

# Unsafe Type of Chronic Suppurative Otitis Media: Epidemiology, Etiology, Classification, Management, Complications and Prognosis

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## Unsafe Type of Chronic Suppurative Otitis Media: Epidemiology, Etiology, Classification, Management, Complications and Prognosis

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### ABSTRACT

We reviewed many literatures on malignant or unsafe type of chronic suppurative otitis media or CSOM. One of the human senses is hearing. Many pathological conditions cause hearing loss, including CSOM. This is caused by middle ear chronic infection with tympanic membrane perforation and ear secretions for at least 2 months. The secretions that come out can be serous, mucous, or purulent. The presence of cholesteatoma is a diagnostic criteria of malignant or unsafe type of CSOM. Cholesteatoma is a cyst containing desquamation of keratin epithelium and usually located in the middle ear, it suppresses the mastoid and epitympanic. Unsafe type CSOM

needs to be diagnosed as soon as possible because it can cause severe complications or even the death. The principle of handling unsafe type of CSOM with cholesteatoma is surgery, the common surgery methods uses in this condition are radical mastoidectomy with or without modification and tympanoplasty. Drugs are only used as an infection suppressant before surgery. The faster diagnosis and treatment given will produce a better prognosis compared to conditions that are already worse with complications.

**Keywords:** cholesteatoma, unsafe type of chronic suppurative otitis media, mastoidectomy.

### INTRODUCTION

The sense of hearing greatly determines the human resources quality.<sup>1</sup> One of the ear disorders occurs due to infectious otitis media (OM), this is an middle ear mucosa, eustachian tube, mastoid antrum, and mastoid cells inflammation.<sup>2</sup> Chronic suppurative (CSOM) is a classification of OM, this is a condition due to chronic infection with perforation of the tympanic membrane and secretions that come out of the middle ear for 2 months or more. Discharged secretions can be serous, mucous, or purulent.<sup>3,4,5</sup> CSOM can be a

continuation of acute otitis media (AOM) that does not heal completely for more than two months.<sup>6</sup> There are two types of CSOM: benign or safe type and malignant or unsafe or atico-antral type.<sup>3</sup> Unsafe type of CSOM is a state of chronic suppurative otitis media with cholesteatoma and perforation of the tympanic membrane in marginal or attic. Cholesteatoma was introduced by John Muller in 1838,<sup>6</sup> it is a cysts containing desquamating keratin epithelium and usually occurs in the middle ear, mastoid and epitympany.<sup>3,4</sup>

This disease is a big problem, especially in developing countries because of high morbidity and mortality due to low awareness of treatment resulting in complications.<sup>7,8</sup> This happens due to poor hygiene factors, socioeconomic factors, low nutrition, population density, and lack of public knowledge of this disease so that they do not seek treatment completely. CSOM is a major cause of hearing loss and deafness. Children who are deaf can experience decreased language, communication, psychosocial problems, and cognitive abilities. Whereas in adults it causes depression, anxiety and anti-social.<sup>10</sup>

This disease can cause extracranial complications and sequelae such as mastoid abscess, facial nerve palsy and many others. It can even cause life-threatening intracranial complications such as brain abscess, thrombophlebitis, meningitis, brain abscess and hydrocephalus otitis.<sup>11</sup> In fact, CSOM is a preventable hearing loss disease.<sup>12</sup>

## DISCUSSION

### Epidemiology

CSOM is the ENT disease that most occurs in developing countries. The incidence is affected by socioeconomic status and race, poor environment, poor health and nutritional status.<sup>13</sup> CSOM is more common among Eskimos, American Indians, and Australian aborigines. However, data shows that 90% of CSOM events worldwide occur in Southeast Asia countries, the Western Pacific, Africa, and minority areas in the Pacific.

World data shows 65-330 million people experience CSOM. Around 60% of them suffer from

significant hearing loss, and 28,000 cases end in death.<sup>6</sup> WHO classifies it in 4 country groups: the highest-prevalent country (> 4%) such as Solomon Islands, India, Australia, and Greenland; high prevalent (2-4%) includes Nigeria, Philippines, Angola, Malaysia, and Mozambique; low prevalent (1-2%); and the lowest prevalent (<1%), such as Saudi Arabia, Gambia, and American Indians.<sup>6</sup>

The prevalence of CSOM in Indonesia in general is 3.8%, this is categorized into high prevalent classification. The data result of a survey to seven provinces in 1996 showed that CSOM was experienced by 3% of the total population.<sup>11</sup> The health survey of Indonesia Sight and Vision Departement to eight provinces of Indonesia in 2012 showed the prevalence of CSOM was 3.1%.<sup>14</sup>

### Etiology

CSOM events are often begins with recurrent otitis media. CSOM starts with acute otitis media (AOM) and tympanic membrane perforation that occurs chronically for >2 months. Things that cause OMA turns into CSOM are (1) late therapy, (2) inadequate therapy, (3) high germ virulence, (4) low endurance and (5) poor hygiene. Below are several factors that cause tympanic membrane perforation becomes persist in CSOM:

- 1 Persistent infection of the mastoid in middle ear resulting the purulent secretions continuously.
- 2 Continued eustachian tube obstruction which reduces the spontaneous closure of the perforation.
- 3 Some large perforations undergo spontaneous closure through

epithelial migration mechanism. At the perforation margin, squamous epithelium can experience rapid growth above the medial side of the tympanic membrane, this will prevent spontaneous closure of the perforation.

Infection factors usually originate from nasopharyngeal inflammation (adenoiditis, tonsillitis, rhinitis, sinusitis), reaching the middle ear through the eustachian tube. Abnormal eustachian tube function is a predisposing factor found in children with down's syndrome and cleft palate. Systemic immune deficiency is the factor that associated with a relatively high incidence of CSOM. Humoral disorders, such as hypogammaglobulinemia and cell-mediated (HIV infection) can occur as chronic ear infections.<sup>15</sup>

Some other factors that become risk factors of CSOM are bacterial or viral infections<sup>16,17,18,19,20</sup> in the upper respiratory tract,<sup>21</sup> autoimmune, allergic,<sup>22</sup> impaired eustachian tube function, and comorbid diseases such as diabetic mellitus.<sup>23</sup>

### Classification

Based on the activity of the secretion that comes out through the external acoustic meatus is divided into two: (1) active chronic suppurative otitis media, characterized by active ear discharge, indicates the existence of an active process and the potential to become progressive. And (2) inactive chronic suppurative otitis media, this is a CSOM case with dry

or wet tympanic cavity but the fluid does not come out actively, indicates a stable and non-progressive state in the pathological process.<sup>2</sup>

Based on cholesteatom, can be divided into two types: (1) congenital cholesteatom: formed when embryonic with intact tympanic membrane without infection signs. Located in the tympanic cavity, the mastoid petrosus area or in the cerebellopontin angle.<sup>2</sup> Thickening of the ectodermal epithelium develops simultaneously with the geniculate ganglion from the medial to the neck part of the malleus bone. This collection of epithelium becomes the epithelial layers of the middle ear. If involution fails, the collection of epithelium becomes congenital cholesteatom. And (2) acquired cholesteatom: formed after the child is born. There are divided into two types: (1) primary acquired cholesteatoma that forms without tympanic membrane perforations, arising from tympanic membrane pars flaxide invagination due to negative pressure in the middle ear caused by tubal disorders (invagination theory). And (2) secondary acquired cholesteatoma: formed after perforation of the tympanic membrane so that the skin epithelium of the ear canal or perforation edge enters into middle ear (migration theory). Or due to tympanic cavity mucosal metaplasia due to long periode of inflammation and infections (metaplasia theory).<sup>2,6,24,25,26</sup>



Figure 1. Congenital cholesteatoma<sup>27</sup>

### Treatments

Unsafe type of CSOM is progressive, the more extensive cholesteatoma will destroy the surrounding bone. If there is a secondary infection it will cause local septic and septic necrosis in the soft tissue, these conditions may cause many complications. During the treatment, the anatomical changes and the infection process in the ear must be observed. CSOM with cholesteatoma is absolutely necessary some surgery treatment, while drugs are used as infection suppressors before surgery.<sup>2,3,13</sup> In limited cholesteatoma cases or patients who are impossible to undergo surgery either under local anesthesia or general anesthesia, can be given conservative treatments with aural toilet. Here we summarize the treatments that can be given to unsafe type of CSOM patients:

#### a. Non-surgical

Aural irrigation is the process of cleaning the ear from earwax, foreign bodies or ear fluid using an irrigation fluid in the form of 0.9% NaCl, 2% acetic acid or 3% peroxide.<sup>29</sup> The fluid is streamed through an external auditory canal using an irrigation syringe and hushed up to flow out for 5-10 minutes. It also can be done aural toilet using suction and cotton bud.



Figure 2. Acquired cholesteatoma<sup>28</sup>

The purpose of aural toilet is to clean the middle ear so that topical medication can penetrate into soft tissue.<sup>30</sup>

Furthermore, the patients are given antibiotics. Ofloxacin can be given as topical antibiotics ear drops, and anti-*Pseudomonas sp* (class IV quinolone and sepalosporin class IV) can be given as systemic antibiotics.<sup>29</sup>

#### b. Surgery

The treatment principle of unsafe type of CSOM is surgery, that is mastoidectomy with or without tympanoplasty.<sup>19</sup> If there is a subperiosteal abscess, the incision of the abscess should be performed before mastoidectomy. There are many surgical techniques in CSOM cases. Below are several surgical methods for unsafe type of CSOM:

1. Radical mastoidectomy, performed in unsafe type of CSOM with infection or widespread cholesteatom. The mastoid cavity and tympanic cavity are cleaned of all pathological tissue; then the boundary wall between the middle ear and the outer ear canal with the mastoid cavity is broken down so the anatomical structure becomes one room. The aim of this method is to remove

pathological tissue and prevent intracranial complications, but hearing function cannot be improved. The disadvantage of this operation is the patients are not allowed to swim for a lifetime.<sup>2,29</sup>

2. Radical mastoidectomy with modification was performed on CSOM with cholesteatom in the affected area but the tympanic cavity was not damaged. The mastoid cavity is cleansed and the ear canal's posterior wall is lowered, the purpose of this technique is to remove the pathological tissue from mastoid cavity and maintain the remaining hearing function.<sup>2,29</sup>
3. Tympanoplasty, the purpose of this surgery technique is for causative elimination and hearing improvement without performing radical mastoidectomy.<sup>31</sup>

c. After surgery<sup>29</sup>

1. Antibiotics: cephalosporin as anti-*Pseudomonas sp* can be given as antibiotic, such as its fourth generation. This type of antibiotic is also an option for pediatric patients that are contra indicated to

quinolon antibiotics. In the case of Methicillin-resistant

*Staphylococcus aureus* (MRSA) infection, fifth generation cephalosporins can be given. While the use of gentamicin can be given if other not-ototoxic drugs are difficult to obtain or if they are the only antibiotics that sensitive to grown bacteria in the culture test. Intravenous metronidazole can be given if we suspects the anaerob bacteria growth.

2. Nonopioid or opioid analgesics can be given as a symptomatic treatment.
  3. Intravenous steroids (if necessary)
  4. The patients must be hospitalized if at the first time their visit are diagnosed with CSOM with intracranial complications.
- d. Patient educations by giving some advises to immediately undergo surgery, explaining about hearing loss and other complications that might occurs, advise the patients to avoid their ears from water.<sup>29</sup>

Below is the diagnosis and management algorithm in chronic otitis media according to Joseph B Nadol.<sup>32</sup>

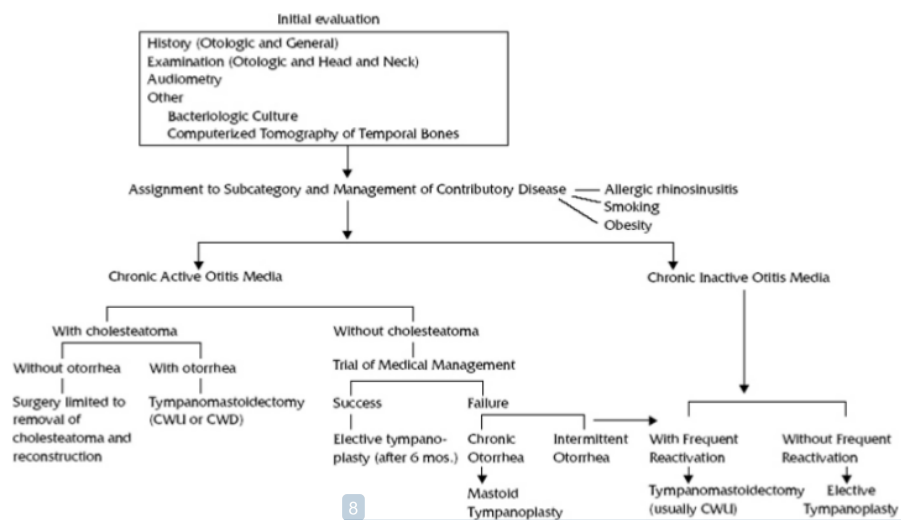


Figure 3. Algorithm for diagnosis and management of chronic otitis media.<sup>32</sup>

### Complications

Chronic suppurative otitis media can be a danger due to its complications, especially in the type of CSOM. Complications can occur intra temporal and intracranial. Intra temporal complications such as subperiosteal abscesses, labyrinthitis, and facial paresis. Whereas intracranial complications such as extradural abscesses, perisinus abscesses, lateral sinus thrombophlebitis, meningitis, brain abscesses, and otic meningitis.<sup>31</sup>

### Prognosis

CSOM patients have a better prognosis if they are treated quickly. Loss of hearing function due to conduction disturbance can be restored surgically, but the results are most likely imperfect.

Late treatments causes death due to complications of CSOM, this occurs in 18.6% of patients because they have experienced meningitis as an intracranial complication.<sup>13,29</sup>

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### CONCLUSION

Unsafe type of chronic suppurative otitis media or CSOM is marked by cholesteatoma. Destruction of hearing bones and surrounding tissue by cholesteatoma will interferes hearing function and quality of life. This condition requires an adequate treatment as soon as possible to prevents further disease course that causes some complications and death.

The most appropriate treatment for unsafe type of CCSOM with cholesteatoma is surgery to eradicating the disease and dry ears to avoid recurrent infections. The surgical approach must be adjusted for each patient according to the general condition and the extent of the cholesteatoma.

### REFERENCES

1. RI Ministry of Health. Curriculum and Indra Health

- Training Module for Puskesmas Nurses. Jakarta: Indonesian Ministry of Health; 2012.
2. Djaafar ZA. Medical Ear Nose Throat Textbook 6. Jakarta Edition: University of Indonesia Medical Faculty Publisher Institute; 2007
  3. Nursiah S. Aerobic Germ Patterns Causing CSOM and Sensitivity to Some Antibiotics in the ENT Section of FK USU / RSUP. H. Adam Malik Medan. Medan: FK USU. 2003.
  4. World Health Organization. Chronic suppurative otitis media burden of illness and management options. Child and Adolescent Health and Development Prevention of Blindness and Deafness. Geneva, Switzerland: World Health Organization. 2004
  5. Farida, et al. Allergy as a Risk Factor for the Occurrence of Benigne-Type Chronic Suppurative Otitis Media. Makassar: Hasanuddin University. 2009
  6. Iskandar N, Soepardi E & Bashiruddin J, et al. Medical Textbooks Ear Nose Throat Head and Neck. 6. Jakarta Edition: FKUI Publisher Institute; 2007
  7. World Health Organization. Prevention of hearing impairment from chronic otitis media: report of a WHO (No. WHO / PDH / 98.4). Geneva, Switzerland: World Health Organization 1998
  8. Edward Y & Mulyani S. Management of Hazardous Type Suppurative Otitis Media. Ear Nose Throat, Head and Neck Surgery (ENT-KL). Padang: Andalas University Faculty of Medicine, 2011
  9. Zahara D. Overview of Chronic Suppurative Otitis Media (CSOM) patients in H. Adam Malik General Hospital Medan. Medan: University of North Sumatra. 2013
  10. Nugroho, et al. Quality of Life of Chronic Suppurative Otitis Media Patients. Medica Hospitalia. 2013; 2 (1): 30-32
  11. Kurniadi A. Characteristics of Chronic Suppurative Otitis Media Patients at Haji Adam Malik General Hospital in 2008-2009. Medan: University of North Sumatra. 2011
  12. RI Ministry of Health. Basic health research (Risksedas) 2013. Jakarta: Health Research and Development Agency, 2013
  13. Aboet A. Chronic Middle Ear Inflammation. Inauguration Speech of the Permanent Professor of Medical Sciences, Ear Nose Throat, Head Neck Surgery. Medan: University of North Sumatra. 2007
  14. RI Ministry of Health. Indonesian Demographic and Health Survey. Jakarta: Ministry of Health Republic of Indonesia, 2012
  15. Zhang Y, Xu M, Zhang J, Zeng L, Wang Y, Zheng QY. Risk factors for chronic and recurrent otitis media-a meta-analysis. PLoS One. 2014; 9 (1): e86397. Published 2014 Jan 23. DOI: 10.1371 / journal.pone.0086397



16. Huldani, Sukmana BI, Rahmiati, Pujiningtyas A & Savitri E, Fauziah, Nihayah U. Cellular Immunity of River Water Consumers and Bandarmasih Municipal Waterworks Consumers. *Indian Journal of Public Health Research & Development*. 2019; 10 (7): 823. DOI: 10.5958 / 09765506.2019.01674.7
17. Huldani, Pattelongi I, Massi MN, Idris I, Bukhari A, Widodo ADW, Achmad H. Research Reviews on the Effect of Exercise on DAMP's, HMGB1, Proinflammatory Cytokines and Leukocytes. *SRP*. 2020; 11 (4): 306-312. DOI: 10.31838 / srp.2020.4.44
18. Eso A, Uinarni H, Tommy T, Sitepu RK, Effendi IK, Ariestiyanto JC, Martamba HC, Arifin EM, Mawu FO, Sukmana BI, Huldani. A Reviews on Use of sea cucumber as a treatment for oral cancer. *SRP*. 2020; 11 (5): 299-307. DOI: 10.31838 / srp.2020.5.44
19. Achmad H, Aflanie I, Putra AP, Noor F, Carmelita AB, Fauziah, Sukmana BI, Huldani. An Overview of the Potential of Sea Cucumbers with Antioxidants and Antiviral Contents as Nutritional Supplements. *SRP*. 2020; 11 (6): 761-770. DOI: 10.31838 / srp.2020.6.112
20. Huldani, Pattelongi I, Massi MN, Idris I, Bukhari A, Widodo ADW, Uinarni H, Carmelita AB, Trisia A, Gunma S, Prayudhistya BKA, Achmad H. Cortisol, IL-6, TNF Alfa, Leukocytes and DAMP on Exercise. *SRP*. 2020; 11 (6): 474-485. DOI: 10.31838 / srp.2020.6.74
21. Hsin CH, Tseng HC, Lin HP, Chen TH. Post-irradiation otitis media, rhinosinusitis, and their interrelationship in nasopharyngeal carcinoma patients treated by IMRT. *Eur Arch Otorhinolaryngol*. 2016; 273 (2): 471-477. DOI: 10.1007 / s00405-015-3518-8
22. Orji FT, Dike BO, Oji O. Determinants of non-healing ear discharge in chronic suppurative otitis media in a developing country. *Eur Arch Otorhinolaryngol*. 2015; 272 (10): 2713-2718. DOI: 10.1007 / s00405-014-3255-4
23. Adams GL, Boies L, Highler P. *The ENT Boies Textbook*. 6th edition. Jakarta: EGC; 1997
24. Schürmann M, Greiner JFW, Volland-Thurn V, et al. Stem Cell-Induced Inflammation in Cholesteatoma is Inhibited by the TLR4 LPS-RS Antagonist. *Cells*. 2020; 9 (1): 199. DOI: 10.3390 / cells9010199
25. Peng T, Ramaswamy AT, Kim AH. Common Otolologic Surgical Procedures: Clinical Decision-Making Pearls and the Role of Imaging. *Neuroimaging Clin N Am*. 2019; 29 (1): 183-196. DOI: 10.1016 / j.nic.2018.09.008
26. Remenschneider, AK, & Cohen, MS (2017). Endoscopic management of congenital cholesteatoma. *Operative Techniques in Otolaryngology-*

- Head and Neck Surgery, 28 (1), 23-28.
27. LPS Rosito, Canali I, Teixeira A, Silva MN, Selaimen F, Costa SSD. Cholesteatoma labyrinthine fistula: prevalence and impact. Braz J Otorhinolaryngol. 2019; 85 (2): 222-227. DOI: 10.1016 / j.bjorl.2018.01.005
  28. Adams GL, Browning GG, Merchant SN, Kelly G, Swan IR, Canter R & Mckerrow WS. Chronic otitis media. Scott-Brown's otorhinolaryngology, head and neck surgery. 2008; 3: 3395-401.
  29. Rosyidah N. Otoendoscope Diagnostic Tests Compared with Direct Oscopes in Diagnosing Ear Abnormalities at the Age of 60 and Over at BSD and Melania Rempoa Nursing Home. 2018
  30. Munilson J & Nelvia T. Revised Mastoidectomy in Dangerous Type Chronic Suppurative Otitis Media. Andalas Health Journal. 2015; 4 (3)
  31. Helmi. Chronic suppurative otitis media. Jakarta: University of Indonesia Faculty of Medicine Publisher Institute; 2005
  32. Ento Key - Fastest Otolaryngology & Ophthalmology Insight Engine. Review of Algorithm for Management of Primary Chronic Otitis Media. Accessed July 12, 2020, from <https://entokey.com/joseph-p-nadol-jr/>

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