Objective: To evaluate the incidence, history, symptoms, clinical signs, and treatment outcomes of blepharokeratoconjunctivitis in a pediatric population at a tertiary cornea practice.

Methods: In a retrospective case series, we reviewed the medical records of all new pediatric patients from January 1, 1997, through December 31, 2002, noting the reason for referral and subsequent diagnosis. We further noted the history, clinical characteristics, and treatment outcomes of the patients with blepharokeratoconjunctivitis.

Results: Review of 195 medical records revealed that blepharokeratoconjunctivitis was the most common single diagnosis at consultation, accounting for 15% of referrals. Of the 29 cases identified, there were 16 girls (55%) and 13 boys (45%). The mean age at consultation was 6½ years (age range, 2-12 years). On initial ophthalmologic examination, 11 (38%) of 29 patients were taking full-strength steroids and 4 patients (14%) were taking oral erythromycin. Oral therapy, in the form of erythromycin (n=21) and doxycycline (n=1), was prescribed to most patients (22/29 [76%]). Therapy with topical steroids was tapered at the initial visit in all patients. Follow-up was available for 15 of 29 patients, with a mean follow-up of 5.4 months (range, 2-25 months). The condition of all patients showed clinical improvement. Recurrences were noted in 6 (40%) or 15 patients; all were successfully managed with low-potency steroid therapy.

Conclusions: Blepharokeratoconjunctivitis is a common reason for cornea referral in children. Oral erythromycin therapy is an effective treatment with a steroid-sparing effect. Recurrences are common and may be successfully managed with low-potency steroid therapy.
RESULTS

One hundred ninety-five pediatric medical records were reviewed. Blepharokeratoconjunctivitis was the most common single diagnosis at consultation, accounting for 15% of referrals (29 patients) (Figure 1). This was followed closely by trauma (27 patients [14%]) and central congenital corneal opacities (25 patients [12%]). There was an increase in patients seen with blepharokeratoconjunctivitis during the 6-year period (Figure 2).

Of the 29 cases identified, there were 16 girls (55%) and 13 boys (45%). The mean age at consultation was 6½ years (age range, 2-12 years), while the mean age at onset of symptoms was 4.1 years (range, 0-8 years; n=25). Twenty-six of the patients were white (90%), 1 was Asian (3%), and 2 did not have their race reported (7%). Twenty-one patients (73%) had a history of styes or chalazia noted, and 3 patients had undergone surgical excision of the eyelid lesion. Six patients had a history of atopy, with asthma (2 patients), eczema (1 patient), and significant allergies (3 patients).

At consultation, 11 (38%) of 29 patients were taking high-potency steroids, in the form of topical 1% prednisone or 0.1% dexamethasone, and 4 patients (14%) were taking oral erythromycin. Disease was bilateral in 28 (97%) of 29 patients but significantly asymmetric in 6 (21%) of 29 patients. Amblyopia, attributed to blepharokeratoconjunctivitis, was present in 2 (7%) of 29 patients. Of the 29 patients, eyelid inflammation was present in all patients (100%), superficial punctate keratitis in 16 (55%), and corneal vascularization in 15 (52%). Corneal infiltration was noted in 8 (28%) of 29 patients, with 4 patients (14%) having small, peripheral corneal infiltrates and 4 patients (14%) having classic phlyctenules. Corneal scarring was seen in 11 (38%) of 29.

Warm compresses were prescribed to all patients; topical antibiotic ointment was prescribed to 27 (97%) of 29 patients. Oral therapy, in the form of erythromycin (n=21) and doxycycline (n=1), was prescribed to 22 (76%) of 29 patients. The length of oral therapy ranged from 1 to 14 months and was dictated by the clinical course. Two patients had gastrointestinal tract distress, of whom 1 was successfully prescribed a lower dosage and 1 developed mouth ulcers, which were subsequently believed to be unrelated to the therapy.

Steroid therapy was tapered at the initial visit in 11 of 11 patients. Follow-up was available for 15 of 29 patients, with a mean follow-up of 5.4 months (range, 2-25 months). All patients showed clinical improvement. Follow-up was available for 8 of 11 patients in whom steroid therapy was tapered. Therapy with steroids was discontinued for 3 patients or tapered to lower-potency steroids for 5 patients, including fluorometholone, and loteprednol etabonate (0.5% Lotemax; Pharmos Corporation, Alachua, Fla; and 0.2% Alrex; Bausch & Lomb, Tampa, Fla). Recurrences were noted in 6 (40%) of 15 patients; all were successfully managed with the same lower-potency steroid therapy.

COMMENT

Blepharokeratoconjunctivitis is an important inflammatory condition that is commonly seen in children. The
Once again, oral tetracycline was a successful therapy. In this case, improvement while taking oral erythromycin. They acknowledged that some believe acne rosacea and phlyctenulosis are disparate presentations of the same process or disease. They contended that the cause of this clinical syndrome may include chlamydial infection, acne rosacea, or both. More recently, Farfour and McClellan described 8 children with meibomian gland inflammation, bilateral keratitis, and findings consistent with acne rosacea, including malar erythema, telangiectasias, and pustules. Once again, oral tetracycline was a successful therapy.

In a larger series, Culbertson et al described 17 patients younger than 18 years who had phlyctenular disease. Five of the patients were suspected to have early acne rosacea, with a definite diagnosis in 2 cases. Five of 10 patients tested positively for Chlamydia species. Most patients were treated with oral tetracycline, with the treatment course ranging from 3 weeks to 9 months. One patient received oral erythromycin (25 mg/kg in 4 divided doses) because of the patient's age. They concluded that the cause of this clinical syndrome may include chlamydial infection, acne rosacea, or both. More recently, Farfour and McClellan described 8 children with eyelid disease, conjunctival hyperemia, and corneal vascularization who responded to combined treatment with oral erythromycin (250 mg/d) and preservative-free steroids. Laboratory evaluation of 4 patients demonstrated coagulase-negative Staphylococcus species in 3 patients and Propionibacterium acnes in 1 patient. They contended that the patients in their study and those reported with childhood acne rosacea and phlyctenular disease represent a spectrum of disease with an unclear common denominator. They used the term "blepharokeratoconjunctivitis" for this entity. In our retrospective review, no information about patients' dermatologic condition or bacterial cultures was given; thus, the descriptive term "blepharokeratoconjunctivitis" is best suited.

This study describes 29 patients with blepharokeratoconjunctivitis: the largest to date, to our knowledge. All of the previous articles refer to this disease as a rare disorder. It is our clinical impression that blepharokeratoconjunctivitis is common but unrecognized in children referred to our practice. In fact, in evaluating all pediatric patients during a 6-year period, it was the most common single diagnosis at referral. The demographics of the patient population that composes our referral base may contribute to this finding. Rosacea is commonly thought to be more prevalent in fair-skinned patients. All of the cases in our study were either white (26 patients [89%]) or Asian (3 patients [3.5%]). Unfortunately, race was not indicated on many of the 195 children in the referral group, making it difficult to assess the overall racial demographics of the pediatric population. In looking at the cases, it is also interesting that a great sex predilection was not found. While there was a mild increase in girls (55%) over boys, other studies have reported a much higher prevalence in girls. The increase in cases during the last 6 years is also noteworthy. While the cause of this trend is unclear, it may be similar to the increase in allergies seen in children during recent years. A few case reports have described patients with immune disorders and similar blepharokeratoconjunctivitis.

The mean age at consultation was 6½ years, while the age at onset of symptoms was 4½ years. This age range is similar to that seen in previous studies. Most patients had received care from a general or pediatric ophthalmologist for some time prior to referral, the most common therapy being full-strength topical steroid therapy (37.9%) with prednisone and dexamethasone. Very few patients (13%) were treated with oral erythromycin. Management changes at consultation included tapering the steroid therapy in all cases and adding oral erythromycin for most patients receiving steroids or with significant disease. All patients were instructed on the use of warm compresses, and most (97%) were given topical antibiotic ointment, either bacitracin or erythromycin. No data concerning compliance with eyelid hygiene were available in this retrospective analysis, but our clinical impression is that many children will participate, especially when coupled with bathing or watching television.

Similar to previous articles, oral erythromycin therapy was successful and well tolerated. It is unclear if the mechanism of action is a direct effect on lipid synthesis or the influence on the microflora that leads to differences in lipid composition. A study that assessed the ability of erythromycin to alter the microflora concluded that it behaves similarly to tetracycline. The dosage of erythromycin ranged from one quarter strength of that used for an acute infection (50 mg/kg) to 250 mg twice a day. Patients were treated for varying lengths depending on their clinical course, ranging from 1 to 14 months. Parents were instructed to discontinue erythromycin therapy during an acute infection that required oral antibiotic therapy. After 6 months of therapy, we attempted to discontinue the oral therapy and resume only if the condition recurs.

As this condition is a chronic, recurrent one that affects young patients, the importance of minimizing steroid therapy cannot be overemphasized. The treatment regimen of all patients was successfully tapered from high-potency steroids during initial treatment and recurrences. We recommend the institution of oral erythromycin or doxycycline therapy, age-dependent, in any child who requires steroids to manage his or her disease. While a limitation of this study is the lack of follow-up on half of the cases, this is consistent with the consultation nature of the practice.
Blepharokeratoconjunctivitis is a common reason for cornea referral in children. Oral erythromycin therapy is an effective therapy with a steroid-sparing effect. Recurrences are common and may be successfully managed with low potency steroids.

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REFERENCES