

## CASE REPORT

# Surgical Management of an Unusual Case of Preseptal Cellulitis: A Case Report and Review

Anjani Kumar Jha

## ABSTRACT

Preseptal cellulitis, also known as periorbital cellulitis, is an acute inflammatory and/or infective condition of the eyelids or skin around the eye. Periorbital cellulitis is more common in children. It can occur after a scratch or bug bite around the eye and allow germs or bacteria to cause an infection. It can be the result of a minor injury to the area around the eye, or it may extend from another site of infection, such as sinusitis. A stye or chalazion may also become worse and involve the eyelid. It almost always responds to medical management with antibiotics and anti-inflammatory drugs. We present a case of preseptal or periorbital cellulitis of unknown origin in a 25-year-old male patient who failed to respond to all kinds of antibiotic, antihistaminic, and anti-inflammatory drugs including steroids. Instead his condition got worsened wherein the cellulitis started to spread to the forehead and was crossing the midline. Finally, he was managed surgically by incision and drainage through an existing scar in the eyebrow region. The patient recovered completely within a period of 1 week postoperatively.

**Keywords:** Incision and drainage, Periorbital cellulitis, Preseptal cellulitis.

**How to cite this article:** Jha AK. Surgical Management of an Unusual Case of Preseptal Cellulitis: A Case Report and Review. *Int J Oral Care Res* 2016;4(2):160-164.

**Source of support:** Nil

**Conflict of interest:** None

## INTRODUCTION

Preseptal and orbital cellulitis are infections of the eyelid or orbital tissue that present with eyelid erythema and edema. Although these conditions are less common causes of eyelid edema than contact dermatitis and atopic dermatitis, immediate recognition and treatment are critical to prevent vision loss and other serious complications, such as meningitis and cavernous sinus thrombosis.<sup>1</sup>

Periorbital cellulitis is characterized by inflammation, redness, warmth, and varying degrees of pain. Adults may develop this condition; however, eyelid cellulitis is more common in children. Some individuals may develop chemosis, which is swelling in the whites of the eyes. Conjunctivitis, or redness in the eye whites, may also result from periorbital cellulitis.

## CASE REPORT

A 25-year-old male patient with nonresolving swelling and erythema of the left upper eyelid and forehead was referred to our center by an ophthalmologist. Initially, the patient had reported to the ophthalmologist with the chief complaint of swelling of the left upper eyelid. The patient was diagnosed with periorbital cellulitis, and medical management with antibiotics and anti-inflammatory drugs was initiated. In spite of the patient being on higher intravenous antibiotics, anti-inflammatory and antihistaminic drugs, and steroids for a period of 21 days, there was no relief. Instead, the patient's condition got worsened and the erythematous swelling started spreading vigorously to involve the forehead crossing the midline. There was no history of any previous such occurrence; there was no history of any drug allergy or insect bite. On general physical examination the patient was moderately built and moderately nourished; there was no signs of pallor, icterus, cyanosis, clubbing, or lymphadenopathy. On systemic examination there was no abnormal finding and vitals were within normal limits. On extraoral examination there was no facial asymmetry; there was obvious erythematous swelling in the region of the upper half of the left upper eyelid, which extended superiorly only till the eyebrow. The erythematous swelling involved the left supraorbital region superior to the medial two-third of the eyebrow, spreading further medially to involve the middle portion of the forehead, and further spreading downward to involve the glabella and the skin over the fronto-naso-orbital region. The patient had no pain or burning sensation except for slight discomfort in closing the eye. The pupillary light reflex was normal, the extraocular movements were within the normal limit, and there was no visual disturbance except for the enophthalmos of the left eye and mild redness of both the eyes, which were the only positive eye findings. There was an old scar within the superior margin of the left

Associate Professor

Department of Dental Surgery, Major SD Singh Medical College and Hospital, Farrukhabad, Uttar Pradesh, India

**Corresponding Author:** Anjani Kumar Jha, Associate Professor Department of Dental Surgery, Major SD Singh Medical College and Hospital, Fategarh, Farrukhabad-209602, Uttar Pradesh India, Phone: +919939189470, +918539951446, e-mail: anjansmile@rediffmail.com



**Fig. 1:** Preoperative view of the preseptal cellulitis with enophthalmos



**Fig. 2:** Postoperative healing

eyebrow (history of laceration due to fall around 15 years back). There was no discharge, nasolacrimal duct was patent, and paranasal sinusitis was ruled out (Fig. 1). Routine blood investigation was done, which was within normal limits. Under proper aseptic measures, incision and drainage was done through the existing scar under local anesthesia. There was no pus except for the inflammatory exudate. A thorough debridement of the involved planes was done using normal saline. Wound closure was done with 3-0 black silk. The exudate was sent for culture and sensitivity. The patient was put on oral antibiotics and anti-inflammatory drugs for 5 days. Sutures were removed on the 7th postoperative day, wound healing was satisfactory, and the erythematous swelling, redness of the eye, and enophthalmos had resolved (Fig. 2). The culture and sensitivity report was negative.

## DISCUSSION

Preseptal cellulitis can occur by three possible mechanisms: (1) spread of infection from the upper respiratory tract, presumably by venous and lymphatic channels; (2) direct inoculation from trauma; and (3) spread of infection from the skin and adjacent structures. In our case the cause was unknown as none of the above-mentioned mechanisms were found except for an old scar over the eyebrow.

An understanding of the anatomy of the eyelid is important in distinguishing preseptal from orbital cellulitis. The orbital septum is a sheet of connective tissue that extends from the orbital bones to the margins of the upper and lower eyelids;<sup>2</sup> it acts as a barrier to infection deep in the orbital structures.<sup>3</sup> Infection of the tissues superficial to the orbital septum is called preseptal cellulitis, whereas infection deep in the orbital septum is termed orbital cellulitis.<sup>3</sup> Distinguishing between the conditions is important in determining an appropriate treatment. Both preseptal and orbital cellulitis are more

common in children than in adults.<sup>4</sup> The patient was an adult male in our case, which is an uncommon finding.

## ETIOLOGY

Preseptal cellulitis is caused by contiguous spread from upper respiratory tract infection, local skin trauma, abscess, insect bite, or impetigo.<sup>5</sup> Sinusitis is implicated in 60 to 80% cases of orbital cellulitis.<sup>6</sup> Surgery, trauma, or complication from preseptal cellulitis or dacryocystitis can also cause orbital cellulitis.<sup>6</sup> The pathogens responsible for most cases of preseptal and orbital cellulitis include *Haemophilus influenzae*, *Staphylococcus* species, and *Streptococcus* species.<sup>4</sup> Community-acquired methicillin-resistant *Staphylococcus aureus* (MRSA) isolates have increasingly been found in patients with preseptal and orbital cellulitis.<sup>7</sup> The culture and sensitivity were negative in our case.

## Other Potential Causes

Angioedema, a type I allergic reaction, which is triggered by shellfish, medications, or other allergens, may present with swollen eyelids similar to cellulitis; however, it often occurs bilaterally and concurrently with swelling of other distensible regions of the body, particularly other facial structures and the extremities.<sup>8</sup> Angioedema is often self-limited, but upper airway involvement warrants emergency medical attention.

Although rare, Langerhans cell histiocytosis can cause acute periorbital cellulitis in children. Trauma can induce an inflammatory response, allowing for earlier diagnosis of the orbital lesion.<sup>9</sup>

An external hordeolum, a common staphylococcal infection of the eyelash follicle and its associated gland of Zeis, is typically unilateral and presents with tenderness, erythema, and localized swelling of the lid margin.<sup>3,10</sup> An

internal hordeolum is a staphylococcal infection of a meibomian gland, which is unilateral and presents with pain, eyelid edema, and erythema more diffuse than that of an external hordeolum.<sup>3,10</sup> A chalazion is a sterile nodular lipogranulomatous inflammation of a meibomian gland that is painless and non-erythematous.<sup>10</sup> First-line treatment in all of these conditions includes warm compresses to encourage localization and spontaneous drainage. Topical antibiotics may be applied to hordeola to limit the spread of infection. Recalcitrant lesions may require ophthalmology referral for incision and drainage.<sup>11</sup>

Rosacea, a chronic skin condition most commonly affecting adults in their fourth and fifth decades of life, usually presents with flushing, erythema, and telangiectasias of the face. Some patients develop papules and pustules of the nose, cheek, forehead, and chin. Although eyelid involvement usually accompanies general cutaneous disease manifestations that affect the entire face, the ocular signs of rosacea may develop first.<sup>12</sup> Eyelid involvement can manifest as acneiform eruptions of the lids, periorbital edema and erythema, telangiectasia of the lid margins, and variably thickened and irregular eyelids.<sup>11,13,14</sup> Treatment consists of eyelid hygiene, systemic tetracyclines,<sup>15</sup> topical metronidazole,<sup>16</sup> or 15% azelaic acid gel.<sup>17</sup> However, azelaic acid gel is more irritating than metronidazole, and patients should be cautioned to avoid getting the gel in their eyes.<sup>18</sup> Patients with severe rosacea may develop corneal neovascularization and scarring; these patients should be referred to an ophthalmologist.<sup>19</sup>

Herpes simplex with eyelid involvement is uncommon and presents with unilateral crops of small vesicles with swelling and erythema. In some cases, the vesicles can be very subtle or have previously ruptured to form erosions, complicating the diagnosis. The vesicles typically scab and heal without scarring.<sup>10,20</sup>

Herpes zoster ophthalmicus is a common condition that presents in a unilateral V1 nerve distribution. It is a painful maculopapular rash, with vesicles, crusting, ulceration, erythema, and edema. This condition occurs most often in older adults. Patients generally have headache, fever, and malaise.<sup>10</sup> Treatment with systemic antiviral agents is indicated, and referral to an ophthalmologist should be made to evaluate for sequelae such as corneal disease and iritis.<sup>21</sup>

Systemic disorders such as myxedema, renal disease, congestive heart failure, and superior vena cava syndrome may manifest with periorbital edema. Generalized or regional edema as well as other signs and symptoms consistent with each respective disease should also be apparent. A periocular "heliotope rash" may be the initial presenting sign of dermatomyositis, an idiopathic inflammatory myopathy.<sup>22,23</sup>

Systemic lupus erythematosus (SLE)-related eyelid edema was first described by Tuffanelli and Dubios.<sup>24</sup> They studied 520 patients over a 13-year period. They reported an overall 4.8% incidence of periorbital edema in SLE. It has been reported also in cases of discoid lupus erythematosus and lupus erythematosus profundus.<sup>25,26</sup> The presence of increased dermal mucin can result in periorbital edema in lupus erythematosus (LE).<sup>27</sup> In our case, the disease was limited to the skin but the lesions lacked the appearance of discoid lupus erythematosus, including atrophy, scarring, and follicular plugging.

Horner's syndrome is an eye disorder that consists of enophthalmos (sinking of the eyeball into its cavity), ptosis (droopy upper eyelid), swelling of the lower eyelid, miosis (abnormal contraction of the pupil), anhidrosis (absence of facial sweat), and heterochromia (difference in eye color). Our patient had enophthalmos, which is not reported to the best of our knowledge in cases of periorbital cellulitis. All other features of Horner's syndrome were absent.

## DIAGNOSIS

Preseptal and orbital cellulitis must be differentiated from other diseases that may present similarly, including trauma, malignancy, contact dermatitis, and allergic reactions. A history of sinusitis, fever, malaise, local trauma, impetigo, or surgery may help differentiate cellulitis from other processes.<sup>4</sup>

Physical examination is key to differentiating between preseptal and orbital cellulitis. Although both conditions may present with eyelid edema and erythema, orbital cellulitis presents with additional signs and symptoms, including proptosis, decreased visual acuity, pain with eye movement, limitation of extraocular movements, and afferent papillary defect (i.e., an interference with the input of light to the pupillomotor system resulting in a symmetrical decrease in contraction of both pupils to light given to the damaged eye, compared with light given to the less damaged or normal eye).<sup>3,4</sup> In patients with suspected orbital cellulitis, contrast computed tomography (CT) should be ordered to evaluate the extent of the infection and to look for periosteal abscess. Other tests include a white blood cell count, conjunctival cultures, and blood cultures.<sup>3</sup>

Preseptal cellulitis in adults without local skin infection or trauma is rare. As in children, the presumed mechanism in such cases is spread of organisms from the sinuses, upper respiratory tract, or middle ear by venous or lymphatic channels; the principal organisms involved are *Streptococcus pneumoniae*, other streptococci, and *Staphylococcus aureus*. Preseptal cellulitis due to *H. influenzae* type B has not been documented in adults. The differential diagnosis includes erysipelas, an uncommon disease in

children and very rare in adults. Causes of noninfectious preseptal edema, such as allergic blepharodermatitis or angioneurotic edema, should be considered.

Posttraumatic suppurative preseptal cellulitis can follow puncture wounds, lacerations, and insect bites, but can also occur after blunt trauma without an apparent penetrating wound. Subcutaneous edema and hematoma may predispose patients to abscess formation. The most commonly identified bacterial causes of posttraumatic periorbital cellulitis are *Staphylococcus aureus* and *Streptococcus pyogenes*. Polymicrobial infections may occur, especially if a wound remains open. Anaerobic, non-spore-forming bacteria, such as *Peptococcus*, *Peptostreptococcus*, and *Bacteroides*, are associated with infections following human or animal bites. Contamination with soil can produce myonecrosis with gas gangrene or tetanus due to clostridial infection.<sup>28</sup> Anaerobic infection is suggested by foul-smelling discharge, tissue necrosis, the formation of gas in the tissue, and severe toxemia.<sup>29</sup>

## TREATMENT

Mild preseptal cellulitis in older children and adults can often be treated on an outpatient basis with broad-spectrum oral antibiotics (e.g., dicloxacillin, amoxicillin/clavulanate [Augmentin]) and close follow-up.<sup>3,4,30</sup> Preseptal cellulitis in children younger than 4 years may warrant hospitalization and the use of intravenous antibiotics.<sup>3</sup> If orbital cellulitis is suspected after examination or CT imaging, referral to an ophthalmologist or otolaryngologist is necessary.<sup>3</sup> All patients with orbital cellulitis require hospital observation and broad-spectrum intravenous antibiotics (e.g., ampicillin/sulbactam, second- or third-generation cephalosporins).<sup>3,4,30</sup> With the increasing prevalence of community-acquired MRSA, alternative empiric therapeutic regimens may be necessary. Such therapies include clindamycin, trimethoprim-sulfamethoxazole, doxycycline, and minocycline. Patients with community-acquired MRSA orbital cellulitis may require intravenous therapy with vancomycin, linezolid, or daptomycin.<sup>31</sup> Our patient did not respond to any of the antibiotics including cephalosporins and instead the condition got worsened requiring surgical intervention.

## CONCLUSION

Preseptal or periorbital cellulitis rarely affects adults and is commonly found to occur in children. It is neither associated with exophthalmos as seen in orbital cellulitis nor enophthalmos as seen in Horner's syndrome. The treatment for preseptal cellulitis is always medical and the disease is always found to respond very well when treated with antibiotics and anti-inflammatory drugs.

Our case had unusual presentation of the preseptal cellulitis. It was found in an adult patient with no history of any trauma, insect bite, or sinusitis except the presence of an old scar within the upper margin of the eyebrow. There was no relief and instead the cellulitis got worsened even after being treated with long-term higher intravenous antibiotics, antihistamines, and anti-inflammatory drugs. Instead, the patient responded very well following surgical management wherein an incision and drainage was done. The patient was completely cured of the disease within a period of 1 week postoperatively. To conclude, variations always exist to a particular disease and such diseases should be identified early and managed surgically when they do not respond medically. This will prevent complications that could be life-threatening and will help in the early recovery of the patient.

## REFERENCES

- Papier A, Tuttle DJ, Mahar TJ. Differential diagnosis of the swollen red eyelid. *Am Fam Physician* 2007 Dec 15;76(12):1815-1824.
- Powell KR. Orbital and periorbital cellulitis. *Pediatr Rev* 1995 May;16(5):163-167.
- Pasternak A, Irish B. Ophthalmologic infections in primary care. *Clin Fam Pract* 2004;6(1):19-33.
- Mawn LA, Jordan DR, Donajue SP. Preseptal and orbital cellulitis. *Ophthalmol Clin North Am* 2000;13:633-641.
- Renfro L, Snow JS. Ocular effects of topical and systemic steroids. *Dermatol Clin* 1992 Jul;10(3):505-512.
- Mark BJ, Slavin RG. Allergic contact dermatitis. *Med Clin North Am* 2006 Jan;90(1):169-185.
- Rutar T, Chambers HF, Crawford JB, Perdreau-Remington F, Zwick OM, Karr M, Diehn JJ, Cockerham KP. Ophthalmic manifestations of infections caused by the USA300 clone of community-associated methicillin-resistant *Staphylococcus aureus*. *Ophthalmology* 2006 Aug;113(8):1455-1462.
- Greenberg MF, Pollard ZF. The red eye in childhood. *Pediatr Clin North Am* 2003 Feb;50(1):105-124.
- Levy J, Monos T, Kapelushnik J, Maor E, Nash M, Lifshitz T. Langerhans cell histiocytosis with periorbital cellulitis. *Am J Ophthalmol* 2003 Nov;136(5):939-942.
- Kanski JJ, Nischal KK, Milewski SA. *Ophthalmology: clinical signs and differential diagnosis*. Philadelphia (PA): Mosby; 1999.
- Noble J. *Textbook of Primary care medicine*. 3rd ed. St Louis (MO): Mosby; 2001.
- Donschik PC, Hoss DM, Ehlers WH. Inflammatory and papulosquamous disorders of the skin and eye. *Dermatol Clin* 1992 Jul;10(3):533-547.
- Zug KA, Palay DA, Rock B. Dermatologic diagnosis and treatment of itchy red eyelids. *Surv Ophthalmol* 1996 Jan-Feb;40(4):293-306.
- Uhara H, Kawachi S, Saida T. Solid facial edema in a patient with rosacea. *J Dermatol* 2000 Mar;27(3):214-216.
- Stone DU, Chodosh J. Oral tetracyclines for ocular rosacea: an evidence-based review of the literature. *Cornea* 2004 Jan;23(1):106-109.

16. Barnhorst DA Jr, Foster JA, Chern KC, Meisler DM. The efficacy of topical metronidazole in the treatment of ocular rosacea. *Ophthalmology* 1996 Nov;103(11):1880-1883.
17. Liu RH, Smith MK, Basta SA, Farmer ER. Azelaic acid in the treatment of papulopustular rosacea: a systematic review of randomized controlled trials. *Arch Dermatol* 2006 Aug;142(8):1047-1052.
18. Ziel K, Yelverton CB, Balkrishnan R, Feldman SR. Cumulative irritation potential of metronidazole gel compared to azelaic acid gel after repeated applications to healthy skin. *J Drugs Dermatol* 2005 Nov-Dec;4(6):727-731.
19. American Academy of Ophthalmology. Preferred practice pattern. Blepharitis [accessed 2007 Apr 25].
20. Fitzpatrick TB, Freedberg IM. *Fitzpatrick's dermatology in general medicine*. 6th ed. New York (NY): McGraw-Hill; 2003.
21. Yanoff M, Duker JS, Augsburger JJ. *Ophthalmology*. 2nd ed. St. Louis (MO): Mosby; 2004.
22. Sevigny GM, Mathes BM. Periorbital edema as the presenting sign of juvenile dermatomyositis. *Pediatr Dermatol* 1999 Jan-Feb;16(1):43-45.
23. Hall VC, Keeling JH, Davis MD. Periorbital edema as the presenting sign of dermatomyositis. *Int J Dermatol* 2003 Jun;42(6):466-467.
24. Tuffanelli DL, Dubios EL. Cutaneous manifestation of systemic lupus erythematosus. *Arch Dermatol* 1964 Oct;90:377-386.
25. Donzis PB, Insler MS, Buntin DM, Gately LE. Discoid lupus erythematosus involving the eyelids. *Am J Ophthalmol* 1984 Jul 15; 98(1):32-36.
26. Magee KL, Hymes SR, Rapini RP, Yeakley JW, Jordon RE. Lupus erythematosus profundus with periorbital swelling and proptosis. *J Am Acad Dermatol* 1991 Feb;24(2 Pt 1):288-290.
27. Williams WL, Ramos-Caro FA. Acute periorbital mucinosis in discoid lupus erythematosus. *J Am Acad Dermatol* 1999 Nov;41(5 Pt 2):871-873.
28. Gorbach SL, Bartlett JG. Anaerobic infections. *N Engl J Med* 1974 May 23;290(21):1177-1184.
29. Placik OJ, Pensler JM, Kim JJ, Mets MB, Engel JM. Necrotizing periorbital cellulitis. *Ann Plast Surg* 1993 Oct;31(4):369-371.
30. Tovilla-Canales JL, Nava A, Tovilla y Pomar JL. Orbital and periorbital infections. *Curr Opin Ophthalmol* 2001 Oct;12(5):335-341.
31. Micek ST. Alternatives to vancomycin for the treatment of methicillin-resistant *Staphylococcus aureus* infections. *Clin Infect Dis* 2007 Sep 15;45(Suppl 3):S184-S190.