Acoustic rhinometry AR usage as a tool to evaluate the initial status of the nasal patency of cystic fibrosis patients, the improvement postoperatively as well as the follow up F/U.

Introduction

- 36% of carriers suffer from chronic rhinosinusitis CRS compared to 13–14% in the general population.
- Nasal polyposis prevalence in CF patients (pts), depend on age, increasing during adolescence from 6% to 48%. Sinus disease is present in almost every CF patient. Symptoms are rare due to adaptation and absence of a healthy baseline for comparison. Endoscopy and computerised tomography CT show the affected sinuses, increased recognition of polyposis, hypoplasia of the frontal sinuses, abnormalities of the lateral nasal wall and uncinate process.
- In a retrospective study of pediatric patients, showed nasal obstruction (62%), rhinorrhea (64%), mouth breathing (38%). Chronic complaints included cough (60%), sleep disturbance (37%), headache 32%), anosmia (12%). Headache is more prevalent in adolescents and adults, as a chronic complaint.

Objectives

1. If there is any difference in CF children’s (B) nasal volume in comparison to a healthy control(A) group by using AR.
2. Sinus CT in CF pts does not reflect clinical disease. The efficacy of surgical treatment (FESS) controlled by AR versus sinus CT.

Materials and methods

- 5 healthy children aged 7-14y.o, 3 girls and 2 boys mean age 8y.o, with no nasal complaints consisting Group A and 5 CF children aged 6-16 y.o, 2 girls and 3 boys mean age 10,6y.o, that attended our ENT children’s hospital department, consisting Group B.
- Group A and group B were examined by physical examination, nasal anterior rhinoscopy, and AR. As the findings were negative for group A, we didn’t proceed to unindicated CT as would have been expected to be also negative.
- In Group B applied sinus CT.
- Both groups pts were asked to score their nasal breathing, Scale:1: worst to 10: excellent.
- In 4/5 CF children of group B it was decided to have FESS (positive nasendoscopy, CT, scoring values 1-8/10, AR). All pts from Group B had been operated previously, only 1 patient evaluated preoperatively to have sufficient nasal patency and the treatment to be continued as conservative.

Examination protocol

- RhinoMetrics SRE2000 device was used for the AR at room temperature (20°C). The patients were allowed to rest for 30 minutes before the recording commenced and the device was calibrated. We calculated: the mean total minimal cross section area MCA1, the nasal volume V1 in the nasal valve, the total mean cross sectional area TCA5 and nasal volume V5 in the posterior end of the inferior turbinate. Three valid measurements were done in a neutral position(nat) and after using Novorin drops(dr) for both groups. 3 CF pts from B group had AR postoperative measurements in both positions.

Results:

<table>
<thead>
<tr>
<th></th>
<th>A nat</th>
<th>A dr</th>
<th>CF nat</th>
<th>CF dr</th>
<th>CF pop</th>
<th>CF pop dr</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCA1</td>
<td>0.544</td>
<td>0.662</td>
<td>0.544</td>
<td>0.676</td>
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<tr>
<td>V1</td>
<td>2.2</td>
<td>2.4</td>
<td>2.27</td>
<td>2.542</td>
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<td>2.886</td>
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<tr>
<td>TCA5</td>
<td>1.858</td>
<td>2.578</td>
<td>1.466</td>
<td>1.4</td>
<td>1.7</td>
<td>2</td>
</tr>
<tr>
<td>V5</td>
<td>5.1</td>
<td>6.6</td>
<td>5.488</td>
<td>6.5</td>
<td>6.8</td>
<td>8.2</td>
</tr>
</tbody>
</table>

Conclusions

1. AR „normal values” for nasal patency in CF pts cannot really stated as the average MCA1 for the healthy random group and the CF group was equal while V5 volume was 1% higher! (Table)
2. Endoscopic diagnosis is quite accurate and the sinus CT the gold standard modality for the exact extent of the disease.
3. Although sinus CT alone shouldn’t be absolute indication for surgical treatment but combined with the subjective, objective and endoscopic picture of these pts.
4. If there is decision for surgical treatment (FESS) for the CF pts, AR turns to be quite evaluating as we can compare the nasal patency before (Graph 1) and after surgery(Graph 2) objectively despite the patients subjective scoring. (Pic1,pic2)
5. The patient’s complaint regarding nasal breathing is really completely irrelevant with the nasal disease, as there is symptom adaptation.
6. AR is a guide to measure the nasal volumes, but alone cannot be used as a criteria to decide surgery.
7. Although AR can be a quick guide while assessing postop the F/U of the CF pts.
8. AR measurements need to be applied and compared in bigger group of pts.