

Complicated rhinosinusitis of *Streptococcus intermedius* etiology – challenges for treatment. Pediatric case report

Powikłane zapalenie zatok przynosowych o etiologii *Streptococcus intermedius* – wyzwania w leczeniu. Opis przypadku pediatrycznego

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KEYWORDS:

Streptococcus intermedius, complicated rhinosinusitis, acute rhinosinusitis, abscesses of head and neck, abscess drainage, endoscopic sinus surgery

SUMMARY

We report a case of a 16-year old boy with acute rhinosinusitis complicated by a recurrent abscess involving the soft tissues of the supraciliary arch and orbit that failed to respond to initial adequate treatment. The etiology of the inflammation was a rare bacterium: *Streptococcus intermedius*. Initial treatment consisting of broad-spectrum antibiotics and endoscopic sinus surgery failed to achieve a complete resolution of the inflammation with a formation of In addition to conservative management including both broad-spectrum and targeted antibiotic therapy the patient underwent two endoscopic sinus surgery procedures and two external access drainage procedures of the supraciliary arch abscess. Additionally an MRI head scan revealed edema and contrast enhancement of the dura adjacent to the frontal sinus and a suspicion of thrombosis in the superior sagittal sinus. The patient was dismissed home after 22 days of hospitalization in good condition and symptomless, with a satisfying follow up.

SŁOWA KLUCZOWE:

Streptococcus intermedius, powikłane zapalenie zatok przynosowych, ostre zapalenie zatok przynosowych, ropnie głowy i szyi, drenaż ropni, endoskopowa operacja zatok

STRESZCZENIE

Prezentujemy przypadek 16-letniego chłopca z ostrym zapaleniem zatok przynosowych powikłanym nawracającym ropniem obejmującym tkanki miękkie łuku brwiowego i oczodołu, który nie reagował na właściwe leczenie. Etiologią stanu zapalnego była rzadka bakteria: *Streptococcus intermedius*. Zastosowane leczenie obejmujące antybiotykoterapię o szerokim spektrum działania i endoskopową operację zatok nie doprowadziło początkowo do zadowalającej poprawy klinicznej. Oprócz leczenia zachowawczego obejmującego zarówno antybiotykoterapię o szerokim spektrum działania, jak i celowaną antybiotykoterapię pacjent przeszedł dwa zabiegi endoskopowej chirurgii zatok i dwa zabiegi drenażu ropnia z dostępu otwartego, co przyniosło poprawę jego stanu i wycofanie się objawów. Jednak w badaniu kontrolnym MRI głowy stwierdzono obrzęk i wzmocnienie kontrastowe opony twardej przylegającej do zatoki czołowej oraz podejrzenie zakrzepicy w zatoce strzałkowej górnej. Pacjenta wypisano w stanie ogólnym dobrym po 22 dniach hospitalizacji z zaleceniem przyjmowania leków przeciwkrzepliwych. Podczas kolejnych wizyt kontrolnych w Poradni obserwowano zadowalającą poprawę oraz ostatecznie całkowite ustąpienie objawów.

INTRODUCTION

The pathogen from the *Streptococcus viridians* group: *Streptococcus intermedius* – is part of the normal bacterial flora of the oral cavity, pharynx, gastrointestinal tract and genitourinary system. In rare cases it can act as a main pathogen in acute infections, which poses a great challenge for treatment, because it is likely to spread to further locations

and form inflammation and abscesses both in soft tissues and bones. Even though the bacteria is sensitive to many antibiotics in laboratory setting, the clinical outcomes of treatment might be poor. It is essential to combine surgical and pharmacological methods of treatment to prevent the recurrence of abscesses and achieve local improvement in inflamed tissues. We would like to present a case report of

teenager treated in the Department of Pediatric Otolaryngology of the Medical University in Warsaw.

CASE REPORT

A 16-year old patient was admitted to the Emergency Department of the Clinical Children’s Hospital with the symptoms of acute sinusitis complicated with superior eyelid edema on the left side. On admission the patient complained about edema that lasted 2 days and increased on the day of admission. He had also a five-day history of upper respiratory tract infection with general symptoms such as fever and fatigue. The patient had no history of chronic diseases, allergies or previous similar episodes. Prior to admission he received oral cefixime and topical xylometazoline for two days and was referred to the hospital for a otolaryngological consultation after his symptoms increased during outpatient treatment.

On admission the patient’s palpebral fissure was significantly narrowed, there was edema and redness of the upper eyelid (fig. 1a, b). No exophthalmos or impaired ocular movement was observed. The boy complained of pain during palpation of the affected area. The patient didn’t report blurred vision or pain during ocular movement. In the left nasal duct there was presence of muco-purulent discharge and bilaterally there was edema of nasal mucosa. Blood test done on admission revealed increased CRP – 12.08 (<0.5) (mg/dl), dimer D – 861 (0-550) (ug/L FEU) and normal count of white blood cells. A contrast-enhanced computed tomography scan (CT) scan of sinuses was performed, which revealed completely opacified sinuses on the left side with a fluid level in the left frontal sinus (fig. 2a). Partial destruction of the bony compartments of the left ethmoid sinuses and lamina papyracea were described (fig. 2b). Mucosal edema in of the left middle and inferior conchae was also present. The CT scan revealed also massive edema of the subcutaneous tissue visible during clinical examination. No signs of an abscess in the area were described.

Complicated acute sinusitis was diagnosed, the patient received aggressive conservative management consisting of broad-spectrum intravenous antibiotics (ceftriaxone and clindamycin), intravenous steroid (dexamethasone), topical decongestion with xylometazoline and non-steroidal

anti-inflammatory drugs. Due to the severity of the edema, he was qualified for urgent endoscopic sinus surgery (ESS). The procedure was performed on the first day of patient treatment. Maxillary, frontal, ethmoid anterior and posterior and sphenoid sinuses on the left side were opened and rinsed with saline. Purulent mucus found in the ethmoid sinuses was collected for microbiological examination. Mucosa collected from the left frontal recess was sent to histopathological examination.

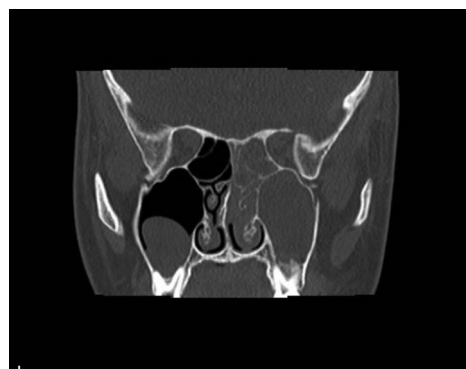
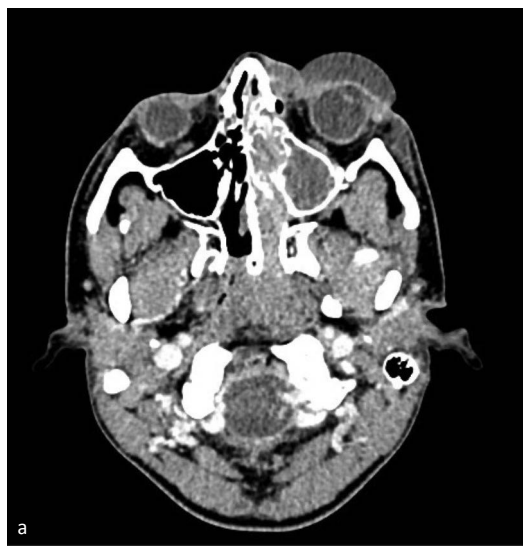


Fig. 2a, b. The first CT scan performed on admission



Fig. 1a, b. Edema of the left upper eyelid and left supraciliary arch at admission

On the first day after surgery the edema of the eyelids slightly decreased. The general condition of the patient and nasal patency improved, while the tenderness on palpation of the eyelids and left frontal bone was still present. Two days after surgery an ultrasound examination of the edematous tissues was performed, which showed in addition to edema an irregular solid-fluid space 7 x 27 x 44 mm in size anteriorly to the frontal bone. A drainage of the abscess was performed from an external approach on the following day with an outflow of a substantial amount of pus. The microbiological examination of the material revealed the presence of *Staphylococcus intermedius* sensitive to the applied antibiotic treatment. On the fifth day of hospitalization edema of the left eyelid significantly increased and a second procedure of eyelid abscess drainage was performed the following day, with again an outflow of abundant purulent fluid with blood. Once again a sample for the microbiological cultures was taken. A mild compressive dressing was placed over the area with sodium bicarbonate to reduce edema and prevent hematoma. Exploration of the incision on the eyelid during the following days did not result in subsequent pus collection, ophthalmological examination result was normal, CRP and D-dimer lever normalized. A slowly decreasing edema and tenderness of the affected region was still present. On the tenth day of hospitalization a control CT scan was performed which revealed the presence of an abscess 23 x 9 x 30 mm in size, adjacent to the frontal bone externally in the region of the left superciliary arch (fig. 3a). In the left maxillary, ethmoid and sphenoid sinuses swollen mucosa was found. A complete opacification of the left frontal sinus was described (fig. 3b). A local inflammatory reaction in the frontal bone in the walls of the frontal sinus was described with a suspicion of edema of the adjacent dura.

Due to the apparent obstruction of the left frontal sinus drainage pathway the patient was qualified for a second ESS procedure in which inflamed mucosa was removed from the left frontal recess, frontal sinus was cleaned and the ostium was widened. Erosion of the bone of the anterior aspect of the frontal sinus was observed, a likely communication path between the frontal sinus and the inflamed soft tissue of the supraciliary arch. Necrotic bony tissue was removed from the wall during the surgery and sent to histopathological and microbiological examination. Topical clindamycin with dexamethasone was delivered into the frontal sinus. The abscess was also punctured and drained percutaneously and then irrigated with 0.9% NaCl. After the second surgery the patient's local and general state improved again. Microbiological findings revealed the probable contamination of the sample with *Staphylococcus epidermidis*, no other pathogen growth was observed. A subsequent magnetic resonance imaging (MRI) scan was performed to confirm the intracranial involvement and monitor treatment (fig. 4a, b). It revealed a residual abscess in the location of the previously drained one 10 x 3 x 4 mm in size and edema of the

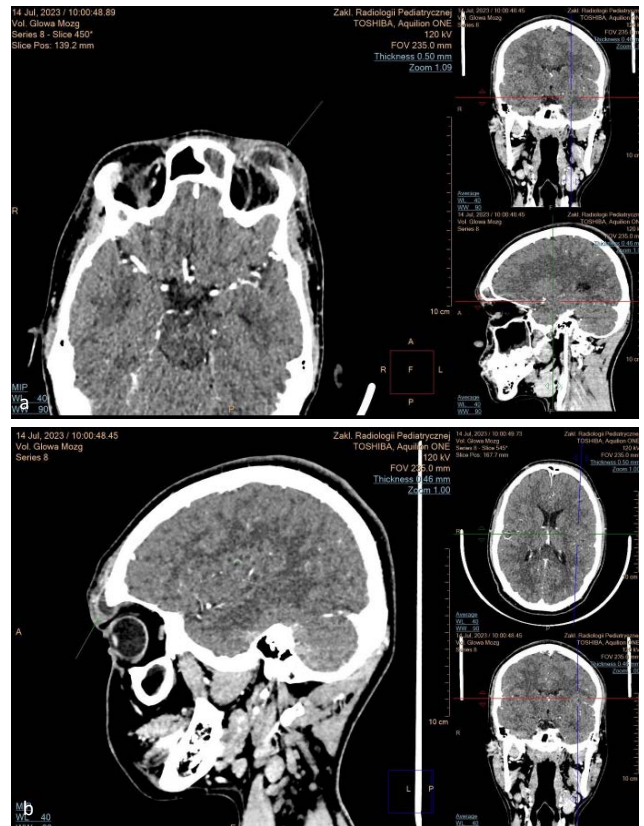


Fig. 3a, b. The second contrast-enhanced CT scan

adjacent soft tissues with gas presence. Edema and contrast enhancement of the dura adjacent to the left frontal sinus with partial thickening of the dura was described. A new finding was a linear absence of the contrast on the posterior part of the superior sagittal sinus.

The patient underwent a radiological, hematological, neurological and infectious diseases specialist's consultation. Subcutaneous enoxaparin was ordered. An abdominal ultrasound was performed without any pathological findings. The patient was discharged home on the 22nd day of hospitalization, in a good general and local condition, with oral amoxicillin for four weeks, intranasal corticosteroids for three months and subcutaneous enoxaparin until a planned in six weeks head MRI.

The control head MRI revealed no signs of abscess or edema of the tissues in the previously affected region, with presence of residual scar tissue. Thickened mucosa in the left frontal sinus was present, but less severe. Frontal bone in the area of previously observed inflammation was slightly enhanced with contrast. Dural enhancement was absent. The linear absence of the contrast inflow in the left superior sagittal sinus was comparable to the one in the previous examination. After hematological reconsultation thrombosis was ruled out and enoxaparin was discontinued.

The patient remained in outpatient follow-up care. On subsequent ambulatory visits healing of the nasal mucosa was normal, there were no signs of discharge or nose

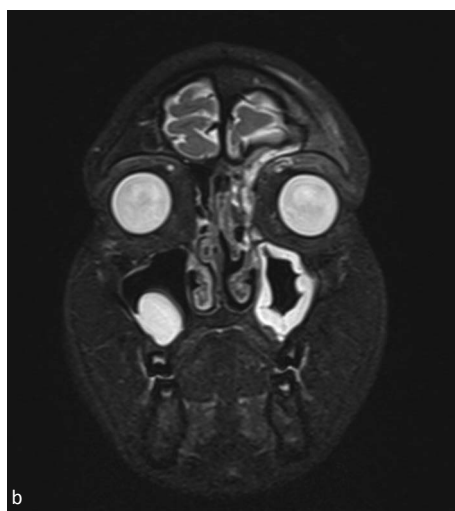
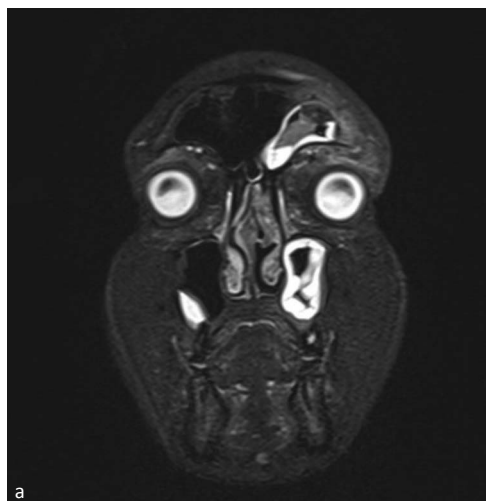


Fig. 4a, b. MRI with contrast: In comparison to the previous CT examination, there was smaller edema of the left maxillary mucosa, there was present residual abscess in the superior part of the left orbit 10 x 3 x 4 mm. The edema of the soft tissues around the abscess was found. There are signs of the edema and enhancement of the bone marrow of the left frontal bone, laterally to the frontal sinus – the suspicion of the bony inflammation. The enhancement of the dura above the frontal lobe was also found – with the dural thickening in this area at the length of 10 mm at the level of the inflammation in the frontal sinus. The most concerning finding was a linear loss of contrast in the posterior part of the superior sagittal sinus-condition after previous thrombosis? Thickening of the rest of the left sinuses like in the previous CT

obstruction. The asymmetry of the palpebral fissures and supraciliary arches was gradually decreasing and resolved completely after five months of observation. The patient didn't complain of any worrying symptoms. With a satisfying response to the treatment and a good local outcome, further follow-up visits were discontinued.

DISCUSSION

Streptococcus intermedius together with other streptococci is commonly a part of the bacterial flora of the



Fig. 5. Improvement on the first visit in hospital ambulatory 3 months after hospitalization



Fig. 6. Improvement 5 months after hospitalization

upper respiratory tract, oral cavity, pharynx, gastrointestinal tract, and urogenital tract. It is an alpha-hemolyzing Gram-positive facultatively anaerobic bacteria. Although it is predominantly included in the commensal microbiota, it may also act as an opportunistic pathogen in some cases causing difficult to treat infections with life-threatening complications, even in immunocompetent patients.

A characteristic feature of *S. intermedius* is the ability to produce abscesses both in the tissues adjacent to the site of infection (usually within the head and neck) but also in remote regions of the body such as the abdominal cavity. It is also known to cause osteomyelitis and lead to development of systemic infections. Hyaluronidases and neuraminidases produced by this strain of Streptococci facilitate the penetration of bacteria into deeper tissues, which leads to their high pathogenic invasiveness (1).

According to literature, microbiological identification of *S. intermedius* may prove more difficult than with other pathogens, which led to the development of molecular methods to identify and characterize this organism more accurately (2). Accurate identification of the is crucial to the treatment and the follow up. The number of the results that revealed *S. intermedius* presence in the abscesses of our patients with complicated rhinosinusitis, has lately increased in our clinical laboratory results. In the described case *S. intermedius* was identified in the material obtained intraoperatively during the first surgical intervention using a standard aerobic culture, which led to a prompt microbiological diagnosis. No further examination of the material was needed.

Clinically *S. intermedius* infections usually originate within the head and neck but may be associated with purulent abscess formation in various regions of the body. Han et al. identified paranasal sinus infection as the most

common origin for *S. intermedius* head and neck abscesses in adults (37% of cases). Other localizations consisted of periodontal and facial soft tissues, deep neck spaces, peritonsillar region and tracheostomy. Other studies have described cases of *S. intermedius* brain and liver abscesses, central nervous system infections, infective endocarditis, septic arthritis and cranial, mandibular and vertebral osteomyelitis (3, 4). According to a recent study by Issa et al. in patients 0-20 years old formation of brain abscesses was the most common complication of *S. intermedius* infection, with a male to female predominance of 2:1 among the patients (5, 6). In our patient's case, the infection spread through the craniofacial bone structures from the sinuses to the soft tissues of the orbit and supraciliary arch. Signs of osteomyelitis of the frontal bone and involvement of the adjacent dura were found in imaging studies with no intracranial abscess formation.

The reported susceptibility of *S. intermedius* to antibiotic treatment in literature is beta-lactams, according to the antibiograms, with a good response. However, clinical susceptibility is apparently worse. Because of the high virulence of the bacteria, that is observed clinically, the combination of the third generation cephalosporins with other antibiotics (f.e.g. clindamycin) is recommended, because of the fact that third generation cephalosporins penetrate the blood-brain barrier.

Conservative management of choice reported in literature usually consists of intravenous ceftriaxone with vancomycin being used in patients allergic to beta-lactam antibiotics. Treatment should be continued for 4-6 weeks, and surgical drainage of the abscess should be performed to achieve a good outcome (1, 3, 4, 7). In our case, we treated patient over 4 weeks with ceftriaxone and clindamycin the combination of antibiotics that we commonly use in complicated rhinosinusitis, with good clinical response. After several procedures of the sufficient abscess drainage, the patient's condition improved gradually. According to

a number of case reports, early administration of intravenous antibiotics in combination with surgical debridement leads to a complete resolution even in cases complicated by osteomyelitis or intracranial abscesses (6-9). Local antibiotic administration has also been introduced in some cases to prevent the recurrence of abscesses (7, 10).

In our patient no remote abscesses were found in additionally performed imaging studies. Pharmacological antimicrobial therapy together with surgical drainage of the forming abscesses were sufficient to eradicate the pathogen from the afflicted tissues leading to a complete resolution.

Additional diagnostic assessment is indicated to eliminate the other possible foci of infection (11, 12). Each patient during diagnostic process requires the CT or MRI examination to check the presence of abscesses, it is also recommended to reexamine the patient radiologically again during follow up after the treatment (13-16).

CONCLUSIONS

Our immunocompetent patient's case shows the complications of sinusitis of rare *S. intermedius* etiology, that required the multi-direction treatment – both surgical and pharmacological. *S. intermedius* etiology of the disease is very challenging to treat, also in cases that are sensitive to the ordered treatment as in the antibiogram. Even though the patients' general condition is improving during the hospitalization (often prolonged), the local state still requires performing several surgical procedures to reduce the volume of pus and complete the healing process of the inflamed tissue. The drainage of the pus and reduction of the bacterial culture locally, gives the best outcomes in addition to the proper antibiotics. *S. intermedius* gives a risk of causing also further abscesses in the body tissues, that might be locally resistant to the pharmacological treatment, so it is also essential to be careful during the follow up control radiological examinations to exclude the presence of residual or recurrent abscesses is very important.

CONFLICT OF INTEREST KONFLIKT INTERESÓW

None
Brak konfliktu interesów

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