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Orbital complications in sinusitis in children

Sinusitis in children is a significant problem due to its incidence. It is considered that 5–10% of children suffering from acute inflammation of upper airways develop sinusitis. The continuity of the mucosa is the basis of common inflammatory response of the mucous membrane of the nose and paranasal sinuses. In this case rhinosinusitis is the explanation.

The etiology of the acute sinusitis is mainly infectious. The most often isolated aerobic bacteria are: *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Moraxella catarrhalis*. The twenty-five percent of pathogens are the bacteria which produce beta-lactamase.

Among the orbital complications the most common are: inflammatory eyelids' oedema, subperiosteal abscess, inflammation of orbital soft tissues, orbital abscess, retrobulbar neuritis and thrombosis of cavernous sinus. The incidence of orbital complications is more often among children than among adults due to specific anatomical structure: not adhered suture lines, natural dehiscences, narrow sinus ostia, which predispose to infection development and the absence of venous valves. The predisposing factors are: the dysfunction of the muco-ciliary apparatus connected with an allergy and viral infections in the nasal mucose membrane in children, obstruction of the nose caused by hypertrophy of adenoid tissue or foreign body, immunological deficiencies and chronic respiratory diseases such as cystic fibrosis and bronchial asthma. All the mentioned factors have the negative influence on the physiological sinusal drainage and they predispose to the growth of bacteria in this area.

The aim of the research was the assesment of incidence of orbital complications in children with rhinosinusitis.

MATERIAL AND METHODS

The project was based on the retrospective analysis of data case records of children treated for sinusitis. The research was conducted on the group of 125 children aged up to 18 years, treated at the Department of Pediatric Otolaryngology, Phoniatory and Audiology of the Medical University of Lublin in the years 2000–2002. The orbital complications concern 25 patients aged from 7 months to 15 years (20% of the patients were treated for sinusitis). The average age in this group was 8 years.

RESULTS

All cases of complications were the consequence of acute rhinosinusitis or escalation in the course of chronic inflammation.

In the period preceding hospitalization six children (24%) were treated using antibiotics, two children were not treated at all, the symptomatic treatment was conducted on three patients, and

the information concerning previous treatment was incomplete in over a half of patients (56%). The progressing oedema of the eyelids was observed in 11 patients (44%) in the period of 12–96 hours before hospitalization.



Fig. 1. CT scan – cellulitis orbitae

The diagnostic process was based on the clinical examination connected with the endoscopy of the nose, computer tomography and ophthalmological examination. The following orbital complications were observed: *peri-orbital cellulitis* in 24 patients (96%), *cellulitis orbitae* in one patient (4%), *abscessus orbitae* in one patient (4%), *thrombophlebitis sinus cavernosus* in one patient (4%) and *retrobulbar neuritis* in one patient (4%).



Fig. 2. CT scan – cellulitis orbitae

On the basis of bacteriological investigation it was revealed that the most common pathogens connected with complicated sinusitis were: *Streptococcus pneumoniae*, *Staphylococcus aureus* and *Streptococcus sp.*



Fig. 3. CT scan – retrobulbar neuritis



Fig. 4. CT scan – retrobulbar neuritis



Fig. 5. CT scan – abscessus orbitae



Fig. 6. CT scan – abscessus orbitae

The vast majority of patients were treated pharmacologically using intravenously administered antibiotics, mainly Cephalosporines of 3rd generation, mucolytic drugs, local and general administration of anti-swelling drugs. In the case of thrombosis of cavernous sinus, the patient additionally received anticoagulant treatment. Six children required surgical intervention. The surgical treatment was performed using classical technique with the drainage of the sinus. The conducted treatment contributed to the complete recovery in 24 patients (96%) suffering from complicated sinusitis. The patient with the complication in the form of retrobulbar neuritis, was outpatiently treated without laryngological care for quite a long time. At the moment of admission the patient presented the high-degree disturbances of vision ability. Despite the immediate surgical treatment and following ophthalmological treatment, the patient did not regain vision ability.

DISCUSSION

Orbital complications in sinusitis in children are more common than intracranial complications. They are connected with spreading of the infection throughout natural dehiscences and the neurovascular foramina (1). The authors indicate the role of FESS in prevention of spreading of the infection. According to Vazquez et al., intracranial complications concern 3.7%–11% of patients with sinusitis (6).

The retrospective studies concerning orbital complications were conducted by Sobol et al. They observed 139 cases of orbital complications in their material during 10-year period of observation. In our material orbital complications occur relatively more seldom, namely 25 cases during three years. Similarly to our research CT examination was performed in order to differentiate between the type of complication and intravenous infusions of antibiotics were used in pharmacological treatment (5). Younis et al. stress that orbital complications are still frequent. They observed 16 cases of orbital abscess in their research, which were treated surgically using external approach or endoscopy (7). The authors consider that endoscopy will soon replace classical surgical methods and reduce the amount of complications.

Hermann et al., taking into account orbital complications, divided the children into two groups: below the age of 7 and above the age of 7. They revealed higher incidence of orbital complications in the group of children above the age of 7 caused by various species of bacteria (polymicrobial cultures) (2). The average age of patients with complicated sinusitis was 8 years, and the complications concerned mainly children up to 7 years of age. Similarly to Mitchell's research, the complications were most often the consequence of *ethmoiditis* (4).

According to Ikeda, we think that ophthalmological symptoms such as exophthalmus, diplopia, ptosis require immediate surgical intervention with drainage, and this can prevent vision loss (3). The treatment of our patient with retrobulbar neuritis was unsuccessful due to delayed hospitalization. Most of authors stress the value of computer tomography, which describes the extension of pathological process and facilitates making a decision about surgical operation in the area of sinuses.

CONCLUSIONS

1. Sinusitis still carries a risk of serious complications.
2. Computer tomography and endoscopic examination of the nose are essential for diagnosis and assessment of the extension of the pathological process.

REFERENCES

1. Grundmann T., Weerda H.: Orbital and intracranial complications of acute sinusitis in childhood – status of endoscopic paranasal sinus surgery based on case examples. *Laryngorhinootologie*, 76, 9, 534, 1997.
2. Herrmann B.W., Forsen J.W. Jr.: Simultaneous intracranial and orbital complications of acute rhinosinusitis in children. *Int. J. Pediatr. Otorhinolaryngol.*, 68, 5, 619, 2004.
3. Ikeda K. et al.: Surgical treatment of subperiosteal abscess of the orbit: Sendai's ten-year experience. *Auris Nasus Larynx*, 30, 3, 259, 2003.
4. Mitchell R., Kelly J., Wagner J.: Bilateral orbital complications of pediatric rhinosinusitis. *Arch. Otolaryngol. Head Neck Surg.*, 128, 8, 971, 2002.
5. Sobol S.E. et al.: Orbital complications of sinusitis in children. *J. Otolaryngol.*, 31, 3, 131, 2002.
6. Vazquez E. et al.: Complicated acute pediatric bacterial sinusitis: Imaging updated approach. *Curr. Probl. Diagn. Radiol.*, 33, 3, 127, 2004.
7. Younis R.T. et al.: Orbital infection as a complication of sinusitis: are diagnostic and treatment trends changing? *Ear Nose Throat J.*, 81, 11, 771, 2002.

SUMMARY

Sinusitis plays an important role in pediatric otolaryngology due to its incidence. It results from bacterial infections which find favourable conditions for colonization, specially in case of obturation of natural ostia. Such a situation may lead to the development of orbital and intracranial complications. The aim of our research was the assessment of incidence of orbital complications in patients with rhinosinusitis treated at the Department of Pediatric Otolaryngology, Phoniatry and Audiology of the Medical University of Lublin. The research was conducted on the group of 125 children and the orbital complications developed 25 children from this group. The patients with orbital complications were treated pharmacologically using intravenously administered antibiotics and surgically in six cases. The conducted treatment contributed to the complete recovery in 24 patients. On the basis of our research we confirm that sinusitis still carries a risk of complications. All complicated cases of sinusitis should be diagnosed using endoscopic examination and computer tomography.

Powikłania oczodołowe w przebiegu zapalenia zatok u dzieci

Zapalenia zatok, ze względu na częstość występowania, stanowią ważny problem w laryngologii dziecięcej. Są następstwem infekcji bakteryjnej, która znajduje dogodne warunki do kolonizacji, szczególnie w przypadku niedrożności ujść naturalnych zatok. Sytuacja ta może prowadzić do powikłań oczodołowych i wewnątrzczaszkowych. Celem naszych badań była ocena częstości występowania powikłań oczodołowych u pacjentów leczonych w Klinice Otolaryngologii Dziecięcej, Foniatrii i Audiologii Akademii Medycznej im. Feliksa Skubiszewskiego w Lublinie. Badaniami objęto 125 dzieci, z których powikłania oczodołowe rozwinęło 25 pacjentów. Pacjenci z powikłaniami oczodołowymi byli leczeni w sposób zachowawczy poprzez podanie dożylnie antybiotyków o szerokim spektrum oraz operacyjnie w sześciu przypadkach. Zastosowane leczenie było skuteczne u 24 pacjentów. Na podstawie naszych badań potwierdzamy, że zapalenie zatok niesie ze sobą nadal ryzyko powikłań. Powikłane przypadki zapalenia zatok powinny być dokładnie badane przez ocenę endoskopową i tomografię komputerową.