Acute respiratory infections in children from an ENT perspective

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ABSTRACT

Background. Adenoidectomy remains a frequent surgical approach for recurrent upper respiratory tract infections (URTI) in children. We research if only age and collectivity are responsible for recurrences, or other anatomic conditions can account for the history of the patient.

Design. Retrospective case series review.

Material and method. Questionnaire about respiratory symptoms and correlations observed between the history of the patient and the presence or absence of short soft palate.

Results. 102 children could provide enough data to be included in the study. Frequent URTI were observed in 30% of the affected children and only 16% of their normal peers. 41% of URTIs each persisted longer than 10 days in short soft palate children vs. 17% in normal patients. Broncho-pulmonary complications were encountered in 44% of children with short palate as opposed to 27% in others.

Conclusions. Short velli palatini can disturb normal swallowing process and allow rhinopharyngeal chronic inflammation. That can lead to persistent recurrent URTIs, more probable chronic obstruction through the adenoids and other diseases in pediatric ENT practice.

Keywords: adenoidectomy, URTIs, short soft palate

Acute respiratory infections in children are extremely common. Some studies report up to 9-10 episodes/year in the range of 1-6 years old. (1) Some conditions can be made responsible for this epidemiologic behaviour: season, crowding, collectivities, age-associated immunity. The complications arising from their incidence vary: otitis, tracheobronchial disease, meningitis.

Implications of acute respiratory infections in children are multiple: parental stress, overloading of the medical system and abusive/non-judicious use of antibiotics (by medical staff) with consequent antimicrobial resistance. (2) The issues about acute respiratory infections regard their ethiology and the most efficient/right way to address their management or prevention. Parental concern and consequent low productivity are other aspects of upper respiratory tract infections (URTI) in children.

From an epidemiological point of view, social conditions are of utmost concern, because aerial contagion and collectivities can not be completely avoided. (3) Poor social environment and low medical addressability are not dependant on medical care and their solution lies in the community.

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The goal of this paper is to possibly demonstrate/hypothesize other (e.g. anatomical) factors contributing to recurrent acute respiratory infections in children, with arguments from the experience of our pediatric ENT department.

MATERIAL AND METHOD

102 children admitted into our pediatric ENT department for adenoidectomy, between January 2011 – December 2012, were enrolled in the study. An informed consent was obtained from each parent.

Every parent of the patients enrolled was asked to fill a questionnaire, regarding the upper respiratory infection history of their children. The addressed issues were: number of episodes of URTI/month, length of URTI (less or more than 10 days), broncho-pulmonary complications associated with URTI and cough as a persistent symptom among other symptoms of the acute respiratory disease. We introduced the last mentioned issue only later in the study, so only 64 patients answered the question regarding cough.

The children were admitted and operated in our department, with adenoidectomy performed, by Beckmann curette technique, under general anesthesia. Local appearance of the pharynx, uvula and velli palatini was noted visually by the senior surgeon and recorded into the medical data. The soft palate was appreciated as being short or normal, subjectively. Figure 1 shows a typical aspect, with large distance from the velli palatini to posterior pharyngeal wall and bifid uvula.

The recorded data were used to assess the incidence of short soft palate in adenoidectomy patients. The association of specific URTI symptoms with this anatomic condition were researched.

RESULTS

Data obtained from the questionnaires are presented in Table 1 and 2.

The incidence of frequent URTI (more than 1 episode each month) in adenoidectomy children with short soft palate is 29.4% as compared to 16% (χ²-test = 0.016) in normal peers. The difference is statistically significant.

In 41% of the adenoidectomy patients with short velli palatini, duration of each URTI was longer than 10 days, versus 17% in normal children (χ²-test = 0.0003), also significantly different.

Broncho-pulmonary complications and cough dominate clinical symptoms and disease in 44% of short palate patients but in only 18% for the others (χ²= 0.0001). Persistent cough was seen predominantly in children having the palatal incompetence, even if not as overt malformation and other specific symptoms.

DISCUSSIONS

Nasal anatomical conditions can predispose to particular/prolonged courses of infectious diseases of the nose. The responsible mechanisms could be: chronic obstruction that leads to poorer clearance of nasal mucus, eventually promoting local bacterial growth. Consequent hypoxia of the nasal mucosa favors further ciliary damage. Local inflammatory disease of the nasal mucosa from other diseases can also contribute to recurrent local bacterial infections.

It has been cited in the literature that one condition promoting recurrent infections of the upper airways is pharyngo-laryngeal reflux. (4) It does so by maintaining an inflammatory status of the rhinopharynx, as stated by some authors.

<table>
<thead>
<tr>
<th>TABLE 1. Summarized data from patients’ questionnaires</th>
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<tr>
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<table>
<thead>
<tr>
<th></th>
<th>No. of children</th>
<th>%</th>
<th>Short Soft Palate</th>
<th>%</th>
<th>Normal soft palate</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>102</td>
<td></td>
<td>34</td>
<td>29.4%</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>&gt; 1 URTI/month</td>
<td>21</td>
<td>20%</td>
<td>10</td>
<td>41%</td>
<td>11</td>
<td>16%</td>
</tr>
<tr>
<td>URTI with &gt; 10 days duration each</td>
<td>26</td>
<td>25%</td>
<td>14</td>
<td>44%</td>
<td>12</td>
<td>17%</td>
</tr>
<tr>
<td>Broncho-pulmonary complications</td>
<td>27</td>
<td>26%</td>
<td>15</td>
<td>44%</td>
<td>12</td>
<td>18%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE 2. Data regarding cough as a persistent symptom in adenoidectomy patients</th>
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<table>
<thead>
<tr>
<th></th>
<th>No. of children</th>
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<th>%</th>
<th>Normal soft palate</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>64</td>
<td></td>
<td>20</td>
<td>50%</td>
<td>12</td>
<td>27%</td>
</tr>
<tr>
<td>Cough dominating the clinical picture</td>
<td>22</td>
<td>34%</td>
<td>10</td>
<td>50%</td>
<td>12</td>
<td>27%</td>
</tr>
</tbody>
</table>
Lack of normal continence of the natural mus- 
cular ring of the rhinopharynx, as seen in our 
short soft palate patients, could be responsible, 
at least in part, for such condition.

Being a tertiary referral and a large surgical 
pediatric ENT center, most of our surgery com-
prises adenoidectomy as a standard approach 
for chronic inflammatory conditions and obstruc-
tion of the nose. It is a common approach in pe-
diatric ENT. (5) We found that in many children 
submitted to this kind of surgery, short palate is 
a common finding, more than its prevalence in 
normal population (6) (33.3% from our adenoi-
dectomy patients). Due to the risks that this ana-
tomical condition predisposes postoperatively 
(velopharyngeal incompetence in selected cases 
after adenoidectomy) (7), we tried to evaluate 
the incidence of such children ongoing adenoi-
dectomy and compared their ratio to the risk of 
the same malformation in the general popula-
tion. The figures are statistically significant.

As long as the most common issues that are 
presented as main reasons to perform adenoi-
dectomy, from a patient’s history point of view, 
are frequent URTIs and the difficulty to manage 
them, the question about the role of short pal-
ate in this condition can be discussed.

In our study, the number of upper respirato-
ry infections that a child could have before per-
forming adenoidectomy in our department was 
higher in children presenting with a short palate 
(30% vs 16%). Also, acute respiratory episodes 
with a longer duration (more than 10 days) had 
a higher incidence in these patients: 41% vs 17% 
than in their normal pharyngeal counterparts. 
That figures suggest that an abnormal status of 
the nasal/ nasopharyngeal mucosa favors long 
and recurrent relapses of acute respiratory infec-
tious disease.

The incidence of pulmonary complications 
associated with URTI was significantly higher in 
short palate children (44% vs 18%). Cough, as a 
main symptom, was also seen in 50% abnormal 
children vs 27% in normal ones.

Adenoid obstruction of the posterior nasal 
passage can promote less clearing of the nasal 
secretions and enhance microbial inflammation 
and proliferation. Factors that can add more in-
flammatory reaction to the naso-pharyngeal 
mucosa have additional favorable effect on na-
sal persistent infections.

Cough can also be maintained by persistent 
discharge in the rhinopharynx. Every pathologic 
condition maintaining this situation can contrib-
ute to cough prolongation beyond normal heal-
ing of a simple infectious process.

We hypothesize that the presence of a short 
velli palatini predisposes to partial reflux of food 
into the rhinopharynx, during deglutition. Me-
chanical and and chemical inflammation of rhi-
opharyngeal mucosa stimulates local patho-
genic microbial flora. That is why these children 
are frequently seeking medical ent care or are 
submitted to adenoidectomy more frequently 
than others.

Some sources of error can be questioned in 
our study. First of all, there is no definition of 
short palate in terms of anatomic measure-
ments. (8) It can be demonstrated usually by 
means of nasal endoscopy on a cooperating 
child, showing a lack of complete closure of the 
rhinopharynx in certain types of phonation. 
Still, in a patient with a large obstructive ade-
noind pad, that vellar incompetence can be diffi-
cult to prove/show. (9) It is also impossible to 
predict postoperatively the distance between 
the soft palate and the oropharyngeal wall, af-
after adenoidectomy. Instead, an experienced 
surgeon can be aware of the condition and ap-
preciate „on the move“ the existence of the 
condition. Usually, sophisticated images are not 
currently used for evaluation of an indication for 
adenoidectomy. Bifid uvula can be of use when 
noted clinically, but it is not always possible to 
detect it, especially in small or uncooperative 
children. Palpation of the palatal plate can bring 
sometimes information about an occult submu-
cosal palatine cleft. (10)

CONCLUSION

Although there is no solution to this anatomi-
cal inherited condition, the specialist that ob-
serves a short soft palate can predict and warn
the patient of possible frequent URTIs in spite of adenoidectomy. He can also propose partial adenoidectomy (e.g. shaver technique) in those cases where nasal obstruction is the only/main complaint and the risk of velopharyngeal insufficiency is high.

REFERENCES