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Clinical Observation

Periorbital and orbital cellulitis in adults

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ABSTRACT

Objective: The pathogenesis and management of periorbital cellulitis (POC) and orbital cellulitis (OC) is distinct in the adult population. We evaluated the clinical features, radiological characteristics, etiologies and management of hospitalized adults with POC and OC.
Methods: A retrospective chart review of patients ≥18 years of age, hospitalized with POC and OC over a 20-year period.
Results: The charts of 91 patients were identified, of whom 75 were diagnosed with POC and 16 with OC. No age or gender preference was noted in either group ($P = 0.149$). The most common etiology of OC was infected scleral buckle or orbital implant (43.7%) followed by sinusitis (18.8%). Both were significantly more prevalent in the OC group than in the POC group. In the POC group, skin infection was the most common etiology (33.3%), followed by dacryocystitis (22.7%). Twelve patients (75%) with OC and 12 patients (16%) with POC underwent surgical drainage of their infection ($P = 0.001$).
Conclusion: POC and OC in adults have different distributions, predisposing factors and management than in children. The patient's medical history is of crucial importance, as it may help diagnose the entity. External periocular etiologies, such as skin infection, dacryocystitis, conjunctivitis, insect bite and allergic reaction causes POC and very rarely become OC, whereas sinusitis and infected orbital implants are a significant cause for OC. An infected implant is a unique cause of OC and high suspicion of orbital involvement should be raised in any sign of infection in these patients.

1. Introduction

Periorbital cellulitis (POC) and orbital cellulitis (OC) are two distinct infectious conditions affecting the surrounding tissues of the eye. By definition, POC infection is anterior to the orbital septum and involves the eyelid and periocular soft tissues. OC occurs posterior to this septum with involvement of the orbit itself [1]. As more common in children, [2,10] almost all studies have been published about the clinical features of POC and OC in the pediatric population [1]. Some studies discuss the clinical characteristics, etiologies and management of these diseases in both children and adults, however the number of adults is small [3]. Harris [4] concluded that subperiosteal orbital abscess becomes a more aggressive disease with age.

The etiology, pathogenesis and management of POC and OC differ in the adult population. As we were unable to find previous publications regarding POC and OC in adults, we conducted this study. Records of all patients 18 years or older admitted to our institution with POC and OC in the past 20 years were reviewed in order to evaluate the epidemiologic features, radiological characteristics, etiologies and therapeutic results of these conditions in adults.

2. Methods

2.1. Study population

We retrospectively reviewed the medical records of patients 18 years or older with POC and OC hospitalized in our institution between January 1, 1990 and March 31, 2010. Diagnoses were made clinically and supported by computed tomography (CT) scan in all cases of OC and in many cases of POC. In addition to the primary diagnosis, information extracted from patient files included, demographic data, medical history, side of affected eye, etiology of orbital cellulitis, CT scan findings, treatment, complications, and follow-up interval. The date of first admission was used as the beginning of follow-up and the date of the last clinic visit was considered the

☆ AsianAOMS: Asian Association of Oral and Maxillofacial Surgeons; ASOMP: Asian Society of Oral and Maxillofacial Pathology; JSOP: Japanese Society of Oral Pathology; JSOMS: Japanese Society of Oral and Maxillofacial Surgeons; JSOM: Japanese Society of Oral Medicine; JAMI: Japanese Academy of Maxillofacial Implants.

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Table 1
Demographic and clinical data of orbital and periorbital cellulitis in adult patients.

Variable	Orbital cellulitis ($n=16$)	Periorbital cellulitis ($n=75$)	P-value
Mean age, years (range)	51.9 (23–85)	56.8 (18–97)	0.432
Males (%)	10 (62.5)	32 (42.7)	0.149
Right side involved (%)	6 (37.5)	34 (45.3)	0.567
CT scan (%)	16 (100)	31 (41.3)	<0.0001
Etiology (%)			
Infected implant	7 (43.8)	0	<0.0001
Sinusitis	3 (18.8)	2 (2.7)	0.01
Eyelid infection	2 (12.5)	7 (9.3)	0.7
Trauma	1 (6.3)	5 (6.7)	0.951
Skin infection	0	25 (33.3)	0.005
Dacryocystitis	0	17 (22.7)	0.036
Allergic reaction	0	3 (4.0)	0.556
Conjunctivitis	0	3 (4.0)	0.556
Insect bite	0	3 (4.0)	0.556
Postsurgical infection	0	3 (4.0)	0.556
Other[a]	2 (12.5)	3 (4.0)	
Unknown	1 (6.3)	4 (5.3)	
Complication rate	25%	4%	0.004

[a] Other etiologies include OC, systemic bacteremia, panophthalmitis; POC, corneal abscess, sinus tumor.

end of the follow-up. The study was approved by the Institutional Review Board. Informed consent was not required.

2.2. Statistical analysis

Comparison between categorical variables was analyzed using Fisher's Exact Test. A P-value < 0.05 was considered statistically significant. Data were analyzed using SPSS Statistical Software.

3. Results

The files of 91 adult patients with OC and POC were reviewed. OC was diagnosed in 16 patients and POC in 75. A comparison of demographic and clinical data between the two groups is shown in Table 1. The mean age ± SD was 51.9 ± 22.4 years in the OC group and 56.8 ± 22.5 years in the POC group ($P=0.432$). No gender preference was noted in either group ($P=0.149$). All cases presented unilaterally with no side predilection ($P=0.567$). A summary of all cases of OC is presented in Table 2. Culture and antibiotic sensitivity testing of the pus performed in OC cases. There was a growth of *Staphylococcus aureus* in 8 cases, *Pseudomonas aeruginosa* in 2 cases, and one case of *Citrobacter koseri* and *Spyngo paucimobilis* infection.

The most common etiology of OC in our group was infected silicone scleral buckle (Labtician Ophthalmics, Oakville, Canada) for rhegmatogenous retinal detachment (RRD) (Fig. 1) or orbital implant (MEDPOR Orbital Reconstructive Implants) (43.7%) which was found only in the OC group ($P<0.0001$). Sinusitis was also more prevalent in the OC group than in the POC group ($P=0.01$). In the POC group, skin infection (Fig. 2) was the most common etiology (33.3%), followed by dacryocystitis (22.7%). These two etiologies were unique to the POC group ($P<0.05$).

A CT scan of the orbits was performed in all patients with OC and in 31 (41.3%) patients eventually diagnosed with POC ($P<0.0001$). Orbital fat infiltration by the infection was the most common finding seen in 10/16 (62.5%) patients with OC. Orbital abscess was found in 5 (31.2%) patients with OC. In POC, findings on CT scan included periorbital tissue involvement, dacryocystitis and sinusitis.

Twelve patients (75%) with OC and 12 patients (16%) with POC underwent surgical drainage of their infection ($P=0.001$). All patients with an infected implant (7/7) had surgical removal of the implant and all 3 patients with OC due to sinusitis had surgical drainage of their orbital abscess. In POC, the most common

Fig. 1. Pt. No. 5: a CT scan of 75-year-old woman showing right orbital phlegmon, orbital fat infiltration and proptosis secondary to infected scleral buckle.

indication for surgical intervention was dacryocystitis (7/12). All patients with OC and 86.7% of patients with POC were treated with intravenous antibiotics on admission ($P=0.122$). The initial treatment regimens were empirically based. The main antibiotics used were penicillinase-resistant penicillin and second-generation cephalosporin, either alone or in combination with other antibiotics (vancomycin, clindamycin, fluoroquinolone, aminoglycoside, third-generation cephalosporin or metronidazole). Topical antibiotics were applied in 81.3% patients with OC and 77.3% patients with POC ($P=0.731$).

The complication rate was 25% in OC patients and included recurrent retinal detachment after removal of infected scleral buckle (1 patient), spontaneous perforation of the globe secondary to bacteremia (1 patient), and recurrence (2 patients). The complication rate was much lower in POC (4%, $P=0.004$) and included high intraocular pressure (1 patient) and recurrence (2 patients).

4. Discussion

Periocular infection is an important clinical entity in ophthalmology. The bacterial form is common and the clinician needs to be comfortable with both initial diagnosis and subsequent management. Untreated or incorrectly treated infection can proceed to cause devastating visual, intracranial, and systemic pathology [5].

POC and OC may have some common etiologies [2,10]. Most previous studies on OC and POC have been performed on the pediatric population which can be treated conservatively or with surgical drainage. The management of pediatric orbital cellulitis with a subperiosteal abscess was largely surgical, until the early 1990s, when it was suggested that simple, aerobic infections were found in children younger than 9 years old, while older children had more complex polymicrobial infections [6]. It has been postulated that

Fig. 2. A 65-year old man with left POC due to left upper lid skin infection. Periorbital erythema, edema and skin scaling are shown.