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Dear Dr. Habal and Editorial Board:

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Corneal Ulcers in Patients with Apert Syndrome

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Morbidity from corneal ulcers is often severe in patients with Apert syndrome. These patients are at an increased risk of developing corneal ulcers due to the compromised corneal environment secondary to exophthalmus. Over the past six years, three out of five patients treated for Apert syndrome at our hospital have developed corneal ulcers. We present a case series discussing each patient, reasons for the development of ulceration, treatment and outcomes. Morbidities suffered in our group of patients included: decreased visual acuity, opacified corneas, amblyopia and blindness. Treatment is often difficult and complex. Therefore, an ophthalmologist should be an active team member in treating Apert patients.

Key Words: Apert, corneal, ulcer

Corneal Ulcers in Patients with Apert Syndrome

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Introduction

Ulcers of the cornea are serious problems that can have deleterious outcomes.[1,2] They are defined as epithelial defects of the cornea with associated inflammation. Although it is known that children with craniofacial syndromes with exophthalmus are at risk of exposure keratitis, the progression to corneal ulceration among these patients is less documented. We found little mention of any correlation between corneal ulcers and Apert syndrome in the current literature.[3] Surgeons treating patients with Apert syndrome should be aware of the potential for serious morbidity. This knowledge is important for the proper ophthalmic care of the Apert patient. Therefore, we discuss three cases where corneal ulcers developed in children with Apert syndrome.

Case One

Patient one is a five year old white male with Apert syndrome. He was noted on physical exam to have worsening papilledema and an increase in intracranial pressure. Due to these findings he was admitted to Oregon Health Sciences University for fronto-orbital advancement. The surgery was performed without complications and there were no acute episodes in the immediate post operative period. However, shortly after recovery it was apparent the patient was unable to move his left globe upward. Compensation of upward gaze when attempting to close the eye was impossible. Lacking this form of compensation together with the inability to completely close his left eye led to a situation of chronic exposure and an ulcer formed. A tarsorraphy was done as initial treatment. The next step in managing the ulcer included a Knapp transposition to elevate his left globe and releasing part of the tarsorraphy. Treatment was successful as the ulcer resolved without further complications. The transposition

was then surgically corrected and the patient has undergone rehabilitation of the left eye.

Case Two

The second patient with Apert syndrome was admitted to Legacy Emanuel Hospital for a frontal-orbital advancement in November 1994. Following surgery the patient had significant periorbital ecchymosis and conjunctival swelling of the right eye. Due to prolapsed conjunctiva the patient was unable to close his eye completely. Exposure keratitis developed which eventually led to a corneal ulcer in December 1994. Treatment of the ulcer was undertaken which included eye drops and patching of the opposite eye. A lateral tarsorraphy was done as well. The opacified cornea was slow to clear but now is nearly resolved. Due to the extended time the cornea was opacified and the poor compliance with patching amblyopia developed.

Case Three

Patient three had developed a significant amount of exposure keratitis by the age of nine months due to exorbitism secondary to Apert syndrome. She was admitted to Legacy Emanuel Hospital for fronto-orbital advancement in November 1997. After an uneventful recovery she was discharged home in good condition. However, follow up exam revealed that her keratitis was not improved. She was treated by ophthalmology with drops and topical antibiotics. This treatment alone was unsuccessful and by January of 1998 corneal ulcers had developed in the right eye. A tarsorraphy was done in order to eliminate exposure and provide a suitable healing environment. The tarsorraphy was successful from the standpoint the ulcers healed. However, her cornea is completely opacified and she is now blind in her right eye.

Discussion

Corneal ulcers are serious disease processes which have potential for severe ocular morbidity. The stage of visual development, when the risk of amblyopia is a concern, coincides with the age these children develop ulcers. Amblyopia, opacification of the cornea and decreased visual acuity are morbidities seen in our group of Apert patients. Prognosis was worse when diagnosis and treatment was delayed. Understanding etiology, progression to ulceration and signs of worsening keratitis may lead to prompt treatment thereby preventing or reducing morbidity.

Several etiologies exist which lead to development of a corneal ulcer.[1] In our group of patients, chronic corneal exposure appears to be the offending cause of ulceration. Ultimately this exposure is from protrusion of the globe secondary to insufficient orbital volume. The exposure is exacerbated by incomplete blinking and poor lid closure at night while asleep. Post-operatively the exposure is worsened due to the amount of periorbital and conjunctival swelling. In surgeries where this type of swelling is expected, we recommend leaving tarsorraphies in place until swelling subsides. The amount of blinking is also reduced due to post-operative obtundation. The natural mechanisms for sufficient corneal wetting are lost and conditions for an ulcer to develop are created.

Corneal injuries often heal well without any complications when the normal eye environment is intact, allowing for unimpeded epithelial healing process. When this natural environment is altered healing may become less predictable.[4] Apert patients obviously demonstrate a compromised orbital environment reducing their capability to heal. Complicating this issue is the addition of infection. Infected corneal ulcers are particularly slow to heal. In fact, as with our second patient, healing may never take place without surgical intervention.

Red eyes need early ophthalmology involvement. In cases of suspected ulceration a thorough evaluation is needed. A corneal exam is indicated to determine if there is indeed loss of epithelium. An exact location and size is crucial to selecting treatment. Interestingly, exposure keratitis often results in peripheral involvement. Also, any perforations should be identified. Gram and

Giemsa stains along with cultures may be useful in determining any superinfection.[1]

Early treatment goals include providing a suitable environment and favorable conditions enabling the cornea to heal. Beginning management strategies include: hydrating drops, intensive topical fortified antibiotics, hydrophilic soft contact lenses, tissue adhesives and patching the eye. However, the method of patching is often impossible due to the amount of exorbitism these patients suffer from. Therefore, tarsorraphy can be very beneficial. Failure of these methods requires more aggressive surgical intervention.[1,5]

Conclusions

In the last six years, three of the five Apert patients treated with fronto-orbital advancement have developed corneal ulcers. Chronic exposure of the cornea is a risk in children with Apert syndrome. Due to the potential for serious morbidity the goal for these children should be prevention.

Patients with Apert syndrome have a multitude of issues needing appropriate care by many subspecialists. Each issue is equally important in the successful treatment of the patient. A team approach is the standard of care in today's health care system. An ophthalmologist is a critical member of the team and should be actively involved in the ongoing care of these patients.

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