

# Orbital Cellulitis Secondary to Dacryocystitis: A Case Report

Bahram Eshraghi, MD<sup>1</sup> • Hesam Hashemian, MD<sup>1</sup>

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## Abstract

**Purpose:** To present a case of orbital cellulitis secondary to dacryocystitis

**Case report:** A 48-year-old postmenopausal lady was referred with a prominent proptosis of the right eye in addition to external ophthalmoplegia. She had one year history of lacrimation. Orbital Computed Tomography (CT) revealed an extraconal infiltration near the medial and inferior orbital wall consistent with orbital cellulitis. Treatment included intravenous antibiotics, followed by dacryocystorhinostomy (DCR) one month after discharge. Within five days after antibiotic treatment, inflammatory signs improved dramatically.

**Conclusion:** Acute dacryocystitis should be considered as an emergency in ophthalmology; as it can cause orbital cellulitis with potential vision-threatening side effects, if left untreated.

**Keywords:** Orbital cellulitis, Nasolacrimal Duct Obstruction, Orbital Abscess

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## Introduction

Nasolacrimal duct obstruction presents with tearing at the beginning. Later, it causes pus reflux and secondary conjunctivitis. Bacterial growth in closed lacrimal gland finally depicts as acute dacryocystitis. Acute dacryocystitis is uncommonly associated with two complications; dermal fistula, and preseptal cellulitis.<sup>1</sup> Orbital cellulitis, a rare vision threatening condition, is the result of posterior extension of infection through the orbital septum.<sup>2</sup> Most of the cases of orbital cellulitis occur in children.<sup>3</sup> Also, there are some previous reports of dacryocystitis in the literature<sup>1-6</sup>; most of them have considered localized abscesses and not diffuse cellulitis.

In the present study, we describe a patient with diffuse orbital cellulitis secondary to dacryocystitis.

## Case report

A 48-year-old woman was referred to the emergency clinic at Farabi Eye Hospital, with fever and a 5-day history of a painful swollen right eye, redness, and reduced vision. She had severe periocular pain and felt ill for the previous three days.

She gave a history of right eye lacrimation for one year, but denied any history of trauma, or sinusitis.

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1. Assistant Professor of Ophthalmology, Eye Research Center, Farabi Eye Hospital, Tehran University of Medical Sciences, Tehran, Iran

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Correspondence to: Hesam Hashemian, MD

Assistant Professor of Ophthalmology, Eye Research Center, Farabi Eye Hospital, Tehran University of Medical Sciences, Tehran, Iran

Email: shhlucky@yahoo.com

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She described a history of an episode of lower lid swelling; controlled with oral medication one year ago. She had used oral cephalixin 500 mg four times a day for three days. She had a history of hypertension controlled with oral medication.

On examination, her oral temperature was 38.5°C. She had marked erythema and swelling of both lids of the right eye, preventing complete examination of the cornea and pupil. Visual acuity (VA) was  $20/400$  in the right and  $20/25$  in the left eye, not improved with pinhole. To the extent we could examine, no relative afferent pupil defect was noted. The pupils were equal, having normal light reflexes. Due to lid swelling, it was very difficult to determine exact amount of proptosis. Also, she had lateral displacement of the right eye and about 6 mm axial proptosis. Extraocular movements in all directions were restricted. The globe was tense in retropulsion. We found nothing significant in examination of other cranial nerves, nasopharynx, or the neck. Her leukocyte count was  $10.9 \times 10^9/L$ , with neutrophils predominancy (74%).

Computed tomography (CT) demonstrated a soft tissue density collection on the medial wall and floor of the right orbit, displacing the medial rectus muscle, with posterior extension. Retrobulbar extension of the infiltration caused lateral displacement of the globe and the optic nerve in addition to proptosis (Figures 1 and 2).

The periorbita near the medial wall appeared hazy on the axial CT and the posterior tenon capsule was thickened. The haziness extended into the infraorbital region. The para-nasal sinuses were clear (Figures 1 and 2).

After hospital admission, intravenous therapy started with 1 g of ceftazidime every eight hours and 1 g of vancomycine every 12 hours. Five days after intravenous antibiotic, the patient was afebrile, with a remarkable decrease in eyelid swelling and marked improvement in ocular motility (Figure 3). VA improved to  $20/40$  uncorrected ( $20/25$  with correction). The patient was discharged and she underwent an external dacryocystorhinostomy (DCR) after one month. She showed no recurrence of symptoms.



**Figure 1.** Photograph of the patient 3 days after admission. Proptosis of the right eye is resolving and periocular swelling has been diminished significantly in comparison to admission time.



**Figure 2.** Axial computed scan image showing a hypodense infiltration in the extraconal space (white arrow) and marked fusiform swelling of the right medial rectus (black arrow). Nonaxial proptosis is also visible.



**Figure 3.** A coronal computed scan shows a hypodense infiltration (arrow) causing swelling of the periorbita near medial wall; with lateral displacement of the globe.

## Discussion

Acute dacryocystitis usually presents as a preseptal infection.<sup>3</sup> It causes fever, swelling and erythema of the lower lid; most prominently on the nasal side.<sup>7</sup> It is rather a common disease. Majority of cases are either

in the first or the fifth decade of life; 70-83% of the cases are postmenopausal women (as in our patient) and those with poor hygiene.<sup>7</sup>

Nasolacrimal duct obstruction prevalence in post-menopausal population is probably caused by a number of factors. First, a previous study reported that in postmenopausal woman, due to osteoporosis, there is a reduction in the bony nasolacrimal canal diameter.<sup>8</sup> On the other hand, hormonal changes may cause de-epithelialisation of the lacrimal sac and duct; resulting in blockage of an already narrowed lacrimal canal blockage.<sup>7</sup>

Orbital cellulitis, a vision-threatening infection involves structures posterior to the orbital septum. Being primarily a disease of children and young adults, it involves more commonly children under the age of 15. The most common cause is sinus disease, particularly in the younger patients.<sup>3</sup> Most of the patients with acute dacryocystitis end up in pre-septal and not in orbital cellulitis.<sup>4</sup> Lacrimal sac is surrounded by the orbital septum. Medial end of the orbital septum has two attachments. Its superior part is attached to the posterior lacrimal crest, and its inferior part is attached to the anterior lacrimal crest. Although this part of septum is fairly attenuated, acute dacryocystitis more commonly spread anteriorly rather than posteriorly.<sup>5</sup> Some other barriers strengthen the posterior barrier; like deep heads of the preseptal (Horner's muscle) and pretarsal orbicularis muscle (Jones muscle), the posterior limb of the medial canthal ligament, and the lacrimal fascia.<sup>3</sup> When the infection breaks through the lacrimal sac, it may overcome posterior barriers, leading to orbital cellulitis, which requires prompt treatment. Orbital septum is more attenuated in infants; so orbital cellulitis is more common in congenital dacryocystitis.<sup>4</sup> As lacrimal sac is located inferomedial to the globe; infection can make a tunnel between medial rectus and inferior rectus muscles to the intraconal space; leading to intraconal abscess, which can cause rapid visual loss. Therefore, urgent medical and surgical interventions are necessary.<sup>6</sup>

Our patient presented with an extraconal infiltration secondary to acute dacryocystitis. Examination of extensions of lacrimal sac swelling or abscess was impossible due to periorbital swelling and tenderness over the

lacrimal sac. However, the most severe swelling and tenderness were on medial end of the lower lid. On CT scanning, diffuse haziness around the lacrimal sac precluded visibility of dilated lacrimal sac (Figures 1 and 2), but opacification around the lacrimal sac obviated the final diagnosis. One year history of lacrimation, in addition to proximity of the inflammation site to the lacrimal sac in examination and imaging, clarity of paranasal sinuses and lack of any history of sinusitis may help us to locate dacryocystitis as the source of cellulitis. In orbital cellulitis secondary to sinusitis, you can see lid edema, and not preseptal cellulitis. So, as with our patient, we could even make the diagnosis according to examination only. Similar to a previous report,<sup>5</sup> medial rectus muscle was enlarged; most probably due to inflammatory response secondary to adjacent infiltration site (Figures 1 and 2).

As in the literature review, we found 13 reports<sup>1,3-6,9</sup> of 21 cases of orbital cellulitis secondary to acute dacryocystitis (Table 1). Eleven patients (52.3%) presented with intraconal abscess; secondary to violation of intermuscular septum by infection.

Orbital cellulitis can quickly result in visual loss. It occurs even in the presence of oral antibiotics.<sup>6</sup> Intravenous antibiotics are an essential part of treatment. Treatment should start by empirical antibiotics with broad coverage; and in cases of unresponsiveness, they can be changed according to antibiogram taken from abscess drainage.<sup>10</sup> We consider the use of intravenous ceftazidime, and vancomycin as the first empirical option. We did not change the antibiotic regimen, as we got favorable response. Surgical drainage should not be postponed, if there is any confined locus of abscess (in our case, there were no confined locus of abscess) or if the patient does not respond rapidly. Our review revealed that abscess drainage is needed in most cases (Abscess drainage was performed in 18 out of 21 cases - Table 1). After complete resolution of acute inflammation, we can perform DCR to prevent further recurrences.<sup>1</sup>

It can be concluded that dacryocystitis can cause potential vision threatening orbital cellulitis; and therefore, patients should be educated not to overlook symptoms of dacryocystitis. Prescribing topical antibiotics in

chronic dacryocystitis can cause temporary comfort, but as in our case, if obstruction is not treated surgically, it can lead to orbital

cellulitis, and finally, vision threatening intraconal abscess.

**Table 1.** All cases of orbital cellulitis secondary to dacryocystitis reported in the literature.

Author	Year	Age	Sex	Infection site	Treatment
Ahrens-Palumbo	1982	39y	F	EX	IVA
Allen	1985	57y	F	Diffuse	IVA
Molgat	1993	40y	M	EX	IVA,Dr.
Weiss	1993	15d	F	IN	IVA,Dr.
Warrak	1996	62y	M	Subperiosteal abscess	IVA,Dr.
Mauriello	1996	84y	F	IN	IVA,Dr.
Ntountas	1997	38y	M	IN	IVA,Dr.
Kikkawa	2002	38y	F	EX	IVA,Dr.
		64y	F	IN	IVA,Dr.
		62y	F	IN	IVA,Dr.
		51y	M	IN	IVA,Dr.
Ataullah	2002	60y	F	IN	IVA,Dr.
Schmitt	2005	71y	M	Diffuse	IVA
Henney	2007	50y	F	IN	IVA,Dr.
Martins	2008	39y	F	IN	IVA,Dr.
Maheshwari	2009	30y	M	EX	IVA,Dr.
		35y	F	EX	IVA,Dr.
		35y	M	EX	IVA,Dr.
		50y	F	IN	IVA,Dr.
		65y	F	IN	IVA,Dr.
		53y	F	EX	IVA,Dr.
Our report	2012	42y	F	EX	IVA

Y: Years, D:Days, IVA: Intravenous antibiotic therapy, Dr.: Surgical drainage, EX: Extraconal abscess, IN: Intraconal abscess

## Conclusion

Acute dacryocystitis should be considered as a risk factor for orbital cellulitis.

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