Mucosa of the upper airways, objective aspects of the larynx related to adeno-tonsillectomy

VI International Symposium on Tonsils and Mucosal Barriers of the Upper Airways (VI ISTMB)

Round Table in the Auditorium 01.09.2006 4.00 pm
Adenotonsillectomy when and why?

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Abstract

The mucosal barrier of the rhino pharynx, pharynx and larynx is based on the same structure of well functioning cylindrical respiratory epithelium. Tos, Passàli and others have studied the pathological epithelium with the development of pathological cells.

In a clinical setting attacks on the mucosal barrier are well known:
- virus,
- bacteria,
- fungal infections,
- diet,
- environmental toxins,
with individual responding genetic aspects.

For provocation of pathological reactions as well as for repair of the mucosal barrier these aspects have to be taken into account. For prophylaxis, treatment and prognosis the reactions of the individual as a whole must be considered and advice as well as treatment must be given individually and evidence based.
We searched the literature for this study, the first author and year of the studies are presented:

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References - Abbreviations

- Aom - acute otitis media
- OM – Otitis media
- UA - HAEM – Associated Erythema Multiforme
- upper airway
- PPI – Proton-Pump Inhibitor
- Tons – tonsillectomy
- Adeno – adeno-tonsillectomy
- Heli – Helicobacter
- Strepto – streptococcal
- Phar – Pharyngitis
There is a shift for the understanding of evidence of prospective randomised blinded studies with control group and adequate follow up.

We wondered that the larynx so seldom was taken into account in research of the mucosa of the upper airways. If the larynx is disordered it cannot be expected that the mucosa of the upper airways functions in *speech, swallowing and respiration*.
Two Cochrane reviews were made on the upper airways


B: Acid reflux treatment for hoarseness (Hopkins C, Yousaf U, Pedersen M 2006)
A: Surgical versus non-surgical interventions for vocal cord nodules

For vocal nodules 659 studies were found, without any prospective randomised blinded studies without adequate follow up found following the standard scientific rules by the Cochrane Collaboration. -

(The demands for RCTs are not the only made by the Cochrane Collaboration -).

Objective evaluation of the larynx were made in the later studies (videostroboscopy, glottography, fundamental frequency, phonetograms, jitter% and shimmer% (= frequency and loudness variation), very seldom vibrato.
B: Acid reflux treatment for hoarseness

For laryngo-pharyngeal reflux 290 studies were found, 6 were discussed intensively as for their qualities, but they were not evidence based following the rules of the Cochrane Collaboration.

Comment

A strange lack was found of the aspect of the larynx as including the whole gateway to respiration- swallowing- and voicing –three very different functions – in studies of the mucosa of the upper airways.
The important inclusion criteria for patients in studies of the upper airways is not only nose, Eustachian tube, Rhino-pharynx, pharynx but also the larynx in molecular medicine as well as in pathological macro-anatomy.

**In the review of laryngo-pharyngeal reflux the inclusion criteria were based on the videostroboscopy.**

This is also the case for the newest protocol by the Mayo Clinic and the firm Astra Zeneca. They call the trial: Which supra oesophageal reflux symptoms reliably respond to proton-pump-inhibitor (PPI). American Government Identifier: NCT00170001.
Already in 1977 we found that this was not enough (Pedersen 1977), and supplemented with glottography qualitatively.

Dikkers (alone) made a comment in the Lancet (1991) of expert evaluation of videostroboscopies being: 0.59 using Cronbach alpha.

This is why we included the glottogram quantitatively (among others) in a controlled prospective study of 77 patients that were analysed before and 1 month after medical treatment of a benign mucosal disorder of the larynx, where the primary complaint was “my throat does not function”. They were compared with the results of 373 digitized consecutive videostroboscopies and at the same time quantitative measurement of glottograms, (and jitter, shimmer, fundamental frequency and formants) during 4 months. (Pedersen M, Yousaf U 2006)
As one of the inclusion criteria for future studies of the upper airways grades of oedema of the arytenoids in the larynx is an option that is not too complex for evidence based studies at best in combination with glottograms:

**films (digital clips) with glottograms**
1. normal arytenoids
2. slight oedema of the arytenoids
3. moderate oedema of the arytenoids
4. large oedema of the arytenoids
5. very large oedema of the arytenoids

**films (digital clips) of**
- a. normal well functioning vocal cords
- b. vocal cords with too small movements
- c. vocal cords with pathology
1. normal arytenoids
2. slight oedema of the arytenoids
3. moderate oedema of the arytenoids
4. large oedema of the arytenoids
5. very large oedema of the arytenoids
a. normal well functioning vocal cords
b. vocal cords with too small movements
c. vocal cords with pathology
Analysis of the glottography was always made at the same time as the videos in the 373 studies. (Spead program by Laryngograph Ltd.)

A dysfunction of the larynx is part of the mucosal dysfunction of the upper airways:

Reading of a standard text and intonation of a sustained /ah/ in the lower register have the same statistical aspects for the closed phase of the vocal cords in the 373 glottograms (Qx%) with a correlation of r=0.8390.
There is a standard deviation of $Q_x\%$, measured as normal in the group 1 (control group) of the 373 videos in both reading of a standard text (the North wind and the sun) and a sustained /ah/ (<6.9 and 6.5% respectively).

There is a standard deviation of $Q_x\%$, measured as pathological in the group 2-5 of the videos (11.1 and 12.7% respectively).
Statistics for 77 patients in a prospective study with controls
For the sustained tone /ah/, no significant change was found of jitter% and shimmer% with paired t-test. For Qx% there was a significant better closure of the glottis of 4.6% (43.8% to 48.4%) with a significance of 0.0008 with paired t-test. For the reading of a standard text the regularity frequency% was reduced with 1.98% (p= 0.053), the regularity of loudness% with 1.7% (p=0.004) and the Qx% was better with a change of 2.56% (p=0.044) analysed with paired t-tests.

A better throat function is related not only to a better videostroboscopy but also to a better voice function as measured with the glottogram in 77 patients before and after treatment.
The aspect is that e.g. Streptococcal pharyngitis and tonsillitis (as in the book ed. by JC Pechère and EL Kaplan. Karger Verlag 2004): can be secondary to disorders in the larynx and the treatment of larynx disorders results in healing of the pharynx.
Treatment of medical mucosal larynx disorders must include measurable parameters. Treatments aspects of dysphonia with phonetograms were discussed in our study in European Archives of ORL 2004.

It is necessary to take the larynx into account in the clinical setting dealing with specific diagnoses in the upper airways mucosa with specific systematic examinations and blood tests and treatment of specific virus (swabs), bacteria (swabs), fungal infections (swabs), reflux and helicobacter infections, immunological aspects (allergy treatment, diet correction), environmental toxins and other impacts also taking individual genetic responds into account.
The new approach is that the immune system function must be taken into account.

A survey was made at the IFOS conference in Rome last year of acute otitis media (Pedersen 2005), the aspects are the same.

In their Cochrane review the benefit of grommets appeared small (Lous et al. 2005)
There are several reviews of the upper airways in the **Cochrane Library**. In children the two trials from Pittsburgh evaluating tonsillectomy had significant baseline differences between the surgical and non-surgical group and inclusion of children who also underwent adenoidectomy. **Clear baselines should be made in the future.**

No trials evaluated the effectiveness of tonsillectomy in adults. (Burton et al. Comment 2006).

Passàli et al. (2004) have described the structural and **immunological changes of the chronically inflamed adeno-tonsillar tissue** in childhood. The problem is to explain the origin of these changes (the same as in the oesophagys?) and the option is thereafter not surgery but immunological treatment. Further studies on gluco-corticoid receptors in the tonsilar tissue are necessary, as earlier presented (Shirasaki et al. 2003).

In a survey of respiratory viral infections Hayden et al. (2004) jump over the larynx, they describe pharyngitis treatment, and go directly to laryngo-tracheo-bronchitis as one disorder.
Future aspects
The critics of the literature of adeno-tonsillectomy is hard. There is no evidence. Still doctors do it. It is necessary to implement evidence-based medicine (Hannes et al. 2005 show how difficult this is).

Some systematic points have been suggested for clinical diagnosis of mucosal disorders of the upper airways:

1. The larynx, as one part of the upper airways, should always be carefully inspected with a grading of oedema of the arytenoids and vocal cords as a minimum
2. At best a quantitative measurement of glottography at the same time should be made
3. Criteria for diagnosis and treatment should be well defined every time (a database is easy to handle now-a-days for this purpose)
research of mucosal disorders of the upper airways.

1. Hypotheses can be made of the mucosa, but objective clinical trials should be suggested
2. Laboratories to guarantee qualified clinical research should be defined
3. Clinical trials should always be systematic, referring e.g. to the Cochrane Collaboration Handbook
References


3 Clinical Trials. Gov. Identifier: NCT00170001. Which Supraesophageal Reflux Symptoms Reliably Respond to Proton-Pump-Inhibitor (PPI) Therapy Sponsors and Collaborators: Mayo Clinic, AstraZeneca


6 Article. M Pedersen and U Yousaf (2006) Videostroboscopic expert evaluation of the larynx with running objective voice measurement at the same time gives more secure results than videos alone. Conference, Vocal fold physiology and biomechanics Tokyo. Japan


Thanks to all
Indications for tonsillectomy for prevention of recurrent acute pharyngotonsillitis

- Chronic suppurative tonsil infection
- Recurrent acute tonsillitis that cannot be treated with ANY other approach
- Hyperthrophy that cannot be reduced with ANY other approach
Adenoidectomy for prevention of chronic otitis media with effusion

- Adenoidectomy is only indicated when no conservative/medical/immunological treatment does have effect. The effect of adenoidectomy alone is not evidence based.
Adenotonsillectomy for obstructive sleep apnoea

- Is not evidence based
Tonsillectomy for peritonsillar abscess

- The literature is modest
- Mostly insufficient antibiotic treatment is the reason.
- In rare cases immunological deficits makes the operation necessary
Adenoidectomy for prevention of recurrent acute otitis media

- Is not evidence based
Indications for adenoidectomy and/or tonsillectomy for prevention of recurrent/chronic rhinosinusitis in children

- Is not evidence based
What is your recommendation for T&A when a child who has a repaired cleft palate has documented sleep apnoe due to hypertrophied tonsils and adenoids.

- Mostly other immunological aspects will by treatment reduce the size focusing on primary and secondary defects.
- Sufficient antibiotics, allergy and intolerance treatment including steroids (as in astma), treatment of reflux and bacteria with a systemic aspect (helicobakter, mycoplasma) and others.
What medical/surgical options are available for older infants who have documented sleep apnoea secondary to tonsil/adenoid hypertrophy

- Operation is not evidence based
- Check of primary and secondary immune defects
- Treatment effectively with relevant antibiotics for aggravations and local steroids to heal the mucosa
- Find provocations of other kinds (helicobacter, reflux, mycoplasma, diet, toxins in the environment ect.)