

Investigation and management of adult periorbital and orbital cellulitis

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Abstract

Background: Orbital cellulitis has important complications. Despite this, there are few studies in the literature of large groups of cases of this condition.

Methods: We performed a retrospective case analysis of all patients admitted with periorbital and orbital cellulitis between 2002 and 2004.

Results: A total of 27 cases were included in the study. Of these, 25 had undergone a computed tomography scan, 19 of which had revealed significant sinus disease; 10 had had a microbiology result, with the most common organism being *Streptococcus milleri*; 20 had had a white cell count taken, with raised results in only 10; 12 had undergone surgery; and 25 had made a good recovery. One case had been found to be squamous cell carcinoma of the nasal cavity.

Conclusions: In this study, sinus disease was the commonest cause of orbital cellulitis, with the commonest organism being *Streptococcus milleri*. Only 50 per cent of cases with proven disease had had a raised white cell count; this is therefore not a very sensitive test.

Key words: Orbital Diseases; Adult; Cellulitis; Sinusitis

Introduction

Periorbital cellulitis is inflammation and infection of the eyelid and the skin surrounding the eye. Orbital cellulitis develops when infection has passed through the orbital septum to affect the orbit. The commonest cause is spread of infection from the sinuses, in 60–90 per cent of cases.^{1–6} Other causes are insect bites and any injury that breaks the skin.

Orbital cellulitis causes significant morbidity for patients and has some very significant complications, including intracerebral abscess, bacterial meningitis, sight loss and cavernous sinus thrombosis. Despite this, there are few significant studies in the literature discussing how this condition should be managed, perhaps because few centres treat large numbers of these cases. City Hospital in Birmingham contains a tertiary ophthalmology referral centre which covers the population of the second biggest city in England. Treating a large number of cases of periorbital and orbital cellulitis at this hospital afforded the authors the opportunity to assess the management of this condition.

Materials and methods

A computer-generated search was retrospectively performed for all patients over the age of 18 years whose notes had been clinically coded under

‘orbital cellulitis’ or ‘periorbital cellulitis’, between January 2002 and January 2004. Twenty-seven sets of notes were obtained and analysed for the following set criteria: clinical findings, computed tomography (CT) scans, nasal and blood cultures, antibiotic regimes, nasal decongestant use, and surgical procedures and outcomes.

Results and analysis

A total of 27 cases were analysed, with an age range of 18 to 91 years. Fifteen patients were male and 12 were female. Fifteen cases had involved the left eye, 11 the right eye and one patient had had both eyes involved. Twelve patients had required an operation. At presentation, six cases had shown proptosis and ophthalmoplegia, and two had had reduced visual acuity. Twenty-three of the cases had been admitted under ENT, three under the medical team and one under ophthalmology. The investigations each case had undergone are shown in Table I.

Out of a total of 27 patients, a white cell count had been taken in 20, with only 10 raised results. Interestingly, even in those patients who had undergone surgery, only 56 per cent of the white cell counts taken had been raised.

Microbiology swabs had been taken in a total of 10 cases, of which six grew specific organisms, as shown

TABLE I
INVESTIGATIONS AND THERAPY

Investigations & therapy	Admissions (<i>n</i> = 27)		
	ENT (<i>n</i> = 23)	Medical (<i>n</i> = 3)	Ophthalmology (<i>n</i> = 1)
CT (<i>n</i>)	23	1	1
Ophthalmology opinion (<i>n</i>)	21	3	–
ENT opinion (<i>n</i>)	–	1	1
IV antibiotics (<i>n</i>)	23	3	1
Nasal decongestants (<i>n</i>)	15	0	0
Average in-patient stay (days)	12	6	1
Surgery (<i>n</i>)	5	0	0

CT = computed tomography; – = not applicable; IV = intravenous

in Table II, the commonest of which had been *Streptococcus milleri*.

All cases had received intravenous antibiotics, although the regimes used had differed remarkably. In 25 out of the 27 sets of notes, drug cards were available to establish which antibiotic regimes had been used, as shown in Table III. The commonest antibiotics used had been benzylpenicillin, flucloxacillin and metronidazole.

Out of the 27 patients in this study, 25 had undergone a CT scan; reports were unavailable for two of these patients. Even though the majority of admissions had been under ENT (*n* = 23), the majority of CT scans had been ordered by the ophthalmologists (*n* = 17). Of the scans performed, sinus disease had been evident in 76 per cent. Eighteen scans had been performed urgently on the same day as admission, one had been performed the day before admission, four had been performed the day after admission and two had been performed performed two days after admission.

Twelve out of the 27 cases had required surgery, eight men and four women. Only one case did not have the operation recorded in the notes; the other 11 procedures are listed in Table IV. The average in-patient stay had been seven days.

The average age of patients undergoing surgery had been 51 years. All had undergone a CT scan prior to theatre. On CT, sinusitis symptoms had been evident in nine patients, sinus disease in 10 and intra-orbital collections in two. The specific sinuses involved are shown in Table V.

Of the 12 cases which had undergone surgery, eight had had microbiology swabs taken, of which

TABLE II
ORGANISMS CULTURED FROM MICROBIOLOGY SWABS

Organism	Cases (<i>n</i>)
<i>Streptococcus milleri</i>	2
<i>Staphylococcus aureus</i> & <i>Strep milleri</i>	1
Coagulase negative staphylococci	1
Group A haemolytic streptococci	2

TABLE III
ANTIBIOTIC REGIMES USED

Antibiotics	Cases (<i>n</i>)
Benzylpenicillin, flucloxacillin & metronidazole	9
Flucloxacillin & metronidazole	3
Cefotaxime & metronidazole	2
Augmentin, flucloxacillin & metronidazole	2
Benzylpenicillin & flucloxacillin	2
Clindamycin & ofloxacin	1
Cefuroxime & metronidazole	1
Augmentin & flucloxacillin	1
Clarithromycin	1
Augmentin	1
Clindamycin	1
Amoxicillin, flucloxacillin & metronidazole	1

five had grown specific organisms: *Streptococcus milleri* in two, *Staphylococcus aureus* and *Streptococcus milleri* in one, haemolytic group A streptococcus in one and coagulase negative staphylococcus in one.

Out of the 27 cases, 25 had made a good recovery. One case had required drainage of a lateral orbital collection three days after the initial sinus surgery, and another case had been found to be squamous cell carcinoma of the nasal cavity.

Discussion

From our literature review, the largest identifiable series of patients with periorbital and orbital cellulitis comprised 52 patients assessed over a four year period. We therefore conclude that, at the time of the study, orbital cellulitis was relatively common at City Hospital, with over one case per month.⁴ This was probably due to our tertiary ophthalmology referral centre.

It has previously been stated that multi-disciplinary team input is essential in caring for patients with periorbital and orbital cellulitis, in order to ensure the best outcome.² Our study showed that, in general, we were involving the correct teams in patients' management, but there was still room for improvement.

One of the most interesting findings from this study was that patients with the same condition were treated differently, depending on which team of doctors they had been admitted under, as can be seen in Table I. There also appeared to have been no clear protocol as to who should order investigations, CT scans in particular; we felt that this had contributed to six patients receiving a delayed CT scan and two receiving none at all. This, we felt, was particularly important, as previous research has stressed the importance of performing CT scans in

TABLE IV
OPERATIVE PROCEDURES

Procedure	<i>n</i>
Bilateral antral wash-out	3
Antral wash-out & external frontal ethmoidectomy	6
External frontal ethmoidectomy	1
Incision & drainage of nasolacrimal duct abscess	1

TABLE V
SINUSES INVOLVED*

Sinus	<i>n</i>
Ethmoid	9
Maxillary	9
Frontal	5
Sphenoid	3

*On surgical exploration.

cases of periorbital and orbital cellulitis in order to differentiate the condition from acute inflammatory diseases of the orbit.⁷

- Sinus disease is the commonest cause of orbital cellulitis
- Orbital cellulitis can lead to life-threatening complications
- Commonest organisms are staphylococci and streptococci
- Multi-disciplinary management improves outcomes, and clear guidelines, in the form of a protocol, may improve management
- A normal white cell count does not exclude orbital cellulitis, and microbiology swabs may show no growth even in the presence of this disease

We were surprised to find that only 50 per cent of patients with orbital cellulitis in this study had had a raised white cell count and, in particular, that only 56 per cent of those who had undergone surgery and had had a white cell count taken had shown a rise. In our opinion, this demonstrates that this test is not very sensitive for adult orbital cellulitis and should not be relied upon.

As with previous studies, sinus disease was the commonest cause of orbital cellulitis in this study; 76 per cent of CT scans taken had shown evidence of disease.^{1–6}

Previous studies have found the pathogenic organism responsible for orbital cellulitis to be staphylococcus species, streptococcus species and *Haemophilus influenzae*.^{1,4–6} In this study, *Streptococcus milleri* was the commonest organism.

When we examined our antibiotic prescribing after conducting this study, it became clear that a review was necessary. It has been suggested in the literature that intravenous cefuroxime and metronidazole should be used, with therapy changed appropriately as culture results are available, and this is now our departmental policy.¹

In patients in whom medical therapy with intravenous antibiotics fails, surgical intervention is required. In this study, the most common procedures performed were antral washout and external frontal ethmoidectomy. Only one patient had needed further surgery, three days after their initial procedure.

Overall, it was felt that this study had raised our awareness of potential problems in managing periorbital and orbital cellulitis. Following analysis of results, it was decided that a protocol for managing these patient should be put in place in order to improve our outcomes.

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Miss A Robinson takes responsibility for the integrity of the content of the paper.
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