

## Complications of Acute Otitis Media: Study in a Secondary Care Hospital, Sirajgonj, Bangladesh.

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### Abstract

**Background:** Acute otitis media (AOM) is a painful type of ear infection. It occurs when the area behind the eardrum called the middle ear becomes inflamed and/or infected. Complications of acute otitis media consists of perforation of the ear drum, mastoiditis and rarely intracranial complications can occur, such as bacterial meningitis, brain abscess, or dural sinus thrombosis.

**Aim of the study:** The aim of this study was to dig out the exact scenario of complications associated with acute otitis media.

**Methods:** This observational prospective study was conducted in the Department of Otolaryngology & Head-Neck Surgery, Sirajgonj 250 Bed Bongamata Sheikh Fazilatunnesa Mujib General Hospital, Sirajgonj, Bangladesh during the period from January 2018 to December 2019. In total 86 patients with acute otitis media attended to the Department of Otolaryngology & Head-Neck Surgery of the mentioned hospital completed the full tenure of the treatment were finalized as the study population. Data were collected from the participants by using pre-designed questioner and disseminated by several formats of MS Office program.

**Result:** In analyzing the complications among the participants we found 77.91% (n=67) cases of acute mastoiditis, 51.16% (n=44) cases of latent mastoiditis, 8.14% (n=7) cases of facial nerve paralysis, 6.98% (n=6) cases of sigmoid sinus thrombosis, 4.65% (n=4) cases of epidural abscess, 3.49% (n=3) cases of facial nerve decompression and 2.23% (n=2) cases of sub-periosteal abscess.

**Conclusion:** The commonest cause of acute otitis media may be the infection by gram positive bacteria. On the other hand the commonest complication among the patients with acute and chronic otitis media is mastoiditis. This disease is very common in children.

**Key words:** Acute otitis media, Complications, AOM, COM.

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### I. Introduction

Acute otitis media (AOM) is a painful type of ear infection. It occurs when the area behind the eardrum called the middle ear becomes inflamed and/or infected. Complications of acute otitis media consists of perforation of the ear drum, mastoiditis and rarely intracranial complications can occur, such as bacterial meningitis, brain abscess, or dural sinus thrombosis. In fact, OM concerns the middle ear and is further delineated as otitis media with effusion (OME) or acute otitis media (AOM). In practice differentiating AOM from OME can be subjective, which can result in overtreatment of OME with antibiotics<sup>1</sup>. Otitis media is common in children but other people of several age also suffer from OM. OM in adults is thought to be an infrequent diagnosis, and the epidemiology of AOM and OME in adults has rarely been described<sup>2</sup>. There are no practice guidelines for AOM in adults; however, antibiotic treatment. But recommendations are similar to those for children<sup>3</sup>. In children with non-severe AOM, recommendations are determined by the age of the patient and generally include immediately prescribing antibiotics or observing for resolution of symptoms within 48 to 72 hours before prescribing anti-biotics<sup>4</sup>. The drug of choice for AOM is amoxicillin. Besides this amoxicillin/clavulanate is reserved for specific circumstances. Guidelines recommend pain management and topical antibiotics with or without topical hydrocortisone for most adult and pediatric patients with uncomplicated AOE<sup>5</sup>. During the last five decades the rapid increase in welfare and the development of

healthcare systems in industrialized countries have made it possible to offer proper treatment to every patient where necessary. At the same time, antibiotics have been widely available and have led to a notable decrease in the number of severe complications of OM and in the need for operative treatment.<sup>6</sup> Antibiotics are the basis for the treatment of OM and its complications, but the increasing bacterial resistance to antibiotics alters the clinical picture of OM and its complications. The use of antibiotics can sometimes obscure the symptoms of infection and lead to a delay in diagnosis and proper treatment.<sup>7</sup> Latent mastoiditis with subtle local and general symptoms and potentially disastrous consequences<sup>8</sup> is one example of the adverse effects of prolonged antibiotic treatment of OM and delayed diagnosis of complications. Although the high use of antibiotics in the treatment of acute otitis media (AOM) is associated with a lower incidence of acute mastoiditis,<sup>9</sup> bacterial resistance to antibiotics may contribute to the increasing rate of acute mastoiditis.<sup>10</sup> The early complication of OM in adult patients is more often chronic otitis media (COM) or cholesteatoma, and adults have more other diseases than do paediatric patients. Therefore the clinical picture of the disease and the treatment options are somewhat different in these two groups. Because of the low incidence, clinical experience with the diagnosis and treatment tradition many cases remain untreated.

## II. Objectives

**General Objective:** To collect the information regarding the complications associated with acute otitis media.

**Specific Objective:** a) To observe the age range and age distribution of the patients with acute otitis media.

b) To collect information regarding the uses of antibiotics in acute otitis media.

## III. Methodology & Materials

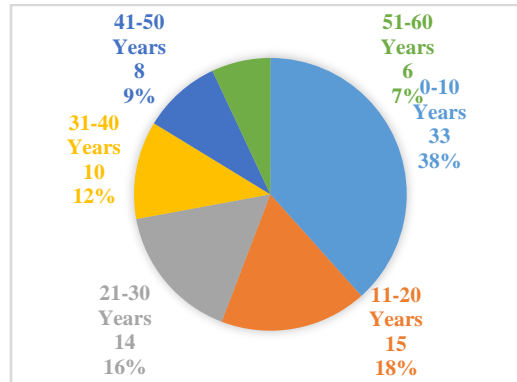
This observational prospective study was conducted in the Department of Otolaryngology & Head-Neck Surgery, Sirajganj 250 Bed Bongamata Sheikh Fazilatunnesa Mujib General Hospital, Sirajganj, Bangladesh during the period from January 2018 to December 2019. In total 86 patients with acute otitis media attended to the Department of Otolaryngology & Head-Neck Surgery of the mentioned hospital completed the full tenure of the treatment were finalized as the study population. The age range of the participants was 0-60 years. The questionnaire was prepared to collect the information about the patient's history, demographics, previous development and treatment of AOM before attended to the hospital and about possible residual symptoms after treatment. The audiometric outcome was evaluated using the guidelines of American Academy of Ophthalmology and Otolaryngology. The inclusion diagnosis of acute otogenic intra-temporal complications included acute or latent mastoiditis, labyrinthitis, acute petrositis or facial paralysis in connection with OM (AOM, COM and COM with cholesteatoma). The diagnostic criteria for acute mastoiditis were a clinical picture of AOM with at least one of the following symptoms or signs: post-auricular tenderness, erythema, swelling, fluctuation of the mastoid area and protrusion of auricle in combination with radiological evidence of mastoid infection (Effusion in the mastoid with signs of bony septal destruction). This study protocol was approved by the ethics committee of the Sirajganj 250 Bed Bongamata Sheikh Fazilatunnesa Mujib General Hospital, Sirajganj, Bangladesh. Data were collected from the participants by using pre-designed questioner and disseminated by several formats of MS Office program.

## IV. Result

In this study 86 patients were finalized as the study population. Among them 45 were male which was 52.33% and 41 were female which was 47.67% of study population. In analyzing the age of the participants we found, the highest number of patients were from 0-10 years' age group which was 33.38% of the study population. Then 15.18%, 14.16%, 10.12%, 9% and 7% were from 11-20, 21-30, 31-40, 41-50 and 51-60 years' age group respectively. The age range of the participants was 0-60 years and the mean ( $\pm$ SD) age was  $24.75 \pm 2.50$  years. In this study in most of the cases bacterial infection had been found. The highest number of infections were occurred by gram positive bacteria. Among cases infected by gram positive bacteria in 57%, 13% and 6% infection *Staph. Aureus*, *Cougulase -ve Staph* and *Streptococcus pyogens* were responsible. On the other hand, among cases infected by gram negative bacteria in 21%, 5%, 3% and 2%, infection *Pseudomonas aeruginosa*, *Proteus mirabilis*, *E. coli* and *Citrobacter spp.* were responsible. Besides these, in 1 patients infection caused by anaerobic bacteria (*Bacteroids spp.*) had been found and in 10% cases we did not found any association of any micro-organism. Lastly in analyzing the complications among the participants we found 77.91% (n=67) cases of acute mastoiditis, 51.16% (n=44) cases of latent mastoiditis, 8.14% (n=7) cases of facial nerve paralysis, 6.98% (n=6) cases of sigmoid sinus thrombosis, 4.65% (n=4) cases of epidural abscess, 3.49% (n=3) cases of facial nerve decompression and 2.23% (n=2) cases of sub-periosteal abscess.

**Table I:** Age distribution of participants (N=86)

Age (Years)	n	%
0-10	33	38.37%
11-20	15	17.44%
21-30	14	16.28%
31-40	10	11.63%
41-50	8	9.30%
51-60	6	6.98%



**Figure I:** Age distribution of participants (N=86)

**Table I:** Microorganisms isolated in positive cultures among participants (N=86)

Organism	n	%
<b>Gram positive</b>		
Steph. aureus	49	57%
Couglase -ve Staph	11	13%
Streptococcus pyogens	5	6%
<b>Gram negative</b>		
Pseudomonas aeruginosa	18	21%
Proteus mirabilis	4	5%
E. coli	3	3%
Citrobacter spp.	2	2%
<b>Anaerobe</b>		
Bacteroids spp.	1	1%
<b>Non-bacteria</b>		
No growth	9	10%

**Table II:** Complications among the participants in number (N=86)

Complications	n
Acute mastoiditis	67
Latent mastoiditis	44
Facial nerve paralysis	7
Sigmoid sinus thrombosis	6
Epidural abscess	4
Facial nerve decompression	3
Subperiosteal abscess	2

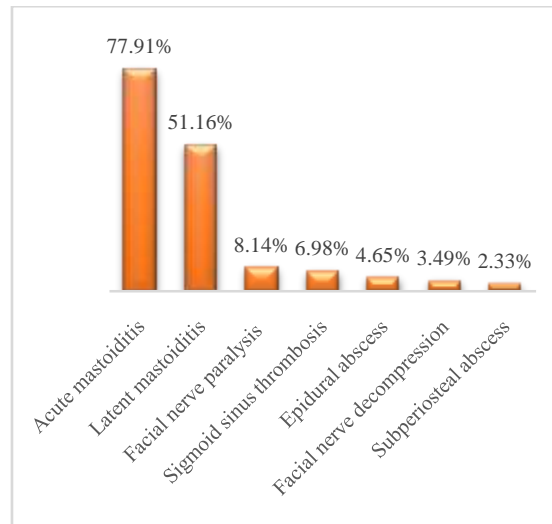


Figure II: Complications among participants in percentage (N=86)

## V. Discussion

The aim of this study was to dig out the exact scenario of complications associated with acute otitis media. Severe complications of AOM are rare today and only few studies<sup>11</sup> focusing on the adult patients with intra- temporal or intracranial complications of AOM has been published recently. Although we have many limitations, this study gives a good general view on the subject. Special attention has been given in the material collection and evaluation, and only patients with radiological or operative confirmation of complication were included. All the needed material was collected from the chart review and the patient questionnaire prepared on the native language was used to confirm the results. AOM is associated with several types of complications but it seems that the proportion of COM and cholesteatoma is decreasing. Like in earlier reports<sup>12</sup> concerning acute complications of AOM and COM, also in this study, acute mastoiditis was the most frequently found single intratemporal complication followed by facial paralysis, latent mastoiditis and labyrinthitis. In our study we found 77.91% (n=67) cases of acute mastoiditis, 51.16% (n=44) cases of latent mastoiditis, 8.14% (n=7) cases of facial nerve paralysis, 6.98% (n=6) cases of sigmoid sinus thrombosis, 4.65% (n=4) cases of epidural abscess, 3.49% (n=3) cases of facial nerve decompression and 2.23% (n=2) cases of sub-periosteal abscess. The high proportion of mastoiditis is a sign of difficulties in diagnosing adult patients complicated ear infections, leading to delay in the treatment. The incidence of intracranial complications was strongly associated with latent mastoiditis, chronic middle ear infection and cholesteatoma as in earlier studies.<sup>13</sup> The overall number of intracranial complications was low, but the proportion of intracranial abscesses was higher than in previous reports.<sup>14</sup> The proportions of different types of OM in the patients with intracranial complications were similar as in the study by Barry et al.<sup>15</sup> They studied 79 adults with otogenic intracranial complications and found AOM in 41%, COM in 15% and COM with cholesteatoma in 22% of cases. The availability of antibiotics decreased the number of intra-temporal and intracranial complications of OM significantly in Finland from the 1950s to the 1970s,<sup>16</sup> and the incidence has remained low ever since then (0.32/100 000). Antibiotic treatment for AOM before the complication was associated with lower number of performed mastoidectomy. However, the time from the beginning of the ear symptoms to the diagnosis of the complication was not significantly associated with the performed operative treatment. Antibiotics form the basis for the treatment of complications of OM, but the indications for operative measures and their timing is a constant subject of discussion in the literature. In our study children were suffering from otitis media in a large number. Myringotomy with or without tympanostomy tube placement is beneficial to ensure the drainage of the middle ear and to harvest a specimen for bacterial culture. According to the results of our study and earlier studies with children,<sup>17</sup> operative treatment is suggested for the patients with acute complications of OM when there are signs of abscess forming intratemporal complication or intracranial complication or when COM or cholesteatoma is behind the acute complication. Mastoiditis without further complications usually responds to more conservative treatment. In this study, mastoidectomy was performed in a large number of patients and four of the operations were accompanied by the evacuation of an intracranial abscess. This is markedly higher proportion than 35% in previous report by Barry et al.<sup>15</sup> In AOM with facial paralysis, Ellefsen and Bonding<sup>18</sup> have shown that recovery is significantly associated with the severity of paralysis and this finding was apparent also in the present study. In adults, facial paralysis associated with OM is often accompanied by COM and cholesteatoma.<sup>12</sup> Although the risk of a complicated middle ear infection is lower today, the danger of complications still remains. In this study, the proportion of the adult patients with hearing loss seemed to be

significantly higher than in earlier reports.<sup>15</sup> However, the lack of pre-complication audiograms should be remembered when the results are considered. Labyrinthitis induced the most confound inner ear damage, and therefore it was the single most disabling form of intratemporal complications. The hearing loss of the patients with labyrinthitis was profound or total in all cases. Still, the vertigo associated with labyrinthitis was well compensated in all the patients. Antibiotic treatment has decreased the mortality associated with the complications of OM, but it is still high in countries with a developing healthcare system.<sup>13,14</sup> The overall mortality (2%) associated with the intratemporal and intracranial complications of OM in this study was at the same level as described earlier (1.3–5%).<sup>15</sup> The mortality associated with intracranial complications (12.5%) was comparable with the 10% reported by Gower and McGuirt.<sup>19</sup> The death of one patient reminds of the potential dangers of OM. Special awareness is needed when a patient with OM complains of headache or develops neurological symptoms. The development of an intracranial complication was due to the delay in the diagnosis of the complication. This finding reflects the difficulty in recognizing and understanding the signs and symptoms of an ongoing and progressing ear infection in adults<sup>20</sup>.

#### **Limitations of the study**

This was a single centered study with a small sized sample. So the findings of this study may not reflect the exact scenario of the whole country.

### **VI. Conclusion and recommendations**

The commonest cause of acute otitis media may be the infection by gram positive bacteria. On the other hand, the commonest complication among the patients with acute and chronic otitis media is mastoiditis. This disease is very common in children. These findings of the study may be helpful in treating patients with acute otitis media. For getting more specific findings we would like to recommend for conducting more studies regarding the same issue with larger sized sample.

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