• Letter to the Editor •

Periorbital necrotizing fasciitis accompanied by sinusitis and intracranial epidural abscess in an immunocompetent patient

Su Youn Suh, Jung Hyo Ahn

Department of Ophthalmology, Research Institute for Convergence of Biomedical Science and Technology, Pusan National University Yangsan Hospital, Pusan National University School of Medicine, Yangsan, Gyeongnam 50612, Republic of Korea

Correspondence to: Jung Hyo Ahn. Department of Ophthalmology, Pusan National University Yangsan Hospital, Pusan National University School of Medicine, Research Institute for Convergence of Biomedical Science and Technology, 20 Geumo-ro, Mulgum, Yangsan, Gyeongnam 50612, Republic of Korea. jhahn77@daum.net

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Dear Editor,

We have presented the unusual case of periorbital necrotizing fasciitis (NF) coexisting with sinusitis and intracranial epidural abscess in a healthy young patient that was successfully managed with medical and surgical treatments. The authors obtained informed consent in person and adhered to the tenets of the Declaration of Helsinki.

Periorbital NF is a rapidly progressive and potentially life-threatening soft tissue infection characterized by extensive necrosis and gas formation in the fascia and subcutaneous tissue. Periorbital NF usually occurs in traumatic injuries, in postsurgical wounds, and under immunocompromised conditions, such as advanced age, diabetes mellitus, human immunodeficiency virus (HIV) infection, alcohol abuse, chronic renal failure, and chemotherapy for malignancies. It has also been reported in healthy patients[1]. Previous studies on periorbital NF have reported precipitating events such as blunt trauma or penetrating injury, blepharoplasty, dacryocystorhinostomy, tooth extraction, retrobulbar injection, and dexamethasone intravitreal injection[2-3]. However, there have been rare reports of periorbital NF associated with sinusitis, extended into the epidural space in the immunocompetent patients[4-5].

A 43-year-old male patient visited our Emergency Center with complaints of a right painful lid swelling and headache that started a day earlier. He had no chronic disorder, such as diabetes mellitus, HIV infection, alcoholism, and systemic malignancy. Further, he had no history of trauma or surgery. He was receiving intermittent treatments for chronic sinusitis for over 5y. His vital signs were 142/76 mm Hg (blood pressure), 86 beats per minute (heart rate), 18 breaths per minute (respiratory rate), and 36.2℃ (body temperature). The white blood cell count and C-reactive protein level were 19.4×10^9/L (normal: 4-11×10^9/L) and 20.68 mg/dL (normal: 0-0.5 mg/dL), respectively, indicating severe acute infection or inflammation. Erythrocytes sedimentation rate (ESR) was 6 mm/h (normal: 0-10 mm/h). Furthermore, we performed the systemic evaluation to exclude the sinusitis related to autoimmune disease. The chest radiograph and abdomen computed tomography were normal. Serologic tests such as antineutrophil cytoplasmic antibodies (ANCA) and angiotensin converting enzyme (ACE) showed no abnormality. We admitted the patient and initiated empirical intravenous antibiotic treatment (ceftriaxone, vancomycin, metronidazole). His best-corrected visual acuity was 20/20 in the left eye, but it could not be examined for the right eye because of the severe erythematous swelling of the eyelid. No abnormality was found on B-scan ultrasonography of the right eye.

Eyelid skin necrosis and pus developed a day after admission (Figure 1). Orbital computed tomography (CT) revealed marked swelling and increased fat infiltration with gas bubbles in the right eye accompanied by ethmoid and sphenoid sinusitis. In addition, the sagittal CT view showed maxillary sinusitis with air bubbles, whereas the coronal CT view revealed pneumocephalus with a suspicious bony defect at the frontal sinus wall. Brain magnetic resonance imaging showed frontal sinusitis at the posterior surrounding minimal fluid collection within the right epidural space, which represented an epidural abscess (Figure 2).

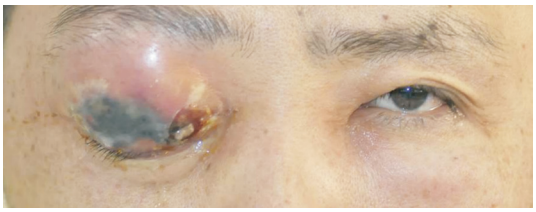

Figure 1 Preoperative photograph of the patient It shows a severe erythematous swelling with extensive skin necrosis and subcutaneous pus in the right eye.

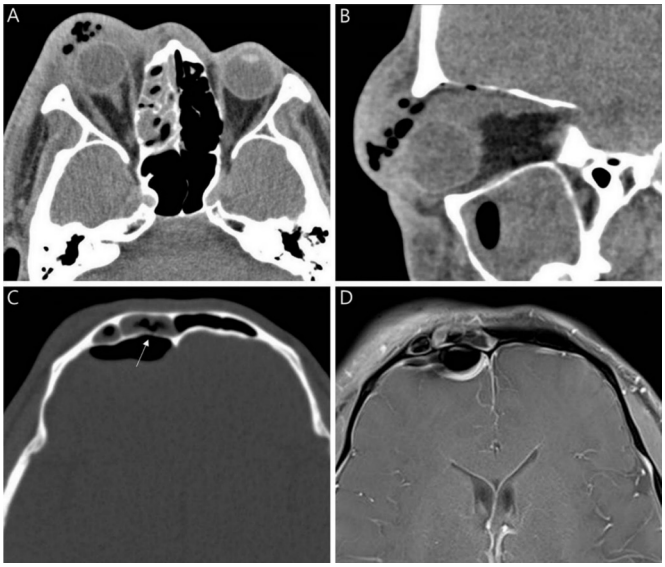

Figure 2 CT and MRI of the orbit and brain A: Computed tomography (CT) showing periorbital swelling and gas bubble formation with extensive ethmoid sinusitis in the right eye; B: CT (sagittal view) showing subcutaneous emphysema and maxillary sinusitis with air; C: CT (coronal view) showing pneumocephalus with frontal sinusitis and a suspicious bony defect (arrow) at the frontal sinus wall; D: Brain magnetic resonance imaging showing frontal sinusitis surrounding the intracranial epidural abscess and pneumocephalus.

The patient was diagnosed with periorbital NF accompanied by sinusitis and intracranial epidural abscess. We performed an emergent surgical debridement with the cooperation of the neurosurgery and otolaryngology teams. First, the epidural abscess connected to the right frontal sinus was identified and extensively debrided using craniotomy. Second, large amounts of the abscess were drained from the right ethmoid, sphenoid, and maxillary sinuses using endoscopic sinus surgery. Finally, debridement of the necrotic skin and soft tissues in the eyelid was performed. Culturing the specimens from the brain, sinus, and eyelid revealed *Streptococcus constellates* as the causative agent. Therefore, the empirical antibiotic regimen was replaced with ampicillin, to which *S. constellates* is highly susceptible. Eyelid swelling and purulent discharge from the wound decreased gradually after frequent wet dressing. The visual acuity of the patient's right eye was preserved at 20/20. A skin graft was successfully performed a month after the surgery (Figure 3). There were no other complications in the brain, orbit, and sinuses. At 2y after surgery, there was no evidence of recurrence of the orbital cellulitis and sinusitis.

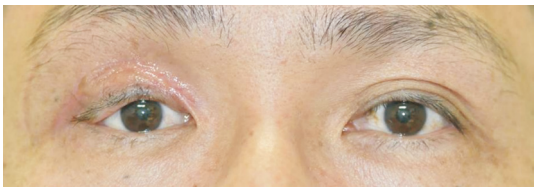

Figure 3 Postoperative photograph of the patient It shows a successful skin graft after the debridement of necrotic tissue in the right eyelid.

In previous studies, approximately 47% patients with periorbital NF were healthy without any underlying comorbidities[2,5]. In several case reports, periorbital NF was also triggered by infections such as dacryocystitis, sinus infection, carbuncle, pneumonia, and parotid gland infection[6-9].

In our case, periorbital NF was provoked by sinusitis extending to intracranial epidural abscess in a healthy young male patient. He had suffered from chronic sinusitis for >5y. It is presumed that the chronic sinusitis abruptly induced periorbital NF and spread into the intracranial epidural abscess through a bony defect in the frontal sinus wall.

The causative organism in periorbital NF is usually Group A β-hemolytic *Streptococcus (S. pyogenes)*, occasionally in combination with *Staphylococcus aureus*[1-2]. However, the pathogen in our case was *S. constellatus*, a member of the *S. milleri* group. *S. milleri* group organisms are commonly found on the mucous membrane of the oropharyngeal and upper respiratory tract. However, they can be aggressive pathogens with a propensity for abscess formation and periocular extension of the infection after mucosal disruption.

The major morbidities of periorbital NF are loss of vision, meningitis, and other neurological disorders; death may also occur. However, we prevented blindness and an escalation to meningitis, toxic shock, or multiorgan failure by prompt surgical debridement and drainage of the abscess with administration of systemic intravenous antibiotics.

In conclusion, we have presented a rare case of periorbital NF accompanied by sinusitis and intracranial epidural abscess in an immunocompetent patient with no history of trauma or surgery. The fact that patient was immunocompetent is actually in favor of good recovery of the patient without loss of vision or any systemic complications.

ACKNOWLEDGEMENTS

Conflicts of Interest: Suh SY, None; **Ahn JH,** None.

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