spread of middle ear infection to the cerebellum usually occurs when a suppuration process occurs in the middle ear, causing osteomyelitis in Trautmann’s triangle, retrograde venous thrombophlebitis and Virchow-Robin periarterial space [9].

Conclusion

We report the case of a 15-year-old girl with CSOM who had multiple intracranial and extracranial complications. Early diagnosis and the use of appropriate diagnostic modalities can reduce the occurrence of complications. CT scan of the head and neck is the gold standard to see bone damage or abscesses that are not visible on physical examination. Bezold abscesses and subdural abscesses are very rare complications of CSOM. The source of infection must be eradicated immediately by surgical incision and drainage of Bezold abscess, open evacuation of subdural abscess and administration of antibiotics according to the results of culture and sensitivity of bacteria. The patient’s condition improved after undergoing these therapeutic procedures.