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ORIGINAL ARTICLE

Evaluation and Ttreatment of Facial Palsy in Acute Versus Chronic Otitis Media - Could Prognosis be Altered?

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Objective: Otologic facial palsy (FP) is a well known complication of otitis media, both acute and chronic. The purpose of this study was to compare treatment strategies and level of neural and otologic recovery in cases of FP in acute otitis media (AOM) versus chronic otitis media (COM) during a 7-year period.

Materials and Methods: A consecutive cohort of 20 patients with otologic FP between the years 1994 to 2000 was evaluated retrospectively and various parameters were examined.

Results: Symptoms were reported only by COM patients and one acute otitis media adult. Otologic examination was pathologic in all cases, average primary House Brackmann score was 4 in both groups and cholesteatoma was identified in three COM adults. Conservative treatment was initiated in all cases with decompression performed in four COM patients. Complete neurologic healing was observed in 30%, with better but not significant results in AOM cases. Neurologic outcome was lower than previously reported especially in the AOM group.

Conclusion: No correlation was found between neurologic outcome and antibiotic treatment decision, bacteriologic studies or surgical treatment.

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Otologic facial palsy (FP) is a well known complication occurring in less than 1% of cases of otitis media, both acute and chronic.[1,2] Declining frequency was noted in the antibiotic era and with the improvement of surgical competency, changing the features of this rare complication and making chronic otitis media (COM) the leading etiologic factor.[2,3]

Three theories have been postulated clarifying facial nerve involvement in otitis media, including the infectious theory, the vasa nervorum thrombotic theory and the bacterial toxin theory, all causing either direct trauma to the facial nerve or edema of the nerve's enveloping blood vessels and connective tissue.[4] A major feature in FP, especially in COM, is the association with dehiscent bone of the facial canal caused by cholesteatoma, involving mostly the tympanic segment.[4,5] Treatment includes antibiotics and steroid therapy[4].

Few clinical studies have analyzed FP due to otologic etiology. Even fewer have compared acute otitis media (AOM) to COM and correlated clinical and radiologic findings, and conservative and surgical treatment to the neurologic outcome.[1]

In the present study, we evaluated all cases of FP due to otitis media admitted to our hospital during a 7-year period, comparing epidemiologic factors, conservative and surgical treatment and final neurological outcome.

Materials and Methods

A consecutive cohort of patients with otologic FP between the years 1994 to 2000 was evaluated retrospectively. All patients, with no age restriction, suffering from complete or partial FP due to acute or chronic otitis media were evaluated. Cases of FP due to temporal bone trauma, Ramsey Hunt syndrome, tympanic or mastoid surgery or malignant external otitis were excluded.

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Anamnestic details regarding age, gender, and onset of symptoms prior to hospitalization were evaluated. Radiologic evaluations, including temporal computerized tomography (CT) scans and magnetic resonance imaging (MRI), were obtained. Hematologic, serologic and bacteriologic findings and audiologic examinations were summarized. FP degree was evaluated according to the House-Brackmann facial nerve grading system (HB). Conservative and surgical treatments affecting neurologic and otologic outcome were analyzed. This study was approved by the Assaf Harofeh Medical Center Institutional Review Board.

Statistical analysis

Statistical analysis was performed with the Mann-Whitney test. P values <0.05 were considered signifcant.

Results

Age and gender

A total of 20 patients hospitalized with FP due to otitis media during a 7-year period were identified. Male to female ratio was 1:1 with an average age of 40 years (range 1-77 years). Bimodal age distribution was noticed with one group (25%) composed of young children in their first years of life and a second group comprising older patients with an average age of 60 years (Figure 1).

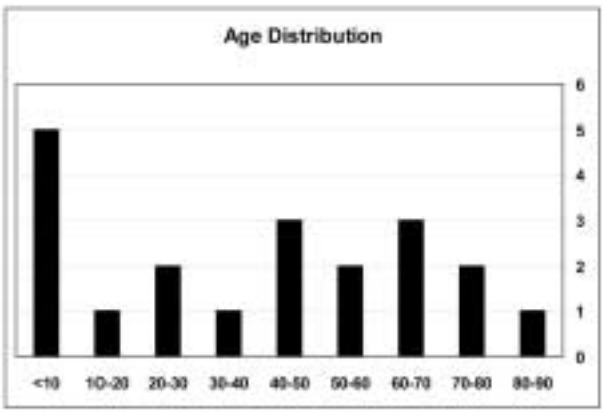

Figure 1. Age distribution of otitis media and facial palsy.

Demographic characteristics

Seven cases of acute otitis media (AOM group) versus 13 cases of COM (COM group) were identified. All 5 children in our study suffered from AOM, comprising 71.4% of all cases in the AOM group. Only 2 out of 15 adults (10.5%) suffered from FP due to AOM. Left: right ear ratio was 1.5:1.

Follow up was of 10 days to 6 months in 15 patients (mean 2.2 months). The shorter follow up was in patients with complete or near complete remission of the palsy (HB 1,2), with the shortest follow up being 10 days in an adult with COM with a complete remission. All patients with known final outcome of HB>3 were followed up for a period of 3-6 months with the shortest follow up being after 4 operated upon patients, and one patients who expired due to systemic illness, all suffering from COM.

Anamnestic features (Table 1)

The average time from presenting symptoms to admission was 2.3 days (range 1-21), with an average of less than 1 day in AOM versus 4 days in COM.

Most symptoms were reported in the COM group and by adults in the AOM group. Ear discharge was reported by 4 adults with COM (30.7%), and 1 adult with AOM (14%). Hearing loss and tinnitus were reported in 5 COM cases and 1 adult with AOM. Only 2 patients complained of increased tear flow, and 2 with COM complained of pain.

Vertigo of 4 months duration was the complaint of one adult patient with COM.

In two adults with COM, a ventilation tube (VT) was inserted several months prior to admission due to serous otitis media.

Physical examination (Table 1)

Otoscopy was pathologic in all patients. In all cases of AOM except for 1 adult, tympanic membrane was not perforated and only bulging, redness and effusion were observed.

Ear discharge and perforation were observed in nine cases, all in the COM group, and in 2 cases pus draining from a VT was noted. Cholesteatoma was observed at otoscopy in 1 case.

The average HB score was 4, both in the COM and AOM groups, with a range of [2-6].

Table 1. Otologic symptoms and signs

	Acute Otitis Media	Chronic Otitis Media
Symptoms		
Pain	0	2
Hearing loss	1	5
Epiphora	1	1
Discharge	1	4
Vertigo	0	1
Signs		
Fever	4	0
Bulging	4	0
Redness	6	1
Effusion	5	0
Discharge	1	9
Perforation	0	9
Granulation	0	1
Polyp	0	2
Cholesteatoma	0	1

Laboratory tests

Leukocytosis was found in 9 patients, 5 (55.5%) with AOM. Positive IgM antibody to Epstein-Barr virus was found in 1 child with AOM.

Cultures were obtained in 16 cases, 5 from the AOM group and 11 from the COM group (Table 2). All AOM bacteriologic studies were negative, but 1 had polymicrobial growth.

No growth was found in 4 cases in the COM group. Polymicrobial pathogen growth was found in one case (with MRSA cultured), the culture yielded Staphylococcus aureus in 2 cases, Pseudomonas aeruginosa in t3hree cases and Enterococcus in 1 case.

Audiologic tests

Audiologic tests were performed in 14 patients at diagnosis. Average speech reception threshold of the pathologic ear was 38.5 db, with an average of 15 dB in 4 out of 7 patients with AOM and 48 dB in 10 out 13 patients with COM.

Table 2. Bacterial growth

	Acute Otitis Media	Chronic Otitis Media
Negative	4	4
Growth	0	0
Pseudomonas	0	3
Staphylococcus aureus	0	2
Enterococcus	0	1
Polymicrobial	1	1
Total	**5**	**11**

Audiometric follow up tests were available in only 4 cases with COM. These demonstrated an improvement of 3.75 dB in the infected ear.

Imaging

A CT scan was performed in 17 out of 20 cases (Table 3) (it was not performed in 3 children with AOM).

In the AOM group, 1 adult demonstrated thickening of the tympanic segment of the facial nerve, while middle ear fullness was observed in 2 children.

In the COM group, cholesteatoma was suspected in 3 out of 13 cases, while fullness of the middle ear with no suspicion of cholesteatoma was observed in 5 cases. No pathology was found in 2 cases.

MRI was performed in 4 patients including a hydrocephalic child. Of these, 2 adults suffering from AOM and the child with AOM had normal MRI results. One adult with COM had pathologic imaging demonstrating a suspected cholesteatoma of the temporal apex (observed previously by a CT scan).

Conservative treatment

Local treatment with Dexotic drops was initiated in 16 patients. Boric acid was used concomitantly in 3 patients. Two out of 4 cases that were not treated locally were children suffering from AOM.

Table 3. Radiologic evaluation

Computerized Tomography Scan	Acute Otitis Media	Chronic Otitis Media
Middle ear fullness	2	5
Suspected cholesteatoma	0	3
Middle ear bone erosion	0	1
Sclerotic mastoid	0	1
Adhesions	0	1
Tympanic segment thickening	1	0
Normal	1	2
Total	**4**	**13**

Amoxicillin/clavulanic acid was the treatment of choice in 17 cases including all patients in the AOM group. Ciprofloxacin was used in 10 adults suffering from COM and concomitantly with amoxicillin/clavulanic acid in 8 of these cases. One patient was not treated with systemic antibiotics.

Systemic steroids were used in 18 patients, 10 of them at the referral day, with a maximal gap between admission and steroid treatment initiation of 11 days in 2 patients. Only 2 patients received valcyclovir.

Preliminary antibiotic treatment was reported in 5 cases - 1 child suffering from AOM and 4 adults with COM.

Surgical treatment

Myringotomy was performed in 8 cases, 6 suffering from AOM (1 adult with AOM had a spontaneous tympanic rupture). Another 5 patients with COM had purulent discharge from a chronic tympanic perforation, and 2 had a VT.

Surgical decompression was performed in 4 cases of COM. In 2 patients the cholesteatoma was excised during surgery, while a dehiscent facial bony canal with no cholesteatoma was observed in the other two. Surgical intervention was performed after an average of 5.7 days of hospitalization and conservative treatment.

The average hospitalization time for the global group was 9.6 days compared to 14 days for the surgically treated patients.

Neurological outcome

In our study, only 6 patients (40% of the followed cases) had full recovery, 3 with AOM (42.8%) and 3 cases of COM (37.5% of followed cases).

The overall HB score improved in all patients from an average HB of 4 to 2.2 points. In the AOM group, the improvement was 2.29 points (HB 4 to HB 1.71), compared to 1.38 points (HB 4 to HB 2.62) in the COM group ($p>0.005$).

Preliminary antibiotic treatment was reported in only 5 cases, with available follow up in 4 of them, 1 with AOM and 3 with COM. The reported average HB of 4.5 points was improved to 2.75 in this group with an improvement from 4 points to 2 points in the AOM cases and 4.66 points to 3 points in the COM cases.

Ciprofloxacin was given to 10 patients in the COM group (71.4%) and none in the AOM group. In these patients the initial HB was 4.1 (compared to 4 in the total COM group) with a final follow up HB score of 2.42 (compared to 2.65 in the total COM group) ($p>0.05$).

Two from the surgical decompression group had an improved neurologic state by 1 point according to the HB score, 1 case had no improvement and the other case deteriorated from HB 3 to HB 4.

Otologic outcome

All but 1 patient had significant to complete healing of the tympanic membrane and middle ear.

Discussion

Otologic FP is a rare complication found in less then 1% of all cases of otitis media and in 0.04-5.1% of AOM, according to the English literature,[1,2,6,7] However, it is frequently found in young children with AOM and adults with COM.4 We identified 20 cases with FP, [7] (35%) due to AOM (5 children and 2 adults), and 13 cases of adults suffering from COM.

Findings and comparison with other studies

We recognized different aspects of clinical behavior. Patients with FP due to COM sought help later and had a prior history of otologic pathology with reported prior antibiotic treatment. Attention should be paid to the fact that symptoms were reported only by adults in both groups.

One of the most important parameters in assessing otitis media in either group was the physical examination. Pathologic otoscopy was found in all cases in our study compared to 89% found by Kvaerner et al,[1] though different signs were observed in each group. Bulging, redness and effusion were observed in all cases of AOM including all children in our group. In the COM group the most common signs were tympanic perforation and drainage (nine cases of each).

A CT scan was performed in 17 cases with suspected cholesteatoma in 3 adults with COM and thickening of the tympanic segment of the facial nerve in 1 adult with AOM. Since in our study as in others, physical examination yielded a higher predictive value than imaging[2], this raises the question of the utility of performing a CT scan in cases of FP with otitis, particularly in cases of AOM, considering the fact that no operation is usually scheduled for these cases.

Bacteriologic studies were obtained in most cases in our series. Pseudomonas aeruginosa and Staphylococcus coagulase were the most common pathogens cultured in 5 cases suffering from COM (62.5% of positive growth), compared with the reported Staphylococcus aureus dominance.[8,9]

In our study, complete recovery was observed in 30% of the total group. Only in 42.8% of cases of AOM was complete remission observed while the same rates of patients were concluded as HB [2]. In our group, a mean HB of 1.7 was achieved in the AOM group within a mean of 2.1 months. Our results show lower rates of neurologic resolution compared to the reported rate of 78%-100%.[1,9] In his paper Goldstein et al. Report a 78% of full recovery with a follow up period of up to one year, which might explain the differences in the recovery rates. [9]

Nearly all patients in our study received amoxicillin-clavulinic acid and Dexotic drops at hospitalization. No correlation found between the use of antibiotics and the neurologic outcome.

In the COM group, 71.4% received ciprofloxacin. Although a high rate of Pseudomonas aeruginosa was cultured in the COM group in our study, a better yet not significant neurologic results were found ($p>0.05$). Thus, antibiotic use was not one of the prognostic factors in this study.

Decompression is performed in between 1.7-60% of cases with COM complicated by FP.[1,8-10] Sertac et al reported complete remission in 14 out of 24 patients with FP due to COM who underwent a decompression procedure, while the other 10 had only partial recovery.[10] In our group, decompression was performed in 4 patients with COM comprising 20% of the global group and 30.7% of cases with COM. The neurologic state improved in 2 (50%) of these cases. The only 2 patients with complete recovery of FP in the COM group did not undergo decompression. No correlation was found with the conservative treatment received by these 2 patients compared to the other 11 cases in the COM group.

Conclusion

In our study, FP due to otitis media occurred mainly in adults with COM. Patients with COM tended to seek help later, had a prior otologic pathology, a higher rate of symptoms and presented with different signs than AOM. Physical examination yielded a high predictive value in both groups, which raises a query regarding the usefulness of performing a CT scan in cases of FP accompanied by otitis, especially in cases of AOM. Neurologic outcome was lower than previously reported especially in the AOM group. None of the parameters including the use of antipseudomonal antibiotics or performing decompression in the COM group was found to have a significant influence on the prognosis.

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