Orbital Cellulitis Secondary to Dacryocystitis: A Case Report
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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

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.1 Orbital cellulitis, a rare vision threatening condition, is the result of posterior extension of infection through the orbital septum.2 Most of the cases of orbital cellulitis occur in children.3 Also, there are some previous reports of dacryocystitis in the literature1-6, 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.
She described a history of an episode of lower lid swelling; controlled with oral medication one year ago. She had used oral cephalexin 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 $10.9\times10^9/L$, 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 vancomycin 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.

**Discussion**

Acute dacryocystitis usually presents as a preseptal infection. It causes fever, swelling and erythema of the lower lid; most prominently on the nasal side. 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.7
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.8 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.7
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.3 Most of
the patients with acute dacryocystitis end up in
pre-septal and not in orbital cellulitis.4
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.5 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.3 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.4 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.6
Our patient presented with an extracanal
infiltration secondary to acute dacryocystitis.
Examination of extensions of lacrimal sac
swelling or abscess was impossible due to
peri orbital 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,5 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
reports1,3,6,9 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.6 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.10 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.1
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.

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Age</th>
<th>Sex</th>
<th>Infection site</th>
<th>Treatment</th>
</tr>
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<tbody>
<tr>
<td>Ahrens-Palumbo</td>
<td>1982</td>
<td>39y</td>
<td>F</td>
<td>EX</td>
<td>IVA</td>
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<td>Allen</td>
<td>1985</td>
<td>57y</td>
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<td>Diffuse</td>
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<td>Weiss</td>
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<td>15d</td>
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<td>Warrak</td>
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<td>M</td>
<td>Subperiosteal abscess</td>
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<td>Ataullah</td>
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<td>Schmitt</td>
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<td>Henney</td>
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<td>F</td>
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<td>Martins</td>
<td>2008</td>
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<td>Maheshwari</td>
<td>2009</td>
<td>30y</td>
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<td>Our report</td>
<td>2012</td>
<td>42y</td>
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</table>

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.

References