CLINICAL CASE

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Post-Traumatic Orbital Cellulitis – Report of Three Cases

Pourazowe zapalenie tkanki łącznej oczodołu – opis trzech przypadków

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Abstract

Orbital cellulitis is a rare condition. It may arise as a sequel to eyelid infection, or from direct spread of infection from the paranasal sinuses; it may be of odontogenic origin and has been reported after meningitis and after nasoorbital fractures with pre-existing sinusitis. Clinically, orbital cellulitisis is of great importance, as it is a severe disease with potentially disastrous consequences. It may lead to optic neuritis, optic atrophy, blindness, cavernous sinus thrombosis, superior orbital fissure syndrome, meningitis, subdural empyema, and even death. We report three cases of orbital cellulitis as a result of facial trauma treated at the Department of Maxillofacial Surgery of the Medical University of Lublin in 2009–2010 (**Dent. Med. Probl. 2010, 47, 4, 503–507**).

Key words: orbital cellulitis, facial trauma, sinusitis, abscess.

Streszczenie

Zapalenie tkanki łącznej oczodołu jest stanem występującym stosunkowo rzadko. Wśród wielu przyczyn choroby procesy zapalne zatok przynosowych, szerzące się przez ciągłość drogą naczyń żylnych, występują najczęściej. W piśmiennictwie opisano również przypadki o etiologii zębopochodnej i pourazowej. Bez względu na przyczynę zapalenie tkanki łącznej oczodołu może prowadzić do groźnych powikłań, takich jak zapalenie nerwu wzrokowego, ślepota, zapalenie zakrzepowe zatoki jamistej, zespół szczeliny oczodołowej górnej, zapalenie opon mózgowo-rdzeniowych, a nawet do śmierci. W pracy opisano trzy przypadki pourazowego ropnego zapalenia tkanki łącznej oczodołu leczone i konsultowane w Klinice Chirurgii Szczękowo-Twarzowej UM w Lublinie w latach 2009–2010 (**Dent. Med. Probl. 2010, 47, 4, 503–507**).

Słowa kluczowe: zapalenie tkanki łącznej, uraz twarzoczaszki, zapalenie zatok, ropień.

Cellulitis is a disease of diverse etiology. The most common reason of orbital cellulitis is inflammation spread by continuity associated with sinusitis or dental diseases. Orbital cellulitis as a complication of severe facial skeleton injuries are rare. Regardless of the reason, it may lead to serious consequences such as optic neuritis resulting in nerve atrophy, thrombotic cavernous sinusitis, superior orbital fissure syndrome, phlegmon, meningitis, encephalitis and even death. Rapid diagnosis and treatment let the patient recover quickly without severe complications. In the diagnosis, we should include detailed anamnesis, ophtalmological examination, MRI and specialistic tests like PCR or cytology. The treatment is in most cases multidisciplinary involving the cooperation of specialists of ophthalmology, laryngology, maxillofacial surgery, neurosurgery and sometimes paediatrics. The main treatment protocol depends on proper localization of inflammation process, its range and etiologic factor. Basically, intensive antibiotic therapy and surgical drainage are used. In the study the authors reported three cases of post-traumatic orbital cellulitis treated and consulted in the Department of Maxillofacial Surgery of the Medical University of Lublin between 2009 and 2010.

Case Reports

Case 1

A 20-year-old male patient (Fig. 1) was transferred to the Department of Maxillofacial Surgery of the Medical University of Lublin from the Department of Traumatology of the Medical University of Lublin where he was hospitalized due to maxillofacial trauma – beaten up without loss of consciousness, having been consulted ophhtalmologically and laryngologically. In the CT examination performed on the 5th day after trauma, the following abnormalities were noted: comminuted fracture of nasal bones, fracture with intussusceptions of anterior and medial wall of the right maxillary sinus, total darkening of the right maxillary sinus as well as anterior and medial right ethmoid cells, haematomas in the upper lateral, lower medial and lateral part of the right orbit with gas bullas and right exophtalmus. On the admission to hospital, the patient was conscious in good verbal contact and good circulatory and respiratory efficiency, arterial blood pressure 130/75, pulse rate 75/min, normal body temperature. In the medical history, the patient notified phlegmonous angina undergone one month earlier. In the clinical examination the following symptoms were noted: oedema of upper and lower eyelid of the right eye and right infraorbital region with the purulent exudate from the right lid slit. The evaluation of vision was impossible on the day of admittance due to serious oedema and pain. In the local anaesthesia, we performed an incision and surgical drainage of lower right eyelid taking swab for bacteriological tests. The result of the bacteriological tests pointed to the infection of *Streptococcus pyogenes*. According with the antibiogram, we applied two antibiotics: Augmentin in the dose 3 × 1.2 g i.v. and Clindamycin 3 × 0.3 g i.m. as well as irrigation of the drained site with Metronidazole. The ophthalmological consultation after three days of drainage of the lower eyelid enabled more precise eyeball evaluation. In the ophtalmological examination, necrosis of ocular conjunctiva, keratitis and diminished photosensitivity of right eyeball was reported. 1% Atropine, Gentamicin, Floxal ointment were prescribed. The following treatment was applied during ten days of hospitalization in the Department of Maxillofacial Surgery. After this period of treatment, the patient was transferred to the Department of Ophtalmology of the Medical University of Lublin with the aim of further specialistic treatment.

Fig. 1. Case 1 – clinical picture

Ryc. 1. Przypadek 1 – obraz kliniczny

Case 2

A 42-year-old male patient (Fig. 2) was admitted to the Department of Maxillofacial Surgery of the Medical University of Lublin on the 6th day after facial trauma – beaten up without loss of consciousness. In the medical history, the patient reported that directly after the injury he came to an emergency station, where the wound of upper left eyelid was debrided. Pharmacological therapy was not prescribed. After three days, rapidly growing oedema of the left part of the face including upper and lower eyelid of the left eyeball appeared. The patient was referred by the ophthalmologist to the Department of Maxillofacial Surgery. On the admittance, the patient was conscious in good verbal contact and good circulatory and respiratory efficiency. In the medical history, the patient reported epilepsy and alcoholism. In the clinical examination huge oedema of the upper and lower eyelid of the left eyeball accompanied by necrosis of the skin of the upper eyelid, no pain symptoms, normal body temparature and lack of photosensitivity of the left eyeball were observed. Blood tests: ESR 114, RBC 4.27, haemoglobine 13.2g/dl, haemat-

Fig. 2. Case 2 – clinical picture

Ryc. 2. Przypadek 2 – obraz kliniczny

ocrit 37.1%, WBC 9.3, glucose 114 mg/dl. Results of bacteriological tests: MRSA and *S. pyogenes*. In the CT examination, the following abnormalities were noted: fracture of the inferior and medial wall of left orbit, massive oedema of soft tissues penetrating to the interior of the orbit, definite thickening of the mucosa of the left maxillary sinus and ethmoidal sinus. In the local anaesthesia, we performed an incision and surgical drainage of the left lower eyelid. Three days later, we excised in general anaesthesia necrotic tissues of the left upper eyelid and we performed a drainage of the left upper eyelid. Pharmacological treatment was prescribed: Augmentin 2 × 1.2 g i.v., Metronidazole 2 × 100 ml i.v., Proxacin, Vankomicin, Neomicin, Oftensin, Floxal. The patient stayed under the ophtalmological control during the hospitalization in the Department of Maxillofacial Surgery. After 15 days of treatment the patient was referred to the Department of Ophtalmology of the University of Lublin to continue the treatment.

Case 3

A 26-year-old patient (Fig. 3) was referred to the Department of Maxillofacial Surgery of the Medical University of Lublin from the Department of Ophtalmology with the aim of consultation. In the medical history, the patient reported an injury of the left orbit caused by shotgun. Within the treatment applied, an incision of the left lower eyelid was performed and bloody exudate was obtained. Surgical drainage was applied. Swabs for bacteriological tests were taken from the site of incision and ocular conjunctiva. The results of the bacteriological tests pointed to the infection of methycilin resistant *Staphylococcus epidermalis*. The next day follow-up examination revealed an improvement of the local status and reduction of the oedema. Nevertheless, a symptom of worsening of vision in the left eye appeared. The patient was referred to the Department of Neurosurgery of the Medical University of Lublin with the aim of further treatment.

Fig. 3. Case 1 – clinical picture

Ryc. 3. Przypadek 1 – obraz kliniczny

Discussion

In the literature, there are various classifications of the orbital tissues inflammation. Chandler et al. [1] in his classification distinguished 5 groups of the inflammation processes of the orbit: I – inflammatory oedema, II – orbital cellulitis, III – subperiosteal abscess, IV – orbital abscess, V – cavernous sinus thrombosis. Shramm et al. [2] modified the above classification by adding an oedema of orbital mucosa as a separate disease entity. Maloney et al. [3] in 1987 introduced to the classification preseptal orbital cellulitis and divided potential consequences into preseptal postseptal. The most often cited in the medical literature and the most useful clinically is the classification dividing the orbital inflammation processes into three groups: I – preseptal orbital inflammation, II – orbital cellulitis, III – endophtalmitis. Preseptal orbital cellulitis is caused most often by *Staphylococcus aureus* and *Staphylococcus pyogenes*, in case of children – by *Haemophilus influenzae*. It involves soft tissues placed in front of the septum of the orbit, which is a fascia separating the anterior and posterior part of the orbit [4]. The inflammation process may spread into the inside of the orbit and finally lead to the preseptal abscess. In such cases, the treatment involves broad-spectrum oral or intravenous antibiotic therapy and after obtaining results of antibiogram change antibiotic to the guided therapy is a standard [4, 5]. In case of viral etiology, the drug of choice is aciklovir in a dose 400–800 mg p.o. five times a day for ten days [6]. In case of a lack of improvement, an incision and surgical drainage of the purulent lesions should be applied. In case of post-traumatic etiology antitetanous prophylaxis is recommended. The eyeball has normal mobility, light reaction and vision on condition that it is not involved in inflammation process. In case of spreading of the inflammation process beyond of orbital septum, the inflammation of the orbital cellulitis begins. The characteristic symptoms are: acute pain of the eyeball, headache, oedema of the eyelids, hyperaemia of the conjunctiva, increased body temperature. The vision evaluation and eyeball examination is disturbed in the early stages of the process due to above symptoms. This type of inflammation is caused in most cases by: *Staphylococcus pneumoniae*, *S. aureus*, *S. pyogenes*

and *H. influenzae* [4, 7–9]. It is a consequence of the inflammation process of paranasal sinuses spread by continuity or by post-traumatic bone tissue defects. It requires an immediate application of broad-wide intravenous antibiotic therapy and after getting the results of antibiogram splitting into the guided parenteral therapy for 7–14 days [7, 10, 11]. The majority of orbital infections can be treated pharmacologically with good final effects in particular in cases of children under 9 years old. Surgical drainage is obligatory among older patients, when after 24–48 hours of antibiotic therapy no improvement is observed or the following symptoms appear: decreased visual acuity, blindness, limited eyeball mobility, lack of light reflex. All the pharmacological and surgical procedures should be preceded by a complex diagnosis including CT for the evaluation of bone defects and air spaces inside the orbit as well MRI for the evaluation of the range of inflammation process [12, 13]. The treatment scheme should include specialistic consultations such as ophtalmological, neurological and laryngological [14]. The final diagnosis is established on the basis of an anamnesis, clinical examination, results of the imaging and bacteriological examination and the results of consultation of specialists of various disciplines. Post-traumatic orbital cellulitis is a rare condition and is a result of the inflammation spread from the skin of orbital region or from the paranasal sinuses. It is often preceded by subcutaneous emphysema or haematoma of soft tissues [7, 15, 16]. The exact inflammation develops within 48–72 hours and if not treated leads to the severe consequences such as: eyelids necrosis, endophtalmitis or superior orbital fissure syndrome, which can mask orbital injuries. The most serious consequence of orbital cellulitis is cavernous sinus thrombosis, which develops very quickly with accompanying acute headache, high body temperature, photophobia, hyperaesthesia of the skin of the face innervated by the first and the second ramus of the trigeminal nerve as well as the meningeal signs. Other intracranial complications include meningitis or cerebral abscess [1, 8, 15, 17]. The common problem in case of this aetiology of the inflammation is cooexisting of the inflammation symptoms and post-traumatic defects of vision organ. In that case, the most important issue is the limitation of the inflammation process and then treating the post-traumatic complications.

Conclusions

Post-traumatic orbital cellulitis is a rare but extremely severe complication of facial fractures. In case of massive post-traumatic oedema of orbital soft tissues, resigning from pharmacological treatment and surgical drainage is a serious mistake. All the injuries of the upper part of the face require multi-disciplinary treatment involving CT and MRI in diagnosis. In case of a lack of improvement of the local status within 48 hours of pharmacological therapy, surgical drainage should be applied.

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