FACTORS INFLUENCING THE INCREASED FREQUENCY OF ACUTE OTITIS MEDIA

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Abstract
Background: Acute otitis media (AOM) is the condition with the highest degree of medical addressability during early childhood. In recent years our department has faced a growing number of cases with AOM. Objective: Analysis of the factors that can influence the growing numbers of children presenting with AOM. Methods: We studied retrospectively records of patients aged 1 to 24 months, admitted with AOM to the 2nd Pediatrics Clinic, between January 1st 2013 and December 31st 2014. Our group consisted of 59 patients for whom we analyzed the following parameters: gender, birth rank, gestational age, type of birth (vaginal versus caesarean section), birth weight, current vaccination status, and recent antibiotic use. Results: Most children diagnosed with AOM were born through caesarean section (33.9% vs 66.1%, p = 0.018). For most children with AOM antibiotics were used in recent history (27.12% vs 72.88%, p = 0.001). 83.5% of patients were immunized according to the Ministry of Health schedule, while none of the children were vaccinated against Streptococcus Pneumoniae. Conclusions: In our study, increased frequency of caesarean section, recent antibiotic therapy and the lack of pneumococcal vaccination seem to be responsible for the increasing number of AOM. Large-scale studies are needed to confirm these hypotheses.

Keywords: acute otitis media, cesarean section, antibiotics, anti-pneumococcal vaccination

Background
Acute otitis media (AOM) is the condition with the highest degree of medical addressability during early childhood. In recent years our department has faced a growing number of cases of AOM. We aimed to analyze the factors that can influence the growing rates of AOM.

Material and method
We conducted a descriptive study that involved a retrospective analysis of the observation charts made for children hospitalized in the 2nd Pediatrics’ Clinic, Timișoara with the diagnosis of AOM. The review period was: January 1st 2012 to December 31st 2014. Our group included 59 children. The study followed the international standards of medical ethics established by the Declaration of Helsinki, regarding confidentiality of patient data.

We analyzed the following variables: age (months), sex, birth weight (g), gestational age (weeks), child's rank (only child or younger brother) and the mode of birth (vaginal versus caesarean), current weight (g), vaccination status (national vaccination program, anti-pneumococcal vaccination), recent antibiotic therapy (the month before hospitalization)

The results are presented as percentages or means and 95% confidence intervals for mean, depending on the type of the variable analyzed. The non-parametric binomial test (for the 95% confidence interval) was used to evaluate differences across the study group in terms of the mode of birth and recent antibiotics’ status.

Results
Descriptive characteristics of the study group are shown in Table 1 and Table 2.

66.1% of the children were born through caesarean section (Fig. 1).
49 children received antibiotic treatment in the month before admission (Fig. 2).

Table 1 - Descriptive characteristics of the study group (I)

<table>
<thead>
<tr>
<th>Variable</th>
<th>n= 59*</th>
<th>Mean</th>
<th>95% Confidence interval for mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (months)</td>
<td>14.64</td>
<td>12.69 - 16.59</td>
<td></td>
</tr>
</tbody>
</table>
Table 2 - Descriptive characteristics of the study group (II)

<table>
<thead>
<tr>
<th>Variable</th>
<th>n= 59</th>
<th>No. cases</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>24</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>35</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Rank</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only child</td>
<td>31</td>
<td>52.5</td>
<td></td>
</tr>
<tr>
<td>Smaller sibling</td>
<td>28</td>
<td>47.5</td>
<td></td>
</tr>
<tr>
<td>National Vaccination Program</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>49</td>
<td>83.05</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>16.95</td>
<td></td>
</tr>
<tr>
<td>Anti-pneumococcal vaccination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>59</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

*3 missing variables

Fig. 1. Type of birth across the study group.

p denotes the statistical significance of the non-parametric binomial test.
Discussions

Our study shows with statistical significance that more than half of the children were born through caesarean section. It is well known that the manner of birth influences intestinal colonization of the newborn: for babies born vaginally, the gut flora is affected by the vaginal and intestinal flora of the mother, while birth by cesarean favors colonization with very different types of bacteria. Thus, their flora is substantially influenced by environmental factors. Several studies have suggested a correlation between birth by caesarean section and obesity, asthma, allergies and various autoimmune diseases. Naso-pharyngeal colonization of the neonate may be influenced by the manner of birth, and a possible correlation with associated pathology requires further study.

This hypothesis is all the more important as the percentage of caesarean sections in Romania has gradually increased in recent years, with 38% of all births being cesarean sections. A larger study is needed to verify our results.

The vast majority of children in our study were vaccinated as required by the National Program of Vaccinations, but none were vaccinated for pneumococcal diseases. Pneumococci are the most common etiologic agent of AOM in the pediatric population. In countries where pneumococcal vaccination was introduced in the national program of vaccination, the incidence of AOM has significantly decreased. Since 2013, the pneumococcal vaccine is introduced into the national vaccination program in Romania, but so far no funds have been allocated for its acquisition.

In addition, significantly more children with AOM received antibiotics before admission to our clinic. This suggests an increased antibiotic resistance to the usual germs that cause AOM. A study performed in Brașov, Romania between 2009 and 2011 revealed a very high percentage of S. Pneumoniae isolates non-susceptible to penicillin (93.8%) and ceftriaxone (77.1%). Another study conducted by "Matei Balș" Institute and published in 2014 showed an increased pneumococcal resistance profile: 72.5% of the S. Pneumoniae isolates were erythromycin resistant.

Conclusion

In our study, increased frequency of caesarean section, recent antibiotic therapy and the lack of pneumococcal vaccination seem to be responsible for increasing the number of AOM. Large-scale studies are needed to confirm these hypotheses.

References


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