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Recurrent Otitis Media in Children and Obstructed Nasal Patency in Endoscopic--Radiographic Examination

Nawrotowe zapalenie ucha środkowego u dzieci z upośledzoną drożnością nosa w badaniach endoskopowo-radiograficznych

Recurrent pathological conditions of nasal patency contribute to decreased ventilation of the middle ear. Normal nasal respiration is of importance in maintaining proper ear ventilation (3, 7).

MATERIAL AND METHODS

In a group of 131 children, aged 5—14 years, with recurrent otitis media, there was performed an endoscopic-radiographic analysis of factors favouring recurrences of inflammations. The basis for evaluation of the degree of nasopharyngeal airway was endoscopy of the middle and lower nasal duct combined with otoscopy, radiography and evaluation of the size of the pharyngeal tonsil.

RESULTS

Roentgenograms of the middle ear (in various projections — as a rule according to the Schüller's method) were complementary. Lack of X-ray changes in the course of exudative otitis media was found in 42% cases. In 28% of patients there was found a decrease of pneumatization or complete opacity of the mastoid antrum, tympanic cavity and pneumatic cells of the mastoid process, without osseous destructions. This was especially the case with longlasting mucotic processes (Fig. 1a). Edema, congestion and softening of pharyngeal opening were usually visualized endoscopically (Fig. 1b). Pus was found in the lumen of the tube opening or abundant mucous secretion with mucous membrane edema.

In 12 cases of chronic suppurative inflammation besides sclerotic reconstruction of pneumatic cavities of the middle ear there were revealed osseous destructions of the lateral wall of the attic, of tympanic cavity and of mastoid antrum (Fig. 2a). In these patients hypertrophies of nasopharyngeal lymphatic tissue obstructed nasal patency surrounding pharyngeal auditory tube opening (Fig. 2b). In 64 cases they closed it almost completely, leaving only a narrow fissure, poorly visible during swallowing (Fig. 3). In 32% patients hypertrophies of the pharyngeal tonsil caused mechanic impatency of the pharyngeal opening of the auditory tube, especially within the posterior wall and subsequent dysphagia of the tube opening. In 38% patients ventilation disturbances and decreased pressure in the middle ear resulted from inflammatory changes and allergic edemas of the region of tube opening (Fig. 4). Endoscopy revealed abnormalities giving ground to handicapped ventilation of the middle ear and recurrent inflammations. Endoscopic changes of the nose and sinuses in the group of children with recurrent otitis media and osseous changes of the middle ear structures on radiographic examination are shown in Table 1.

In 7 cases of chronic cholesteatomatous otitis media localized in the attic or tympanic cavity there was found a destruction of the lateral-posterior wall of the epitympanic recess. In 2 cases CAT examination revealed abnormal soft tissue and osseous destruction within the middle ear.

In inflammatory conditions nasopharynx impatency of the opening has functional character as well. There was also evaluated the size, shape and especially the function of the pharyngeal opening of the tube. Tube function was normal in 45% patients, dysfunction was found in 35%, blockade in 20% cases. During swallowing pharyngeal tube opening opened lazily and poorly. Handicapped patency of the tube in 76% was associated with exudative otitis media. At the same time handicapped patency of pharyngeal opening correlated with the amount of exudate in tympanic cavity.

Endoscopically found, usually polypous hypertrophies of the mucous membranes of maxillary sinuses (12.2% cases) and ethmoid cells (6.8% cases), were regarded as a manifestation of middle duct pathology. In opacities of maxillary sinuses sinusoscopy differentiated polypous formation with residual mucus. Anomalies of the middle concha such as its hypertrophy, excessive pneumatization and curvature deviations were found in 50% cases. A paradoxical curvature deviations were found in 50% cases. A paradoxical curvature of the middle concha, by narrowing anterior opening of the middle nasal duct, caused a reactive edema of the conchal head in 4 cases. Anomalies of the middle concha and curvature of the nasal septum, by decreasing the air space of the middle nasal duct, encumberred endoscopy in 7 cases. Combination of anatomical variants of this kind handicaps ethomoid drainage. In 26 children with lateral deviation of the nasal septum occlusal anomalies were observed.

Table 1. Endoscopic and radiographic changes of the nose and sinuses in the children with reccurent otitis media

Endoscopic and radiographic finding	Number	%
Anomalies of ethmoid funnel structure	4	3.0
Ectasia of ethmoid bulla with the presence of mucous-pus secretion	19	14.5
Small polyps of ethmoid cells	9	6.8
Prolapse of the mucous membrane of the funnel	4	3.0
Hypertrophy of the uniform process	2	1.5
Hypertrophy of the middle concha	36	27.4
Concha bullosa	12	9.0
Abnormal curvature of the middle concha	18	13.7
Mucous-pus secretion on the lower surface of the middle concha	47	35.9
Narrowing of the anterior opening of the nasal middle duct	6	4,5
Hypertrophy of the posterior part of the lower concha	21	16.0
Mucous-pus secretion in the lower nasal duct	70	53.4
Scars and constrictions of the lower duct	1	1.3
Lateral deviation of the nasal septum	31	23.6
Numerous polyps of maxillary sinuses and nasal ducts	7	5.3
Single polyp of the maxillary sinus	9	6.8
Destruction of the superio-posterior external acousic meatus (the so-called tympanic-epitympanic calcar)	7	5.3
Blurred contours of balloon-like dilated mastoid antrum	14	10.6
Sclerotic saturation of the contours and surroundings of the mastoid antrum	19	14.5
Enlargement of aditus and antrum	11	8.3
Destruction of intercellular partitions of the mastoid process	9	6.1
Enlargement, opacity and sclerotic reconstruction of tympanic cavity walls	18	13.7
Erosion of the medial wall of the tympanic cavity	6	4.5
Partial or complete destruction of the chain of auditory ossicles	13	9.9

In 26 cases tympanoplasty was performed. Preoperative assessment of tube function was essential for establishing indications for it and effectiveness of postoperative results. In the group of 20 children who lastingly benefited from tympanoplasty, preoperative examination showed good function of the auditory tube in 60% cases. In the group of 6 children in whom tympanoplasty did not bring lasting therapeutic result, tube function was satisfactory in 2 cases, while only in 4 other children it was poor. Tonsilectomy under endoscopic control performed in 89 children improved ventilation of the middle ear and increased pressure. In 76% cases permanent treatment result was obtained.

DISCUSSION

In etiopathogenesis of exudative otitis media the role of auditory tube dysfunction is emphasized, while inflammation resulting from encumberred

ventilation is regarded as a secondary factor. Hindered drainage of the middle ear cavities and presence of mucous-pus secretion in the region of tympanic opening of the tube can be subsequent to its penetration from the nasopharynx (4). It is important to reveal narrowings in the system of sinusal openings and nasal ducts (1, 5). By encumberring outflow of secretion its suppression gives rise to edemas, thickenings of the mucus membrane, infection spreading most frequently from the ethmoid funnel to nasal ducts (2, 6, 9). Similarly, polyps cause complaints like nasal impatiences by hindering air flow, ventilation of nasal ducts and sinuses. In the light of emphasized anatomic-functional unity of the system of sinuses and nasal ducts handicapped ventillation of its draining area is also important in the genesis of recurrent otitis media (8). In the CAT picture the presence of cholesteatoma precludes lack of abnormal soft tissue and osseous destruction within the middle ear (4). The extent of the blockade of the complex of sinusal openings-nasal ducts-pharyngeal opening of the auditory tube and its subsequent dysfunction considerably affects reduction in the middle ear.

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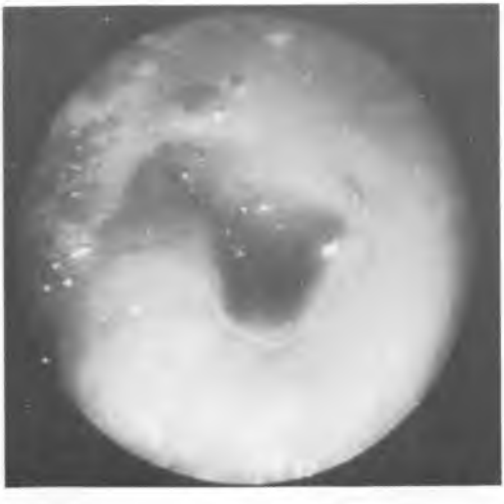
STRESZCZENIE

W grupie 131 dzieci z przewlekłym nawrotowym zapaleniem ucha środkowego dokonano endoskopowej oceny czynników upośledzających drożność jamy nosa. Czynność ujścia gardłowego trąbki słuchowej analizowano w łączności z wynikami po adenotomii i zmianami rtg ucha środkowego.

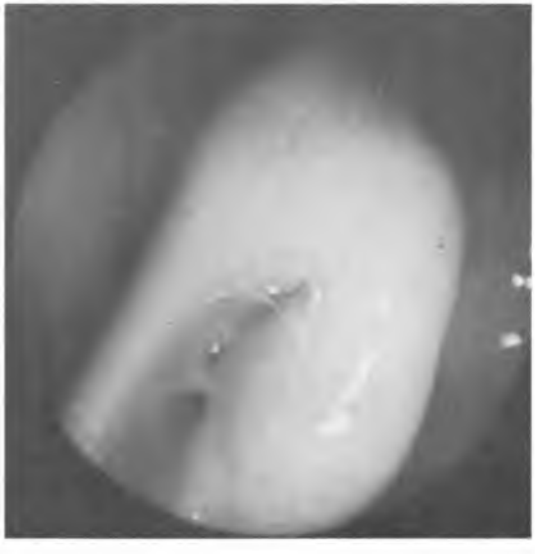
a



b

Fig. 1: a — mucotic mastoid process in the course of recurrent otitis media, b — pharyngeal opening of the auditory tube round, swollen, filled with mucous secretion typical of chronic, recurrent otitis media

a



b

Fig. 2: a — sclerotic mastoid process, aditus and antrum widened, with uneven contours, rarefications of bony texture in the upper part of the antrum and in the perimeningeal region. b pharyngeal opening of the Eustachian tube with thick, wall-like margins with mucous secretion visible in the lumen

Fig. 3. Pharyngeal opening of the auditory tube fissure-like, covered with thick mucus

Fig. 4. Pharyngeal opening of the Eustachian tube clefty, edematous, covered with mucus with a polyp projecting from the inferior wall