Extradural Abscess in Case of Extended Cholesteatoma

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Abstract

Cholesteatoma is life-threatening disease due to its extracranial and intracranial complications. Extradural abscess is one of them and linked to pus and granulation tissue accumulation between the dura mater and temporal bone. The otogenic extracranial and intracranial complications are rare manifestations in modern era of antibiotics, that's why we present a 44 old man with successfully treated extradural abscess in retrosigmoid region as a consequence of probably secondary infected through erosion of the external auditory canal extended congenital cholesteatoma.

Keywords: Extradural abscess, Cholesteatoma, Radical mastoidectomy, Otogenic complications

Introduction

Chronic otitis media with or without cholesteatoma can be associated with intracranial and extracranial complications by one of the following main mechanisms: direct erosion through bone, which typically leads to labyrinthine fistula, mastoid abscess, extradural or subdural abscess, subperiosteal abscess, Bezold's abscess, meningitis, or venous sinus thrombosis; thrombophlebitis, which typically leads to brain abscess; extension through normal anatomical paths (1, 2, 3). Chronic otitis media with cholesteatoma is complicated extracranially or intracranially mainly through direct erosion of petrosal bone.

Most of these complications usually occurred in the third decade of lifetime, predominately with male patients (1, 4). Symptoms include pain at the forehead or ear, pus draining from the ear, tenderness overlying the infectious site, fever, neck stiffness, and in rare cases vertigo or focal seizures. Anaerobic bacteria were the most commonly isolated organisms followed by *Staphylococcus aureus*, *Proteus mirabilis*, and *Pseudomonas aeruginosa* (1, 5).

The otogenic extracranial or intracranial complications are rare manifestations in modern era of antibiotics (6), while in the preantibiotic era, intracranial complications secondary to ear disease occurred in 2.3–6.4% of cases (7, 8). The treat-

ment of patients with extracranial or intracranial otogenic complications is mainly by wide exploration with surgical removal of infected bone and pathologic tissue, and drainage. Beside surgical intervention, the patient will also require intensive systemic antibiotic therapy.

Case Presentation

B.P.N., male, 44 (Nr. 7857/04.06.2019) with incoming diagnose: Mastoiditis acuta suppurativa dextra. Symptoms: hearing loss and purulent otorrhea from 1 year; severe headache from 1 month with fever until 38.2°C; tortocolis and neck stiffness from several days. Clinical examination: intoxicated, in a damaged general condition; upper neck edema right site with deep pain in retromastoidal region by palpation and percussion. Otoscopy: narrow ear canal with skin swelling and slight erosion of the posterior wall of the external auditory canal and scanty purulent secretion. Audiometry: mixed hearing loss 50-70 dB to the right with 30 dB ABG in low frequencies (Fig. 1). Labor: WBC 15.9 g/l↑ (Neu 76%↑, Eo 2%, Lym 18%, Mo 4%), CRP 30.59 mg/dl ↑↑. CT Scan: reduction of the cellular system of the right mastoid, filled with a mass with density of 21-34 HE (probably purulent collection) and bone destruction to the external auditory canal and to the cranial base (Fig. 2, Fig. 3). Neurological examination: neck rigidity in the final phase without neurological deficit.

Fig. 1. Preoperative audiogram shows mixed moderately severe hearing loss 50-70 dB to the right with 30 dB ABG in low frequencies; left mild mixed hearing loss 20-35 dB.

Fig. 2. CT Scan in axial view - bone destruction (to the external auditory canal and to the cranial base).

Fig. 3. CT Scan in coronal reconstruction - reduction of the cellular system of the right mastoid, filled with a mass with density of 21-34 HE, probably purulent collection.

Operation protocol (Nr. 341/06.06.2019): with retroauricular approach and after elevation of the meatal flap, we found erosion in the posterior part of the external auditory canal and provide CWU mastoidectomy (very dense corticalis externa), but after established of cholesteatoma in the antrum we convert to CWD mastoidectomy by following the cholesteatoma matrix towards the external auditory canal until established erosion at the beginning of surgery. Following the matrix of the cholesteatoma in the posterior direction, the extradural abscess

was found retrosigmoidally (Fig. 4). Granulations in this area were identified as part of the perimatrix and removed (Fig. 5). After complete removal of the cholesteatoma, a meatoplasty was performed and the radical mastoid cavity was left open. Retroauricular drainage for 3 days. At this point of surgery a Second-look Operation is indicated 18 months later.

Fig. 4. Intraoperative opening of retrosigmoidal abscess with pus collection

Fig. 5. Intraoperative removal of perimatrix tissue from retrosigmoidal area.

Intraoperative STAM System: M+A+T+S1+S2. EAONO/JOS Staging System: Stage IV Cholesteatoma. Austin-Kartush Classification: Class B (Malleus handle and Stapes footplate only). Histology examination (Nr. 3912/10.06.2019): Cholesteatoma formation. Microbiology: material for microbiology assessment taken intraoperatively from the abscess cavity - *Enterococcus faecalis*, sensitive to all tested antibiotics (Ampicillin-S, Tigecycline-S, Imipenem/Meropenem-S, Ciprofloxacin/Levofloxacin-S, Vancomycin/Teicoplanin-S, Amoxicillin/Clavulanic acid-S, Trimethoprom/Sulfamethoxazole-S, Nitrofurantoin). Perioperative antibiotic treatment: Ciprofloxacin, Ceftriaxone and Gentamycin. Other medications: Sol. Mannitol 15%, Fraxiparine 0.6/s.c./24h and Nonsteroidal Anti-Inflammatory Drugs (Dexketoprofen, Metamizole).

External ear canal tamponade was removed on 3rd postoperative day. 45 days after surgery the patient have no symptoms, except hearing loss (persistence of a mixed hearing loss of about 70 dB and 30-40 dB ABG for all frequencies) (Fig. 6) and less skin sensitivity of the pinna. Otoscopically we found epithelized radical cavity without infection. Postoperative control (local examination and audiometry) on 3rd and 6 month postoperatively, and then every year. Second-look surgery is indicated 18 month after surgery or following with MRI (especially diffusion-weighted imaging with turbo-spin echo technique). We observe each patient with cholesteatoma for many years. Recurrence can occur long time after the initial surgical treatment and we follow-up all patients, even in the otherwise asymptomatic cases.

Fig. 6. Postoperative audiogram shows persistence of a mixed moderately severe hearing loss of about 70 dB and 30-40 dB ABG for all frequencies; left slight hearing loss 15-25 dB.

Discussion

Cholesteatoma is a disease that can occur in each part of petrous temporal bone. It is characterized by a tendency for bone erosion and recurrence. Once established in the middle ear cholesteatoma is destructive lesion that gradually expands and destroys adjacent structures leading to complications (9). The microorganisms that is most commonly cultured is *Streptococcus*, Gram positive cocci and Gram negative cocci as well as Anaerobes have also been implicated. Other organism such as *Proteus mirabilis*, *Staphylococcus aureus*, *Proteus vulgaris* have also been isolated. In our case we isolate *Enterococcus faecalis*, that is sensi-

tive to all tested antimicrobial agents, but some of them are Vancomycin-resistant *Enterococcus faecalis* (VREF), which can be a serious therapeutic problem (10).

In our case complications appears as a result of inadequate antibiotic treatment at the time when the otorrhea begins, and a delay in presentation to our hospital care, but after our radical mastoidectomy, her condition improved significantly. We leave the mastoid cavity open, therefore we do not perform mastoid cavity obliteration on this stage, unlike other authors who performed primarily obliteration to “prevent any further spread of infection” (11).

CT Scan of the temporal bone and neck is the main imaging modality for diagnosis of extracranial and intracranial otogenic complications (12). Radiology is mandatory prior to incision and drainage, to rule out other associated complications. Complications of chronic otitis media occur when the infective process spreads beyond the areas of the middle ear and we want again to discuss the various pathways for the spread of infection: first by direct extension through bone, by cholesteatoma or chronic osteomyelitis; second through the spread by thrombosis of small venules from the dura, transverse sinus and beyond; next through preformed pathways, such as labyrinth, the endolymphatic channels

and last through developmental or traumatic bony defects (1).

Conclusion

Management of patients with extracranial and intracranial complications secondary to middle ear cholesteatoma is challenging. The main goal of cholesteatoma treatment in cases with extracranial complications is the eradication of the disease from middle ear and surrounding extracranial pathological tissues. Nowadays one-stage elimination of cholesteatoma is almost always possible. However, in these cases multiple operations may be required, especially for hearing rehabilitation.

Compliance with Ethical Standards

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