

Mastoiditis and Mastoid Abscess Management Guidelines

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Abstract

Mastoiditis is a relatively common complication of otitis media either acute or chronic. CT is considered the imaging modality of choice for patients with acute mastoiditis. If a complication is discovered, MRI should follow, to help the surgical planning. The generally accepted initial therapeutic approach to mastoiditis is based on intravenous antibiotic treatment and myringotomy, provided there is no abscess or other complication on hospital admission. Mastoidectomy is an effective treatment for mastoiditis associated with mastoid abscess, cholesteatoma, intracranial complications and otorrhoea persisting for more than 2 weeks despite adequate antibiotic treatment.

Keywords :

Mastoiditis and mastoid abscess

Medical treatment

Myringotomy

mastoidectomy

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List of abbreviations

The abbreviation	The meaning
AOM	Acute otitis media
C&S	Culture and sensitivity
CHL	Conductive hearing loss
CT	Computed tomography
CSOM	Chronic suppurative otitis media
EAC	External auditory canal
E. coli	Escherichia coli
H. influenza	Haemophilus influenza
I&D	Incision and drainage
ICC	Intracranial complication
IJV	Internal jugular vein
IV	Intravenous
MRI	Magnetic resonant imaging
P. aeruginosa	Pseudomonas aeruginosa
PTA	Pure tone audiometry
SPECT	Single photon emission computed tomography
Staph. aureus	Staphcoccus aureus
Strept. pneumonia	Streptococcus pneumonia
Strept. Pyogenes	Streptococcus pyogenes

INTRODUCTION

Mastoiditis is used to be a relatively common complication of suppurative otitis media either acute or chronic. There is extension of infection beyond the mucoperiosteal lining of the middle ear cleft to involve the bony septae of the mastoid process. Mastoiditis occurs in two main forms, acute & chronic. (Mawson 1967)

Acute mastoiditis is an explosive coalescence of air cells with formation of an empyema and only occurs in cellular mastoids. Chronic mastoiditis is a slow penetration of acellular bone by granulations accompanied by hyperemic decalcification of bone. In most cases the otitis media is concurrent either acute or chronic. (Mawson 1967)

With the advent of broad spectrum antibiotics, the clinical course of middle ear disease has been altered. There is occasional suppression of the presenting signs and symptoms of mastoiditis secondary to acute middle ear disease, causing the clinician to have a false sense of security following apparent resolution of the middle ear infection. The course may be so insidious that the first awareness of mastoiditis may be following the presentation of an intracranial complication such as meningitis, lateral sinus thrombosis, or brain abscess. (Holts and Gates 1983)

Masked mastoiditis is a variant of acute mastoiditis which occurs as a cold coalescence of air cells in an infection damped down but

unextinguished by antibiotics which are mishandled. Latent mastoiditis is seen most commonly when an inadequate dosage of antibiotics has been given, particularly when the tympanic membrane does not rupture. After 2 weeks of apparent normality, otitis media flares up again & may present as mastoiditis or one of its complications. (Mawson 1967)

In a study by Schachen et al. (1991), they found an obstruction in the aditus ad antrum mainly by granulation tissue in 19.2 % of 229 human temporal bones with otitis media or mastoiditis. The pathological conditions were more seen in cases with obstruction. It appears that obstruction of the aditus ad antrum contributes to the pathogenesis and accentuates pathologic conditions in otitis media.

The infection may progress through the adjacent bones or the emissary veins beyond the mastoid air cells and may present as a subperiosteal abscess or as an intracranial complication. (Niv et al. 1989)

The incidence of acute mastoiditis in patients with acute otitis media (AOM) dropped from 50% at the turn of the 20th century to 6% in 1955, and to 0.4% in 1959. By 1993, only 0.24% of patients with acute otitis media (AOM) developed acute mastoiditis. At the same time, however, the rate of subperiosteal or other extra/intracranial complications increased from 20% to nearly 50% of patients with acute mastoiditis in some centers. (Dudkiewicz et al. 2005)

Additionally, during the time of Friedrich Bezold (1824-1908), 20% of patients with mastoiditis developed a subperiosteal abscess. Interestingly, this incidence has increased; today nearly 50% of patients diagnosed with coalescent mastoiditis have subperiosteal abscess. (Spiegel et al. 1998)

AIM OF WORK:

In this study, we will review the different modalities of management of mastoiditis and mastoid abscess. After evaluating the different modalities, our aim is to set clear guidelines for the management strategy of this condition.

CHAPTER (I)

INCIDENCE, AETIOLOGY AND PATHOLOGY

Prior to the antibiotic era, one quarter to one half of patients with acute otitis media and chronic suppurative otitis media presented with mastoiditis, subperiosteal abscesses and sigmoid sinus thrombophlebitis . (Proctor 1966)

The incidence of mastoiditis in the paediatric age has consistently increased over the last two decades even in industrialized countries, the same negative trend has been observed for suppurative intracranial complications. (Ghaffar et al. 2001)

Although several literature reports show that the incidence of acute mastoiditis has decreased over the last few years, there is evidence that it has recently been rising again; this phenomenon could be due to the increasing antibiotic resistance of microorganisms like Streptococci to penicillin, in particular the penicillinase-producing *S. pneumoniae* and the β -lactamase producing strains of *Moraxella* and *Haemophilus* . (Tarantino et al. 2002)

In addition, the initial treatment can be insufficient (duration, dose) or improper, leading to an increase in complications such as acute mastoiditis in the majority of cases. (Vera-cruz et al. 1999)

In a study of intracranial complications of infectious diseases done by Gower and McGuirt (1983), 2% to 6% of patients developed an intracranial suppurative complication, with a fatal outcome in three quarters.

Despite that the antibiotics reduced the complication rate to 0.02 - 0.15%, the mortality from complications of otitis media is still high (20%), especially in populations with lower socioeconomic conditions. (Osma et al. 2000)

In a study done by Tarantino et al. (2002), 60% of their patients, in the 30 days before admission to their department, showed evidence of acute or recurrent suppurative otitis media, which can be interpreted as a risk factor of mastoiditis. (Tarantino et al. 2002)

Before antibiotics were introduced, acute mastoiditis was a disorder of older children. An increased incidence in infants aged under 2 years have been documented. This phenomenon is due to the fact that young children are sent early to day care centers, where they are exposed to the risk developing recurrent AOM. (Tarantino et al. 2002)

Although the majority of middle ear infections involve the mastoid cellular tract, a subperiosteal abscess or an exteriorization into the neck (Bezold's abscess) occurs in less than 2% of AOM episodes. (Spiegel et al. 1998)

Acute mastoiditis can develop without a previous history of recurrent AOM or after a single episode of AOM. (Zanetti and Nassif 2006)

A masked mastoiditis should be suspected if there is persistent pain or otorrhoea despite 2 weeks of antibiotic treatment. (Luntz 2001)

In a study done by Zanetti and Nassif (2006), 37 of their 44 patients (84%) developed mastoiditis after the first recognized episodes of AOM. Antibiotic treatment prior to admission does not seem to prevent the onset of mastoiditis.

The age specific incidence in **figure 1** , shows that peak incidence was in the second and third year of life, 22 and 22.4 per 100,000 children, respectively.

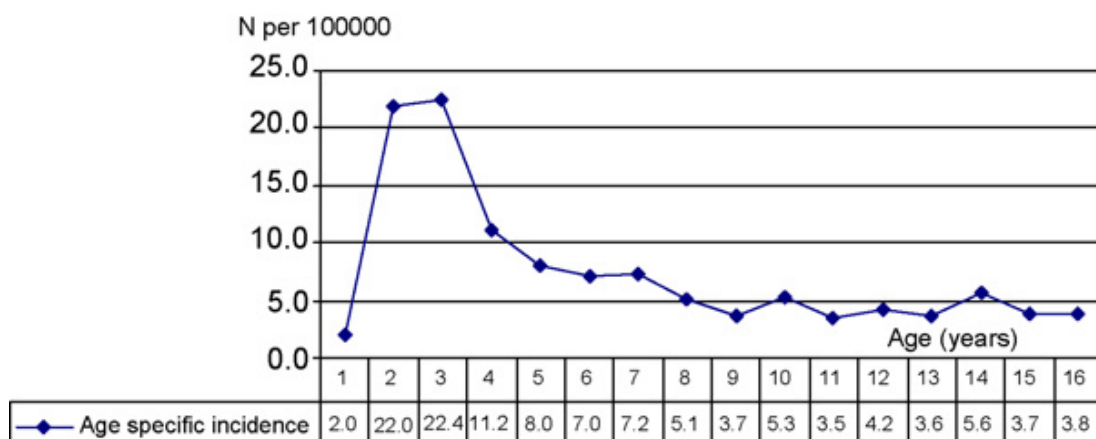


Fig. 1: Age specific incidence of acute mastoiditis based on national data from the Norwegian Patient Registry 1999—2005. (Kværner et al. 2007)

The incidence of acute mastoiditis was twice as high in children below 2 years, with peak age in the second and third year of life. During maturation of the immune system children are vulnerable to infections.