

IJMA

INTERNATIONAL JOURNAL OF MEDICAL ARTS



Volume 3, Issue 3 [Summer (July-September) 2021]



J-Gate
INDEX

<http://ijma.journals.ekb.eg/>

Print ISSN: 2636-4174

Online ISSN: 2682-3780

About IJMA [last updated July, 1st, 2021]

- ✓ International Journal of Medical Arts is the Official Journal of the Damietta Faculty of Medicine, Al-Azhar University, Egypt
- ✓ It is an International, Open Access, Double-blind, Peer-reviewed Journal
- ✓ Published four times a year
- ✓ The First Issue was published in July 2019
- ✓ Published under the following license: Creative Commons Attribution-ShareAlike 4.0 International Public License (CC BY-SA 4.0). It had updated from the Creative Commons license [CC BY] in volume 2, Issue 4, October 2020 About IJMA
- ✓ The Egyptian Knowledge Bank hosts the web site of IJMA
- ✓ The Egyptian Knowledge Bank supports IJMA
- ✓ IJMA follows the regulations of the International Committee of Medical Journal Editors
- ✓ IJMA is indexed in the "Directory of Open Access Journals" [15 January 2021].
- ✓ IJMA is indexed in JGate [29-6-2021]
- ✓ IJMA is a member of the International Society of Managing and Technical Editors
- ✓ Listed in "Index Copernicus", "Publons", "Academic resource index [ResearchBib]", "Electronics journal library", "Eurasian Scientific Journal Index", and "Citefactor"
- ✓ IJMA introduced to the search engine [BASE] through DOAJ

Click image to reach the page



Egyptian Knowledge Bank

DOAJ



INDEX COPERNICUS
INTERNATIONAL



ESJI Eurasian Scientific Journal Index
www.ESJIndex.org





Available online at Journal Website
<https://ijma.journals.ekb.eg/>
Main subject [Otorhinolaryngology]*



Original Article

Facial Nerve Paralysis as a Complication of Acute Otitis Media

Mohammad Mahmoud Fathy Ramadan ^[1]; Mahmoud Helmy Elsaied ^[2]; Mohamed GM Hassan ^[3]

¹ Department of Otorhinolaryngology, Damietta Faculty of Medicine, Al-Azhar University, Egypt

² Department of Medical Education, Damietta Faculty of Medicine, Al-Azhar University, Egypt

³ Department of Physiology, Damietta Faculty of Medicine, Al-Azhar University, Egypt

Corresponding author: **Mohammad Mahmoud Fathy Ramadan**

Email: mramadanent@domazhermedicine.edu.eg

Submission date: April 04, 2021; Acceptance date: June 30, 2021

DOI: [10.21608/ijma.2021.185449](https://doi.org/10.21608/ijma.2021.185449)



DOAJ

ABSTRACT

Background: Facial nerve paralysis is not a very frequent association with acute otitis media (AOM). The pathophysiology and treatment of this condition still under debate.

Aim of the Work: to review the treatment strategies and extent of recovery in patients with facial nerve paralysis after AOM.

Patients and Methods: The study was a retrospective study. Authors reviewed a total of 4710 cases of AOM seen during the period from 2010 to 2020. Fourty cases developed facial nerve paralysis. All were reviewed for epidemiological data and clinical assessment. Facial palsy was graded by House-Brackmann scale. All patients were treated with antibiotics combined with oral or intravenous corticosteroids. Myringotomy with or without application of a ventilation and mastoidectomy without decompression of the facial nerve were performed in selected cases.

Result: Normal facial function was resumed to normal in all patients. The paralysis was mainly of acute onset (90.0%) and otorrhea reported among 12.5%. The initial paralysis grade was mainly grade IV (41.3%) followed by grade III (26.3%). The topography was mainly infrageniculate (86.3%). A collected material for bacteriology was reported for 40.0%, and 53.1% of them had negative culture. The most common detected organism was staphylococcus aureus (18.8%). Myringotomy was done for 7.5%, aspiration for 10.0% and Mastoidectomy for 10.0%. The overall outcome was good among 90.0% and bad among 10.0%. The duration for complete cure in cases with good outcome not exceeded 3 months. Only lower initial grade on House-Brackmann scale and infrageniculate topography were associated with favorable outcome.

Conclusion: The management of facial nerve paralysis due to acute otitis media could be conservative by antibiotics with corticosteroids.

Keywords: Facial Nerve; Otitis Media; Paralysis; House-Brackmann scale; Mastoidectomy.

This is an open-access article registered under the Creative Commons, ShareAlike 4.0 International license [CC BY-SA 4.0] [<https://creativecommons.org/licenses/by-sa/4.0/legalcode>].

Citation: Ramadan MMF, Elsaied MH, Hassan GM. Facial Nerve Paralysis as a Complication of Acute Otitis Media. IJMA 2020; 3[3]: July-September: 1618-1623. [DOI:10.21608/ijma.2021.185449].

* Main subject and any subcategories have been classified according to the research topic.

MATERIALS AND METHODS**INTRODUCTION**

Acute otitis media [AOM] is more common in pediatric age, with an estimated incidence around 0.004% [1].

American Academy of Pediatrics [AAP] recommended the diagnosis of AOM in children with moderate to severe tympanic membrane bulge, or in new onset otorrhea which is not due to acute otitis externa [2].

In adults, AOM is not common; however adults have up to 10 times greater chance of developing peripheral facial paralysis [PFP] as a complication than pediatrics [3].

AOM complications are traditionally categorized as intracranial or intratemporal. Among intratemporal complications, mastoiditis and facial nerve paralysis are the commonest. The pathophysiology of facial nerve paralysis with AOM is not yet fully understood. There are several hypotheses to explain the condition. Nerve compression by edema and exposure to bacterial toxic metabolites are the most accepted theories [4].

Today, antibiotics are associated with marked reduction of the peripheral facial paralysis (PFP) associated with AOM [5, 6].

Antibiotics make a significant reduction of facial paralysis in many series [7-9]

As far as conservative treatment is indicated, the use of intravenous antibiotics, with or without corticosteroids and myringotomy are generally accepted in patients with intact tympanic membrane. Surgery is a debatable option of treatment [10].

THE AIM OF THE WORK

Here we aimed to represent cases of peripheral facial paralysis associated with acute otitis media, and to also study the epidemiological, and prognostic aspects.

This study was submitted to the Institutional Review Board for Research Ethics and Design, Damietta Faculty of Medicine, Al-Azhar University, Egypt. It was approved under the number [IRB 00012367-21-01-016]

We analyzed files of 4710 cases of acute otitis media, seen at our department during the period from 2010 to 2020.

A total of 80 patients (1.69%) had peripheral facial paralysis associated with (as a complication of) AOM. All patients were clinically evaluated to confirm the diagnosis of AOM. Then, they were categorized according to the House-Brackmann scale [11] at the treatment onset and at the end of treatment.

Hilger stimulator or electroneurography were the electric tests [12] used to assess prognosis of facial nerve paralysis. The topography of paralysis was evaluated by the study of tearing, stapes reflex and image assessment (if patient referred to surgery).

The clinical treatment was achieved by a broad spectrum antibiotics to assure the coverage for the most common bacterial pathogen responsible for acute otitis media, associated with steroids.

In addition, eye drops and intendants were prescribed to protect the eye. Surgical treatment options included myringotomy and/or Mastoidectomy to decompress the facial nerve, with intact nerve sheath during the acute phase of OM.

Statistical analysis:

For qualitative variables, relative frequency and percentages were calculated. But, for quantitative variables, mean and standard deviations were presented. To examine association between outcome and studied variables, Chi square or student "t" tests were used for qualitative and quantitative data, respectively. $P < 0.05$ was set as significant to interpret data. All statistic calculations were performed by statistical package for social science package, version 16 (SPSS Inc., USA).

RESULTS

Patients who developed facial nerve paralysis were mainly males (58.8%). Their age ranged between 2 and 62 years, the mean age was 17.5 years.

Facial paralysis associated with acute otitis media was predominantly of acute or sudden onset (90.0%).

Otorrhea (external discharge) was reported in 12.5% of patients.

The initial paralysis grade was mainly grade IV (41.3%) followed by grade III (26.3%) and then grade V (18.8%) followed by grade II (10.0%) and finally grade I (3.8%).

The topography was mainly infrageniculate (86.3%). A collected material for bacteriology was reported for 40.0%, and 53.1% of them had negative culture.

The most common detected organism was staphylococcus aureus (18.8%) followed by streptococcus (15.6%), then pneumococcus and haemophilus influenza (6.3% for each organism).

Antibiotics with corticosteroids were used for all patients. Myringotomy was done for 7.5%, aspiration for 10.0% and Mastoidectomy for 10.0%.

The overall outcome on the basis of electrophysiological studies was good among 90.0% and bad among 10.0%. The duration for complete cure in cases with good outcome not exceeded 3 months, the mean duration was 1.53±0.55 months. The final grade was I among 90.0%, II among 5% and III among 5% (Table 1).

Among studied variables, only lower initial grade on House-Brackmann scale and infrageniculate topography were associated with favorable outcome (Table 2).

Table (1): Data of patients developed facial nerve paralysis

Variable		Statistical measures
Sex	Male	47(58.8%)
	Female	33 (41.2%)
Age (years)		17.5±13.5; 2- 62
Facial nerve paralysis pattern of onset	Acute or sudden	72(90.0%)
	Gradual	8(10.0%)
Otorrhea		10(12.5%)
Initial grade	I	3(3.8%)
	II	8(10.0%)
	III	21(26.3%)
	IV	33(41.3%)
	V	15(18.8%)
Topography	Infrageniculate	69 (86.3%)
	Suprageniculate	11 (13.8%)
Collected material for bacteriology		32(40.0%)
Detected organisms	No growth	17(53.1%)
	Haemophilus influenza	2 (6.3%)
	Pneumococcus	2 (6.3%)
	Staphylococcus	6 (18.8%)
	Streptococcus	5 (15.6%)
Treatment	Antibiotics + corticosteroids	58(72.5%)
	Antibiotics + corticosteroids + Myringotomy	6(7.5%)
	Antibiotics + corticosteroids + Aspiration	8(10.0%)
	Antibiotics + corticosteroids + Mastoidectomy	8(10.0%)
Outcome	Good	72(90.0%)
	Bad	8(10.0%)
Duration of complete cure (months)		1.53±0.55; 1-3
Final grade	I	72(90.0%)
	II	4(5.0%)
	III	4(5.0%)

Table (2): Factors associated with outcome

Variable		Good outcome	Bad outcome	Test	p
Sex	Male	40(55.6%)	7(87.5%)	3.03	0.08
	Female	32(44.4%)	1(12.5%)		
Age		17.68±14.04	16.12±8.99	0.29	0.76
Onset	Acute	66(91.7%)	6(75.0%)	2.22	0.18
	Gradual	6(8.3%)	2(25.0%)		
Otorrhea		8(11.1%)	2(25.0%)	1.27	0.26
Initial grade	I	3(4.2%)	0(0.0%)	12.66	0.013*
	II	8(11.1%)	0(0.0%)		
	III	21(29.2%)	0(0.0%)		
	IV	30(41.7%)	3(37.5%)		
	V	10(13.9%)	5(62.5%)		
Topography	Infrageniculate	64(88.9%)	4(50.0%)	8.54	0.003*
	Suprageniculate	8(11.1%)	4(50.0%)		
Bacteriology	No detected growth	14(85.3%)	3(37.5%)	2.64	0.62
	Haemophilus influenza	1(4.2%)	1(12.5%)		
	Pneumococcus	2(8.3%)	0(0.0%)		
	Staphylococcus	4(16.7%)	2(25.0%)		
	Streptococcus	3(12.5%)	2(25.0%)		

DISCUSSION

Of 4710 cases of acute otitis media, 80 patients (1.69%) developed facial nerve paralysis. Makeham et al. [7] investigated the infective causes of facial nerve paralysis and reported that, about 1% of cases are developed as a complication of acute otitis media. They reported that, about 70.0% of patients were under the age of 12, the commonest affected age by AOM. However, our patient's mean age is above that age and this could be attributed to the retrospective nature of the study with heterogeneity of cases, as we included all patients who had developed AOM during the study period.

The incidence reported in the current study is much higher than the western literature (about 0.02%) [16, 17]. This could be attributed to antibiotic abuse and over the counter drugs, a common problems in our country.

The cause of facial nerve paralysis in AOM is not well understood, but possible mechanisms include direct neurotoxic effects exerted by metabolites, inflammation, and nerve ischemia due to pressure by edema [18].

In the current work, the majority of patients (86.3%) had infrageniculate facial nerve lesion in relation to

topography, as this is the site in direct contact with the AOM associated infection [10].

Results of bacteriological analysis in the current study is in line with previous studies in literature. For example, Ngo et al. [13], Mittal et al. [14], and Thorne et al. [15] reported that, the most common cause of AOM includes infection by *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis*. However, otitis media with complications, the commonest organisms involve *S. pneumoniae*, *Streptococcus pyogenes*, *P. aeruginosa*, and *Staphylococcus species*. Thorne et al. [15] added that, as an interesting finding, no growth has been detected in up to 36% of examined material.

The possible cause for negative culture in the current work is the fact that, the patient was under antibiotic therapy.

All patients in the current study were recovered with good prognosis in 90.0% after the first course of treatment. This is in line with previous studies, reported that, In AOM, greater than 95% of patients had complete recovery [10,17,19].

Regarding antibiotic treatment, Posa et al. [20] recommended the use of intravenous third-generation cephalosporin, as it had a good meningeal penetration

and target the majority of causative organisms. Carmel et al. [21] reported that, the commonest causative organisms are *Streptococcus pneumoniae*, *Staphylococcus aureus*, and *Streptococcus pyogenes*.

Redaelli de Zinis et al. [17] reported that, there is a consensus about the use of antibiotics in treatment of facial paralysis due to AOM with the use of oral or intravenous corticosteroids. However, the consensus on the use of corticosteroids as a routine association with antibiotics is absent, irrespective of its continued use. This could be attributed to the low number of cases of facial paralysis associated with AOM. Popovtzer et al. [16], as in the current work, reported that, myringotomy, with or without insertion of a ventilation tube is also indicated in cases with intact tympanic membrane. They added, the surgical intervention in the form of mastoidectomy associated with decompression of the facial nerve is indicated in specific cases with a worsening symptoms of AOM or facial nerve paralysis irrespective of clinical antibiotic and steroid treatment. Patient should keep three weeks of grade VI paralysis after treatment or had a bad prognosis on electrophysiological tests to be indicated for mastoidectomy.

For patient's undergone mastoidectomy, we noticed areas of dehiscence and edema of the tympanic portion of the facial nerve. This is in line with Tschiasny's theory described by Redaelli de Zinis et al. [17].

CONCLUSION

Based on the results of the current work, we could conclude that, the development of facial nerve paralysis after or in association with AOM is relatively rare. The treatment by antibiotics with corticosteroids is a suitable treatment option with good results.

Financial and Non-financial Relationships and Activities of Interest

None to be declared

REFERENCES

- Kökoğlu K, Şahin Mİ. Acute Otitis Media and Facial Paralysis in an Infant with Aural Atresia: Management of a Rare Case. *J Int Adv Otol*. 2021; 17(2):186-189. [DOI: 10.5152/JIAO.2021.8569].
- Venekamp RP, Schilder AGM, van den Heuvel M, Hay AD. Acute otitis media in children. *BMJ*. 2020 Nov 18; 371:m4238. [DOI: 10.1136/bmj.m4238].
- Yamaguchi M, Suzuki M, Morita M, Hasegawa S, Ito Y. Facial nerve palsy with acute otitis media associated with EB virus infection. *Pediatr Int*. 2021; 63(5):599-600. [DOI: 10.1111/ped.14451].
- Kitsko DJ, Dohar JE. Inner ear and facial nerve complications of acute otitis media, including vertigo. *Curr Allergy Asthma Rep*. 2007 Nov; 7(6):444-50. [DOI: 10.1007/s11882-007-0068-1].
- Prasad S, Vishwas KV, Pedaprolu S, Kavyashree R. Facial Nerve Paralysis in Acute Suppurative Otitis Media-Management. *Indian J Otolaryngol Head Neck Surg*. 2017 Mar; 69(1):58-61. DOI: 10.1007/s12070-017-1051-3].
- Hutz MJ, Moore DM, Hotaling AJ. Neurological Complications of Acute and Chronic Otitis Media. *Curr Neurol Neurosci Rep*. 2018 Feb 14; 18(3):11. [DOI: 10.1007/s11910-018-0817-7].
- Makeham TP, Croxson GR, Coulson S. Infective causes of facial nerve paralysis. *Otol Neurotol*. 2007 Jan; 28(1):100-3. [DOI: 10.1097/01.mao.0000232009.01116.3f].
- Ciorba A, Corazzi V, Conz V, Bianchini C, Aimoni C. Facial nerve paralysis in children. *World J Clin Cases*. 2015 Dec 16; 3(12):973-9. [DOI: 10.12998/wjcc.v3.i12.973].
- Duygu E, Şevik Eliçora S. Our experience on the management of acute mastoiditis in pediatric acute otitis media patients. *Int J Pediatr Otorhinolaryngol*. 2020 Nov; 138:110372. [DOI: 10.1016/j.ijporl.2020.110372].
- Yonamine FK, Tuma J, Silva RF, Soares MC, Testa JR. Facial paralysis associated with acute otitis media. *Braz J Otorhinolaryngol*. 2009 Mar-Apr; 75(2):228-30. [DOI: 10.1016/s1808-8694(15)30782-5].
- Coulson SE, Croxson GR, Adams RD, O'Dwyer NJ. Reliability of the "Sydney," "Sunnybrook," and "House Brackmann" facial grading systems to assess voluntary movement and synkinesis after facial nerve paralysis. *Otolaryngol Head Neck Surg*. 2005 Apr; 132(4):543-9. [DOI: 10.1016/j.otohns.2005.01.027].
- Kasse CA, Cruz OL, Leonhardt FD, Testa JR, Ferri RG, Viertler EY. The value of prognostic clinical data in Bell's palsy. *Braz J Otorhinolaryngol*. 2005 Jul-Aug;71(4):454-8. [DOI: 10.1016/s1808-8694(15)31198-8].
- Ngo CC, Massa HM, Thornton RB, Cripps AW. Predominant Bacteria Detected from the Middle Ear Fluid of Children Experiencing Otitis Media: A Systematic Review. *PLoS One*. 2016 Mar 8; 11(3):e0150949. [DOI: 10.1371/journal.Pone.0150949].

14. Mittal R, Lisi CV, Gerring R, Mittal J, Mathee K, Narasimhan G, et al. Current concepts in the pathogenesis and treatment of chronic suppurative otitis media. *J Med Microbiol*. 2015 Oct; 64(10):1103-1116. [DOI: 10.1099/jmm.0.000155].
15. Thorne MC, Chewaproug L, Elden LM. Suppurative complications of acute otitis media: changes in frequency over time. *Arch Otolaryngol Head Neck Surg*. 2009 Jul; 135(7):638-41. [DOI: 10.1001/archoto.2009.75].
16. Popovtzer A, Raveh E, Bahar G, Oestreicher-Kedem Y, Feinmesser R, Nageris BI. Facial palsy associated with acute otitis media. *Otolaryngol Head Neck Surg*. 2005 Feb; 132(2):327-9. [DOI: 10.1016/j.otohns.2004.09.013].
17. Redaelli de Zinis LO, Gamba P, Balzanelli C. Acute otitis media and facial nerve paralysis in adults. *Otol Neurotol*. 2003; 24(1):113-7. [DOI: 10.1097/00129492-200301000-00022].
18. Joseph EM, Sperling NM. Facial nerve paralysis in acute otitis media: cause and management revisited. *Otolaryngol Head Neck Surg*. 1998; 118(5):694-6.
19. Gaio E, Marioni G, de Filippis C, Tregnaghi A, Caltran S, Staffieri A. Facial nerve paralysis secondary to acute otitis media in infants and children. *J Paediatr Child Health*. 2004 Aug; 40(8):483-6. [DOI: 10.1111/j.1440-1754.2004.00436.x].
20. Posa M, Nestor K, Coleman R, Rajderkar D, Kelly MN. An 11-Month-Old Male with Acute-Onset Left-Sided Facial Paralysis. *Clin Pediatr (Phila)*. 2019 May; 58(5):594-598.
21. Carmel E, Curotta JH, Cheng AT. Prognostic effect of pre- and post-admission antibiotic treatment in pediatric acute mastoiditis. *J Laryngol Otol*. 2017 Jan; 131(S1):S12-S17. [DOI: 10.1017/S0022215116009063].

International Journal



<https://ijma.journals.ekb.eg/>

Print ISSN: 2636-4174

Online ISSN: 2682-3780

of Medical Arts