Short reports

Material and method
76 children were chosen consecutively from the waiting list. There were 50 boys (median age 6 years 9 months; range 2 years 11 months–10 years 9 months) and 26 girls (median age 7 years 6 months; range 4 years 10 months–10 years 10 months). The parents of the children were interviewed by one of us (J.H.) and asked about symptoms. The child was then examined for mouth breathing, abnormality on anterior rhinoscopy, and serous otitis media. The presence of a symptom or sign was scored as +1. No attempt was made to differentiate between degrees of any sign or symptom. The adenoids were then removed (by J.H.) using a standard technique and washed, dried, and weighed.

Analysis of the data. The results were arranged in order of increasing weights of adenoids and then divided into 4 groups by quartiles. The number of positive scores for each sign and symptom was noted for each of these groups. The data were submitted to a $\chi^2$ test to determine if the total number of positive scores increased with increasing size of adenoids. Each symptom and sign was tested separately to assess whether there was a correlation between scores and increasing size.

The randomness of distribution of the scores was also assessed by the theory of runs using the data arranged in order of weight of the adenoids.

The weight of the adenoid may vary with age and thus interfere with the distribution of the symptoms against the weight. Therefore regression of the adenoidal weight against age was done by the least squares method (using $\log_{10}$ weight since the weight of the adenoid follows a log normal distribution (Hibbert, 1978)).

Results
The incidence of the various symptoms and signs is shown in the Table, divided by quartiles according to weight of the adenoid. Increasing frequency of scores with increasing weight was recorded for snoring only ($\chi^2=9.32$, 3 d.f., $P<0.05$). The results for the remaining observations were non-significant. In addition a $\chi^2$ test for trend showed that there was significant regression for the snoring group ($\chi^2_1=7.97$, 2 d.f., $P<0.05$).

The number of runs for any of the symptoms and signs did not show a significant deviation from randomness.

There was no correlation between the log weight and the age ($r=-0.06$, $t=0.52$, 74 d.f.). Age dependent variation in weight was thus excluded as a factor interfering with a random distribution.
Table  Symptoms and signs—number of positive scores

<table>
<thead>
<tr>
<th>Quartile*</th>
<th>Nasal obstruction</th>
<th>Snoring</th>
<th>Rhinorhoea</th>
<th>Cough</th>
<th>Speech defect</th>
<th>Abnormality on anterior rhinoscopy</th>
<th>Mouth breathing</th>
<th>Serous otitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
<td>12</td>
<td>3</td>
<td>5</td>
<td>11</td>
<td>1</td>
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<td>2</td>
<td>12</td>
<td>6</td>
<td>9</td>
<td>11</td>
</tr>
</tbody>
</table>

\[ x^2 = 2.01 \]
\[ x_1^2 = 7.97 \]
\[ x_2^2 = 1.35 \]

*19 children in each quartile.
†With Yates's correction.

Discussion

In this series there was little correlation between the size of the adenoid and the symptoms and signs usually attributed to adenoidal hypertrophy. Assuming that this series is representative of children referred for adenoidectomy there appear to be 3 possible interpretations of our findings: (1) the symptoms and signs are due, not to the absolute size of the adenoid, but to its size relative to the size of the postnasal space (Adair-Dighton, 1912). It has been shown however that the reduction in size of the nasopharyngeal airway correlates very closely to the size of the adenoid (Hibbert, 1978). The absolute size of the nasopharynx is therefore probably not relevant. (2) The symptoms and signs are not due to hypertrophy but to chronic infection of the adenoid. However, chronic infection has only on rare occasions been demonstrated histologically; furthermore, a preliminary pilot study performed by us has shown reactive hyperplasia in the adenoid with evidence of inflammation only on the surface. (3) The symptoms and signs usually attributed to adenoidal hypertrophy are due to some other factor and are not related to the adenoid.

Summary

A group of 76 children who had been listed for adenoidectomy was investigated by scoring the symptoms and signs usually attributed to adenoidal hypertrophy, and removing the adenoids and weighing them. With the possible exception of snoring there was no correlation between the size of the adenoids and the symptoms usually attributed to hypertrophy of this organ.

We wish to acknowledge our gratitude to those consultants who allowed us access to their patients, to Dr Ian McDicken, Department of Pathology, University of Liverpool who did the histological examination, and to Mrs P. O'Brien who did the typing.

References


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Adenoidectomy: an evaluation of the indications.

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Arch Dis Child 1978 53: 910-911
doi: 10.1136/adc.53.11.910

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