



Chronic Cholesteatomatous Otitis Media Revealed by Extra and Intracranial Complications

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Summary

Introduction: Chronic cholesteatomatous otitis media (CCOM), often described as dangerous because of its osteolytic properties and its progressive nature responsible for serious complications. Objective: To describe the diagnostic and therapeutic aspects of extra and intracranial complications of CCOM in our context.

Materials and Method: This was a longitudinal descriptive study which took place in the otolaryngology and neurosurgery departments of the Omar Bongo Ondimba Armed Forces Hospital from January 2006 to December 2022, concerning 14 patients with CCOM revealed by an extra or intracranial complication.

Results: A total of 14 patients with CCOM revealed by a complication. The average age was 25 years, with extremes of 8 years and 77 years and a ratio of 4. Complications were extracranial in 10 cases, including mastoiditis in 7 cases and facial paralysis in 3 cases. Intracranial complications in 4 cases with 6 complications including subdural empyema 3 cases (1 isolated case and 2 associated cases) and cerebral abscess (1 isolated case and 2 associated cases). CT scan of the brain and rocks made the diagnosis. Treatment included mastoidectomy in 13 cases and craniotomy in 4 cases accompanied by antibiotic and corticosteroid therapy. One case was missing. The evolution was favorable in 12 cases. 1 case of death was noted.

Conclusion: Complications of CCOM are emergencies, they can be life-threatening. Their management must be oto-neurosurgical.

Keywords: Middle ear cholesteatoma; complications; oto-neuro-surgery

Introduction

Cholesteatomatous chronic otitis media (CCOM) is defined by the presence in the cavities of the middle ear of a keratinized squamous epithelium, endowed with the potential for desquamation, migration and erosion [1,2]. It is dangerous and serious because

of its progressive, extensive risks and its complications that can be life-threatening [3]. Its extension beyond the cavities of the middle ear leads to complications that can be life-threatening, or even compromise the major functions assigned to the ear. Complications

of CCOM have become less frequent since the advent of antibiotic therapy in developed countries. However, they are still present with a still high prevalence in developing countries [4]. The classic presentation of CCOM is dominated by chronic otorrhea, but it can occur through an extra or intracranial complication; which is often the result of a delay in diagnosis and/or treatment. Extracranial complications of cholesteatoma are essentially mastoiditis, labyrinthitis, facial paralysis, petrositis, Besold's abscess, otitis externa and intracranial are: meningitis, extra or sub-dural empyema, brain abscess and thrombophlebitis. The diagnosis of these complications is most often evoked on the association of neurological, general infectious signs in a context of undiagnosed or neglected chronic cholesteatomatous otitis media. Computed tomography (CT) of the petrous bone and brain are the examinations of choice to confirm the diagnosis, specify the site of the cholesteatoma, its extension and the type of associated complication [2]. The treatment is oto-neurosurgical and framed by antibiotic-corticosteroid therapy. In Gabon, data on this pathology are non-existent, hence the interest for us to deal with this question. The objective of this study was to describe the diagnostic and therapeutic aspects of extra and intracranial complications of chronic cholesteatomatous otitis media revealed by a complication in our context.

Materials and Methods

This was a longitudinal study with a descriptive aim which took place in the otolaryngology and neurosurgery departments of the Hôpital d'Instruction Des Armées Omar Bongo Ondimba (HIAOBO) from January 2006 to December 2022, i.e. 16 years, concerning patients hospitalized for chronic cholesteatomatous otitis media (CCOM) revealed by an extra or intracranial complication. The inclusion criteria were patients treated in the otolaryngology and neurosurgery departments of HIAOBO during this period, for CCOM revealed by an extracranial complication with mastoiditis and facial or intracranial paralysis with subdural empyema and brain abscess and patients are referred by the neurosurgeon. The non-inclusion criteria were uncomplicated middle ear cholesteatoma or the patient consults for otorrhea and the scanner will make

the diagnosis later, non-cholesteatomatous chronic otitis including simple chronic otitis media, unusable records. The collection of data was done from hospital registers and their collection on a standardized survey sheet. The parameters studied were: age, sex, reason for consultation, age of the ear disease, otological and rhinological history, consultation time, clinical data with physical examination using otoscopy, para-clinical data with audiometry, computed tomography and magnetic resonance imaging, therapeutic data including surgical and medical treatment and evolutionary data (recovery, complication, lost to follow-up or death). Data entry and analysis were performed using Microsoft Office and Excel 2007 software. Ethically, patient anonymity was respected. We obtained the agreement of the director of HIAOBO and heads of the ENT and neurosurgery departments.

Results

During 16 years of clinical activity, 32 patients were hospitalized for management of an CCOM, 14 of which were revealed by an extra and/or intracranial complication and which are the subject of the study, or 44%. The average age was 25 years, with extremes of 8 years and 77 years. Seven patients (50%) were under 20 years old. The sex ratio (M/F) was 4. The antecedents were chronic otorrhea since childhood in 13 cases and trisomy 21 in 1 case. The functional signs (Table 1) were hearing loss in all cases, purulent fetid otorrhea in 13 cases, otalgia in 12 cases and headaches in 6 cases. The average consultation time was 8.28 years with extremes of 7 days to 35 years. Complications were extracranial in 10 cases, including mastoiditis in 7 cases and facial paralysis in 3 cases. Intracranial complications in 4 cases with 6 complications including subdural empyema in 3 cases (with 1 isolated case and 2 cases associated with other extra and/or intracranial complications) and cerebral abscess in 3 cases (including 1 isolated case and 2 cases associated with other intra and/or extracranial complications (Table 2). Examination under a microscope showed the presence of otorrhea in 11 cases, aspiration of the whitish scales of the cholesteatoma in 6 cases and the presence of a polyp in the external auditory canal in 3 cases. Audiometry was performed in 11 patients.

Table 1: Distribution of functional signs of complications.

Signs	Number (N)	Percentage (%)
Hearing loss	14	100
Otorrhea	13	93
Otalgia	12	86
Headaches	6	43

Table 2: Distribution of patients according to complications.

Patients	Age (years)	Complications and Association of Complications
1	13	Right mastoiditis + cerebral abscess
2	22	Right mastoiditis + cerebral abscess + cerebellar empyema

3	35	Mastoiditis + cerebral abscess + cerebellar empyema
4	24	Cerebellar empyema
5	16	Mastoiditis
6	73	Facial paralysis
7	45	Facial paralysis
8	8	Mastoiditis
9	18	Mastoiditis
10	18	Mastoiditis
11	13	Mastoiditis
12	24	Facial paralysis
13	8	Mastoiditis
14	34	Mastoiditis

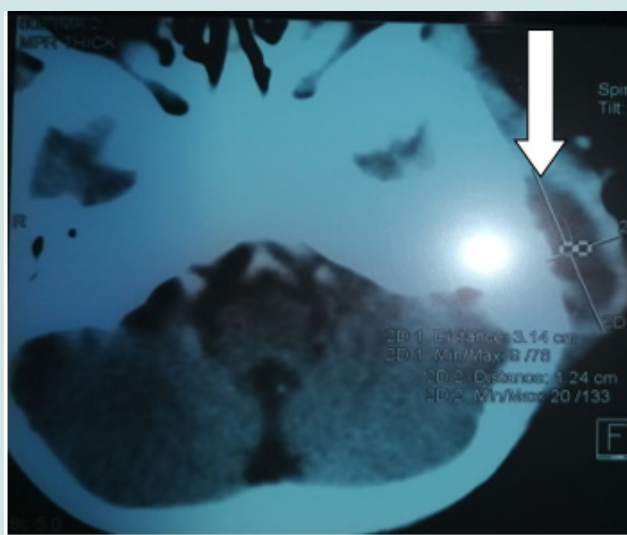


Figure 1: CT scan in axial section showing a purulent collection of the right retro-auricular soft tissues (arrow). (ENT Service HIAOBO).

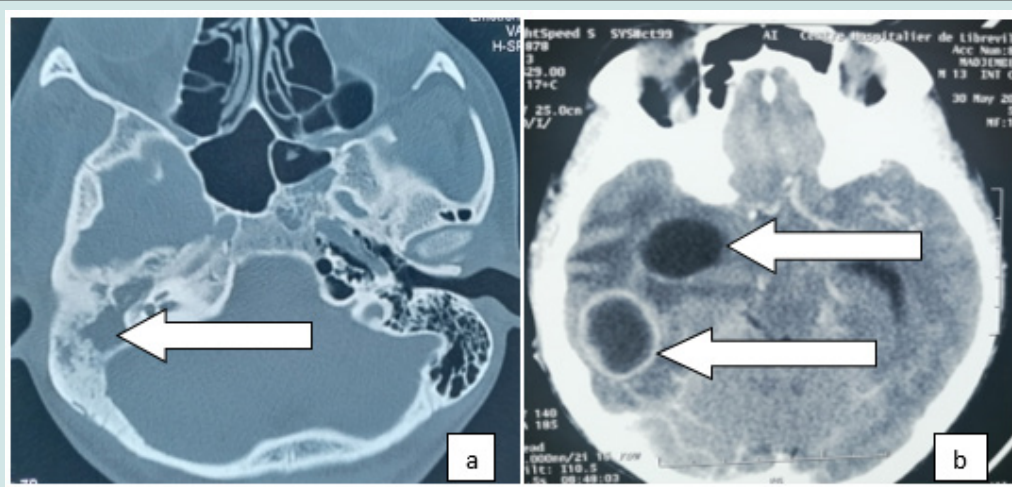


Figure 2: a: CT of the petrous bones in axial section showing mastoid cell filling (arrow)
 B: Axial brain CT showing brain abscesses (arrows).

It objectified conductive hearing loss in 7 cases, with an average threshold of 50 decibels, mixed hearing loss in 4 cases with an average threshold of 60 decibels and an average rinne of 35 decibels. Brain and rock CT scans were performed in all cases and showed an abscess collected from the soft tissues next to the mastoid in 5 cases (Figure 1), filling of the middle ear and mastoid cells found in all patients (Figure 2), partial or complete lysis of the ossicular chain in 11 cases, erosion of the wall of the cubicle found in 13 cases, cerebral abscess in 3 cases, extradural empyema in 3 cases, and lysis of the tegmen tympani in 4 cases (Table 3). Surgical treatment was mastoidectomy performed in 13 cases including 2 cases after craniotomy and 1 case concomitant with neurosurgical treatment. A drainage incision was performed under local anesthesia in 5 cases, in patients presenting with retro-auricular collection, in order to

carry out bacteriology and antibiogram and for cooling before mastoidectomy. ICHT with hydrocephalus was noted postoperatively after craniotomy in 1 case. She required an external diversion associated with 10% mannitol 100cc every 6 hours. The medical treatment was broad-spectrum antibiotic therapy such as the combination amoxicillin – clavulanic acid 1g 3x/d in adults and children: 75 to 100 mg/kg in children in 3 doses, associated with corticosteroid therapy (methyl-prednisolone) 1mg/kg/d. Ceftriaxone-type 3rd generation cephalosporins dosed from 1 to 2 g/day in one dose, combined with metronidazole at a dose of 1.5 g in adults and 30 to 40 mg in 3 doses/day in children, were administered in patients with intracranial complications. The evolution was favorable in 12 cases. One case was missing. It was noted 1 case of death in intensive care 24 hours after the craniotomy following a septic shock.

Table 3: Radiological signs.

Signs	Number
Retro-auricular collected abscess	5
Filling of the middle ear And mastoid cells	14
Atrial chain lysis	11
Erosion of cubicle wall	13
brain abscess	3
Extradural empyema	3
Tympani tegmen lysis	4

Discussion

The review of the literature has shown the role of cholesteatoma in the genesis of complications of otitis media which can be serious and life-threatening [5]. These complications are a real challenge for clinicians because of the severe sequelae they can cause [6]. Classically, it is customary to differentiate between intra and extracranial complications in view of the very different evolutionary and prognostic aspect. Indeed, mortality is entirely attributable to intracranial complications [4]. Complications of OMCC have become rare and rarely reveal the disease in developed countries, however they are still present in developing countries [4]. The rate of occurrence went from 10% in the 70s to 0.36 and 0.69% in the 90s [7,8]. However, in developing countries, this rate remains high as shown by authors such as Abada et al. and Tall et al. with respectively 5.7%, 18% [5,9], and our series with 44%. This very high rate of complications in our study can be explained on the one hand by ignorance of the pathology, lack of education and poor personal hygiene and on the other hand by the lack of appropriate medical care structures, qualified personnel and financial means. These complications occur during the first two decades of life and mainly in male patients [4]. Tall et al. [9] report an average age of 17 years with male predominance. Abada et al. [5] also report an average age of 25.2 years and a male predominance. Our study confirms these data from the literature with a median age of 25 years and a male predominance.

The average consultation time was 8.28 years and the notion of otorrhea mostly dating back to childhood was found in 13 cases. This testifies to the delay in care that can be explained by under-medicalization and a total trivialization of otorrhea, which means that some patients only consult at the stage of complications. The level of medicalization would thus influence the prevalence of these complications [5,9]. Complications of CCOM can be classified according to their location. We distinguish the extracranial complications; it is all the manifestations related to the temporal or petrous extension of the infection or inflammation. They understand.

Mastoiditis

Mastoiditis is an infectious attack of the cavities of the middle ear associated with destructive lesions of the mastoid bone producing osteitis. Its temporo-zygomatic exteriorization appears as voluminous, rapidly fluctuating infiltration of the temporo-zygomatic and pretragal region which takes off and pushes the auricle downwards. Cervical externalizations result from the breaking of the cortex of the tip of the mastoid causing Bezold's abscess [1]. In our study mastoiditis was the revealing complication of cholesteatoma in 7 cases and this was also reported by Bouaity et al. who reported 20 cases of mastoiditis out of 29 cases of complications revealing cholesteatoma in their study [10]. Thus we can note through the literature that mastoiditis is the most frequent extracranial complication [5,11]. Bezold's mastoiditis was noted in 1 case in our series. It

would result from a breach of the cortex of the mastoid apex at the level of the gutter of the digastric, with diffusion of the abscess under the sheath of the sterno-cleido-mastoid muscle. It was reported by Tall et al. in 3 cases [11] and by Osma et al. in 4 cases out of 39 extracranial complications [12]. However, De Albuquerque Maranhao et al. found that mastoiditis ranked second among extracranial complications after labyrinthine fistula [13].

Facial Paralysis

Considered the second extracranial complication in several series of the literature [10,11,14,15]. Its frequency is estimated at 1-2% in chronic cholesteatomatous otitis [16]. Its incidence in complications is estimated at 0.16 to 5.1% [14]. According to Abada [5] and Osma [12], facial paralysis accounts for 17% and 12.8% respectively. In our series, facial paralysis was found in 3 cases and occupies the 2nd place, which confirms the data of the literature. The natural mechanism incriminated is the direct bone destruction of the fallopian canal, generally at its 2nd portion [16,17], by cholesteatoma known for its significant osteolytic power. Facial nerve decompression during mastoidectomy is discussed. It is systematic for Osma [12] and Yetiser [16] who obtain with this gesture, 60 to 75% of complete regression. This same regression was 84.2% for Balsojevic [17] after simple mastoidectomy and it was complete in 2 cases of our study after the mastoidectomy.

Intracranial complications

In the literature, the most common intracranial complication is bacterial meningitis [5,9,11]. The other complications being, in decreasing order of frequency, intraparenchymal temporal and cerebellar abscesses, lateral sinus thrombophlebitis (TPSL) and subdural and epidural empyema. Brain abscess: This is the most common and serious complication of CCOM. Its frequency is variable in the literature with 17.5% in the study by Osma et al., 52% according to Sharma et al. and 83.3% in the series by Bechraoui [12,18,19]. In our series this complication represented 3 cases including 1 isolated case and in 2 cases associated with other complications (mastoiditis and subdural empyema). The temporal location of the abscess was the most frequent according to the studies of Sharma, Bechraoui and Jain [18-20]. This is explained by the mode of extension of the cholesteatoma which generally takes the attico-antral region with direct extension through lysis of the tegmen tympani.

Concerning management, treatment of CCOM must be early and performed as soon as the patient's neurological state has stabilized [18]. In fact, in the presence of serious signs (mass effect, intracranial hypertension), neurosurgical treatment is preferable as first-line treatment [21]. However, some authors recommend surgery for the abscess and the OMCC at the same time when possible [22,23]. Other authors such as Bechraoui performed otological surgery before neurosurgical treatment [19]. Samuel et al. suggested that neurosurgical treatment and otological treatment performed simultaneously or delayed had the same results [24]. In our study, neurosurgical treatment was performed before otological treatment in 3 cases and performed concomitantly with otological treatment in

1 case. The cholesteatoma surgery of the 3 cases having benefited from a neurosurgical treatment was performed 2 to 6 months later because of concerns about the technical platform. In the study by Tall et al. [11], all the patients had undergone neurosurgical drainage of the abscess before their admission to ENT or concomitantly with an ENT intervention, with the exception of one case where the diagnosis was made at autopsy (1 case died in sheave 2 days before surgical drainage and before otological surgery). Mortality from otogenic abscess is highly variable from 8 to 50% and is correlated with neurological status [24]. In our study, no deaths were noted.

Subdural empyema. Its frequency varies from 2 to 20% [4,12], it was 15.4% in the series of Tall et al. [9]. In our study, this complication was found in 3 cases, including 1 isolated case and 2 cases associated with cerebral abscess and mastoiditis. Tall et al. [11] report 2 cases of subdural empyema associated with other complications. Bechraoui et al. reported a case of subdural empyema associated with a temporal abscess [19]. Delay in treatment would induce progression to abscess, as reported in the study by Tall et al. on 2 patients [11]. The clinic is poor, sometimes limited to localized headaches [16], this was the case in a patient in our study who presented with isolated empyema. Surgical treatment is based on drainage of the empyema by trepanation or craniotomy [25]. The mortality of otogenic subdural empyema is estimated at approximately 12%, the prognosis depending above all on the neurological status of the patient during his treatment [26]. We noted 1 case of death in our series, following septic shock in intensive care. Several authors report the association of several complications, Bechraoui et al. [19] noted six cases or 50%, Abada et al. [5] and Osma et al. [12] report respectively 2 and 3 cases of patients presenting more a complication. Tall et al. report 19 patients (33.3%) with the association of EC complications (14 cases), the association of EC and CI complications in 4 cases [11]. In our study the association of complications was found in 3 cases and concerned EC and IC. The delay in treatment could be the main reason, as a neglected empyema can progress to a cerebral abscess.


Conclusion

Complications of chronic cholesteatomatous otitis media are still common in developing countries. Diagnosed by imaging, they are dominated by extracranial complications which are taken care of by ENT specialists. Collaboration with neurosurgeons remains necessary in cases of intracranial complications. Their early management improves the functional and vital prognosis.

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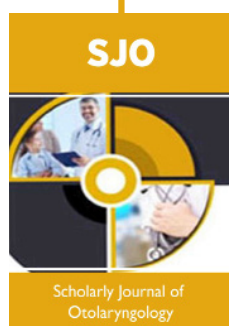
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