

# Paediatric periorbital cellulitis and its management\*

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## SUMMARY

**Topic:** Periorbital cellulitis is often difficult to distinguish from orbital cellulitis, which is a rare but potentially fatal disease. There are only a few small studies in the literature and we aim to look at an ideal way of managing periorbital cellulitis in a paediatric population using our department's experience.

**Materials and methods:** Retrospective analysis of case notes and computer records of children attending our hospital with periorbital cellulitis over 26 month period.

**Results:** Thirty-four patients met the criteria. Sixteen patients had reduced visual acuity, proptosis or ophthalmoplegia. Twenty-three had white cell count checked, 14 were raised and 7 of these had an operation. Eleven had blood cultures checked and all were negative. Seven had other cultures taken, *Streptococcus milleri* was the predominant organism isolated. Sixteen were CT scanned, 14 showed significant sinus disease. All patients were treated with intravenous antibiotics and ten required operative intervention. Two patients developed lateral orbital collections requiring further surgery.

**Conclusions:** Although relatively rare, periorbital cellulitis can be dangerous and it is essential for it to be treated seriously. A multidisciplinary approach is needed in managing children with this condition, with a good history and full blood count assisting in assessing severity, but a CT scan of the patient's sinuses is essential to differentiate from orbital cellulitis.

**Keywords:** periorbital cellulitis, orbital cellulitis, management, investigation, paediatrics

## INTRODUCTION

Periorbital cellulitis is of great importance as it is an indicator of, and difficult to distinguish from, the more serious condition of orbital cellulitis. Orbital cellulitis in the paediatric population, although rare, is traditionally associated with a high morbidity and a potential mortality. Periorbital cellulitis is defined as inflammation of the eyelid and surrounding skin, whereas orbital cellulitis is inflammation posterior to the septum of the eyelid affecting the orbit and its contents. Due to the infrequency of orbital cellulitis there is still little data published on the subject.

Periorbital cellulitis in children is best managed by a multidisciplinary team of paediatricians, ophthalmologists, microbiologists and otolaryngologists. However, it falls heavily on the shoulders of the otolaryngologist to lead the management. This is because sinus disease is the commonest cause with an incidence in the literature of between 60 to 90 % in periorbital/orbital cellulitis<sup>(1)</sup>. The management of this condition has been to investigate with blood tests, cultures and CT scan of sinus and orbit, then treat with antibiotics and potentially surgery.

This paper will attempt to address the ideal management of this condition, assessing the benefit of each test and identify any changes in disease outcomes using the experience of our department.

## MATERIALS AND METHODS

A retrospective analysis of clinical notes was performed. The time frame for analysis was set between January 2002 and March 2004. The notes of all patients under the age of 16 years old were retrieved by using search terms of orbital inflammation or infection. In addition to the clinical notes, computer records were used to assess outcomes of this patient group.

There were three main areas assessed.

1. Which teams were involved in the care of these patients?
2. Which markers aided diagnosis, eye signs (proptosis, ophthalmoplegia or reduced visual acuity), white cell count, cultures and CT scans?
3. How were the patients managed, antibiotics and surgery?

## RESULTS

In total, 34 patients were identified to fit our criteria of periorbital cellulitis, giving an incidence of greater than 1 case per month. The age range for this group was 18 months to 15 years old, with an average age of 10 years. The sex distribution was 16 girls and 18 boys. There was equal eye involvement. The average inpatient stay was four days with a range of 1 to 10 days. Ten children required an operation for their disease and 2 children developed complications. There were no mortalities.

Area 1 – Which teams were involved in the care of these patients?

Of these 34 cases, 25 were managed by the paediatricians and 9 by ophthalmologists. None of the cases had been directly referred to the otolaryngologists. Fourteen of the 25 patients seen by the paediatricians were referred to otolaryngologists. All 9 of the patients seen by an ophthalmologist were referred to the otolaryngologist.

Area 2 – Which markers aided diagnosis, eye signs (proptosis, ophthalmoplegia or reduced visual acuity), white cell count, cultures and CT scans?

Sixteen out of 34 patients had visual disturbance (47%). All of these cases had been seen by both otolaryngologists and ophthalmologists. Of these 16, 10 required an operative intervention.

Twenty-three out of 34 patients had their white cell count checked (68%). Fourteen of the 23 had a raised white cell count (61%), of which 7 went on to have an operative intervention. No patient with a normal white cell count received an operation.

Eleven patients out of 34 had blood cultures taken (32%), of which none were positive. Seven patients had other cultures taken (21%), all gave a positive yield. Five were taken from the sinuses intra-operatively and 2 were eyelid swabs. Four of these were positive for *Streptococcus milleri* and 3 were positive for *Staphylococcus aureus*. *S. milleri* were all isolated from the sinuses, whereas *S. aureus* was only isolated from one sinus swab.

Sixteen out of 34 patients had CT scans of their orbits and sinuses (47%). All these patients had visual disturbance. All these patients had been seen by the departments of ophthalmology and otolaryngology, and 8 had been seen by paediatricians. All the CT scans were organised by the otolaryngology team. Of the 16 CT scans, 14 showed significant sinus disease on the clinically affected side (41%). Ten of these patients underwent an operative procedure.

Area 3 – How were the patients managed, antibiotics and surgery?

All 34 patients received intravenous antibiotics. The regime used, however, differed remarkably. The most commonly pre-

scribed were metronidazole (74% of the patients received this), flucloxacillin (59%), cefuroxime (44%) and benzylpenicillin (29%). The most commonly prescribed regime was benzylpenicillin, flucloxacillin and metronidazole (24%).

Ten patients required an operation (29%). Nine patients had an external frontal-ethmoidectomy and antral washout. One patient received only an antral washout. They had an average age of 10.6 years old (range of 2 to 15). All of these patients had visual disturbance. Seven of the 10 had their white cell count checked which was elevated in all cases. All the patients had undergone CT imaging, which revealed significant sinus disease on the clinically affected side. Two patients developed lateral orbital collections, which we considered to be a complication of the disease. These 2 patients then required a further procedure to drain these collections. After drainage of the collection they made an unremarkable recovery with no loss of visual acuity.

## DISCUSSION

There are few figures available for the incidence of this condition. Using the data available from 8 other studies in the literature there were a total of 622 cases seen over a total of 830 months, giving rise to an estimated incidence of 0.75 cases a month to a department<sup>(1-8)</sup>. The highest incidence was 1.13 cases per month and the lowest 0.30 cases per month. These figures obviously do not take into account many variables. The incidence at our department was 1.31 cases a month. Our high incidence figure could be partly explained by our location. We have a tertiary referral centre for ophthalmology on site which covers the region of Birmingham, which is England's second city. Even so, it can be seen from these figures that this condition is not common.

In paediatric patients with periorbital cellulitis, the otolaryngologist should be involved in all cases. The results show that in our department that was not the case. There were 11 patients that were managed solely by the paediatricians, without the help of ophthalmology or otolaryngology. It appears from the case notes that their symptoms resolved and that no complications developed, however they did not receive any investigation of their paranasal sinuses. This may mean they develop problems again in the future. This issue at our department has now been resolved for the management of future cases.

It can be seen from the results that visual disturbance (proptosis, ophthalmoplegia or reduced visual acuity) is a good marker of severity in this disease. It could be argued that these are features which indicate the presence of orbital cellulitis. It could also be argued that the absence of these features precludes the need for CT scanning on an urgent basis in periorbital cellulitis, as only these patients required an operative intervention, but that is not the practice of our department.

The white cell count was only checked in 2/3<sup>rd</sup> of the patients but this would provide a useful marker to severity of condition and possibly further treatment. No patient with a normal white

cell count required an operation. Whereas half the patients with a raised white cell count needed an operation for sinus disease. Therefore we would advocate using this test in all paediatric patients with periorbital cellulitis.

On the issue of cultures our findings agree with the Australian study, which found that blood cultures were of no benefit in this group of patients<sup>(1)</sup>. They also found that cultures taken intraoperatively gave the best yield. In our results all swabs taken in theatre gave a positive result, which is not really unexpected. The most interesting finding from the cultures is the prevalence of *Streptococcus milleri*. *Staphylococcus aureus* has previously been found to be the most common organism, which has been the case even in some recent studies<sup>(3,5)</sup>. Combining the results of the swabs with the antibiotic regimes it can be seen an overhaul is needed. Reviewing the literature surrounding these infections, anaerobic organisms for orbital cellulitis is very rare. Therefore metronidazole, which was the most commonly used antibiotic and has good anaerobic cover need not be used routinely. Simple aerobic cover with benzylpenicillin and flucloxacillin would seem more than sufficient in all but the most resistant cases, but this would obviously depend on local guidelines.

The prevalence of sinus disease in our group of patients was only 41%, which is lower than many previous studies<sup>(1)</sup>. This could in part be explained by the fact that only 47% of patients had a CT scan of their sinuses. As mentioned at the beginning periorbital and orbital cellulitis are difficult to distinguish clinically. We feel that all children presenting with periorbital cellulitis should receive a CT scan of their sinuses and orbits. This should be performed preferably within 24 hours. Even if this investigation does not change your initial management it will help the subsequent treatment and follow up if sinus disease is present.

Finally, operative management in these patients is reserved for failed medical therapy with intravenous antibiotics. All but one

patient was treated with external fronto-ethmoidectomy and antral washout, which is our mainstay of surgical treatment. The two patients (6%) that progressed on to develop a complication underwent further surgery and drainage of intraorbital collection. This was performed by the ophthalmic surgeons, and neither patient suffered permanent visual impairment. It can be seen that a previously dangerous condition managed by the right teams with the right investigations and treatment can be tamed.

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