

Periorbital necrotizing fasciitis in a previously healthy male

A 34-year-old previously healthy male construction worker presented to an Urgent Care Centre with rapidly progressing left upper eyelid swelling and severe pain associated with increasing edema of the orbit and face. He had been discharged from the same Urgent Care Centre 4 hours prior with a suspected acute hordeolum. On arrival, his vital signs were: temperature 36.7°C, blood pressure 148/86 mm Hg, heart rate 97 beats/min, and oxygen saturation of 98% on room air. His condition deteriorated over the next 30 minutes with rapid progression of orbit and facial edema. Ophthalmology was consulted for a possible orbital cellulitis. On examination by the ophthalmology department, the patient was unable to open the left eye, fluid-filled blebs appeared on the left upper eyelid, and marked edema had spread to his forehead, upper cheek, and ear (Fig. 1). In combination with increasing delirium, his vital signs began to show clear evidence of sepsis: white cell count of $17.2 \times 10^9/L$, temperature 38.4°C, tachycardic at 115 beats/min, oxygen saturation 91%, and a mild decrease in blood pressure of 123/76 mm Hg. Based on clinical appearance, the rapid progression of symptoms, and his deteriorating vital signs, a presumptive diagnosis of periorbital necrotizing fasciitis (NF) was made.

The patient was emergently transferred via EMS to our tertiary care facility where the plastic surgeon and the infectious disease specialist, who had been called in advance, were present. The patient was started on clindamycin 600 mg q8h and penicillin G 6 million international units q6h intravenously. We administered intravenous immune globulin (IVIG), started at 2 g/kg, and the patient was taken to the operating room for emergent debridement (Fig. 2). During surgery, the necrotic upper eyelid tissue was debrided in combination with a lateral canthotomy and cantholysis for increased intraocular and orbital pressure. The adjacent forehead, temple, and upper cheek where there had been clinically progressive edema and inflammation were selectively incised and examined. Although grossly edematous, there was no necrosis, and stat Gram stains obtained from each of these regions revealed no identifiable organism. This was in contrast with the necrotic upper eyelid, which grew Gram-positive cocci (ultimately growing group A beta-hemolytic streptococcus). Postoperatively, the wounds were left open anticipating the need for a second debridement. He remained intubated and in intensive care for 24 hours until clinical stabilization. He received IVIG for a further 2 doses and was discharged home on postoperative day 7 on oral penicillin with no further surgical intervention. At 3-month follow-up, the wounds had completely healed, and the only remaining deficit was a cicatrizing ectropion OS (Fig. 3). Visual acuity was 6/6 OU.

Periorbital NF is an uncommon, but potentially debilitating and life-threatening condition, characterized by



Fig. 1—Forty-five minutes from second presentation to the emergency department.



Fig. 2—Three hours from presentation.



Fig. 3—Six months after surgery, residual left ectropion.

necrosis of the tissue layers surrounding the orbit. A systematic review found 94 published cases of periorbital NF in the past 20 years.¹ The total incidence of all NF in adults is 0.40 per 100,000.² Mortality usually occurs secondary to septicemia and multiorgan failure, and is reported at a rate of 10% to 14.42%.^{3–5} In contrast, the mortality rate of NF in other areas of the body has been reported to be as high as 20% to 35%.¹ A high index of suspicion, and early diagnosis and treatment are key to preventing mortality and minimizing morbidity such as vision loss and soft-tissue defects compromising function and cosmesis.¹ NF can be classified based on microbial culture. Type 1 refers to polymicrobial, including a mix of aerobic and anaerobic microbacteria, and frequently occurs in immunocompromised individuals. Type 2 refers to single organisms and is more common in immunocompetent individuals.¹ Group A beta-hemolytic streptococcus (GAS) is one of the most commonly implicated organisms, cultured in 51% of cases.¹ Typically, these patients present with a several-hour history of rapidly progressive disease and pain out of proportion to the initial appearance of the site of infection, as was seen in this case. The virulence of GAS is attributed to specific exotoxins (e.g., streptococcal pyrogenic exotoxins), which are responsible for inducing the systemic inflammatory response syndrome by massively increasing the release of cytokines from T cells.⁶ The thin eyelid skin allows for early detection of the disease, and it is hypothesized that abundant blood supply to the orbicularis muscle acts as a defense, preventing spread of infection to the underlying orbit.³ NF is a surgical emergency, with the goal of debridement of all necrotic tissue until viable tissue is reached.^{7,8} Tissue samples should be sent for Gram stain and culture. The wound is left open to allow for further examination and possible debridement within 24 hours.⁷ NF suspected to be caused by GAS is treated with penicillin to maximize bacterial killing and clindamycin to prevent further bacterial toxin production. The use of IVIG has been shown to improve

outcomes in group A streptococcal infections because it contains antibodies that neutralize bacterial superantigens and exotoxins.⁹ Studies have shown increased survival with IVIG in patients with septic shock related to group A streptococcal infection.⁶ However, it must be noted that the availability of IVIG may be limited to academic centres and can cost upward of \$50/g.

We believe that the favourable outcome in this case is related to the early diagnosis and prompt attention by the multidisciplinary team. These infections can require substantial resections with significant cosmetic and functional sequelae. In our case, prompt surgical therapy and the use of intraoperative Gram stains mitigated a more conservative debridement. We believe that once the presumptive diagnosis was made, the emergent coordination and cooperative effort of multiple subspecialties including emergency medicine, infectious diseases, plastic surgery, and ophthalmology were key to the positive outcome in this patient from this potentially lethal infection.

Ashley Brissette,* John Davidson,* Nicole Le Saux,† Robert McGraw,* Vladimir Kratky,* Delan Jinapriya*

*Queens University, Kingston, Ont.; and †University of Ottawa, Ottawa, Ont.

Correspondence to:

Delan Jinapriya, BSc, MD, FRCSC: djinapriya@galeneeyecentre.com

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