Ankyloblepharon-ectodermal dysplasia-clefting syndrome: Surgical and medical management in an infant with bilateral corneal perforations

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Ankyloblepharon-ectodermal dysplasia-clefting (AEC) syndrome is a form of ectodermal dysplasia (ED), a rare group of autosomal dominant genetic disorders caused by mutations in the *TP63* gene.[1,2] This gene encodes transcription factor p63, which regulates the development of ectodermal structures including skin, hair, teeth, and nails. There are few published studies on the ocular manifestations of AEC syndrome.

This report describes the complex ocular management of AEC syndrome in an infant over a 2 year period. It discusses the importance of a multidisciplinary approach, early and aggressive management of complications, and discussions with the patient and/or parents regarding long-term complications. Parental consent was obtained for the publication of clinical details and photos.

A 6-month-old Caucasian male with AEC syndrome was referred with bilateral corneal scarring from exposure keratopathy. He was systemically unwell with a poor prognosis at the time of referral. Initial ocular examination showed bilateral corneal scarring from severe exposure keratopathy and lagophthalmos.

He was born at full term and conceived from *in-vitro* fertilization to nonconsanguineous parents. Prenatal screenings were unremarkable. Systemic features of AEC syndrome were seen after birth, including cleft lip and palate, alopecia, scalp erosions, low set ears, and ectrodactyly [Fig. 1]. Genetic testing for *TP63* confirmed the diagnosis.

Ocular examination showed bilateral inferior corneal pannus worse in the right eye [Fig. 2a], normal Bell's reflexes with incomplete and severely reduced blinking. Periocular findings included flat orbits, absent eyebrows, and minimal eyelashes. There were abnormal lid margins with bilateral upper and lower lid anterior lamellar cicatrization, absent meibomian glands, and absent nasolacrimal ducts [Fig. 2b]. The right eye corneal scarring caused significant irregular astigmatism, confirmed on retinoscopy during an examination under general anesthetic. The child displayed many age appropriate visual behaviors and was able to pick up small objects from the floor.

Multiple examinations under general anesthetic were completed over a 2 year period for recurrent episodes of bilateral exposure keratopathy complicated by *Staphylococcus aureus* infectious keratitis. Management included combinations of topical and oral antibiotics, intensive use of unpreserved topical lubricating drops and ointments, bandage contact lenses, and temporary tarsorrhaphies. At 19 months of age, intraoperative anterior-segment optical coherence tomography (AS-OCT) showed bilateral inferior corneal ectasia and a microperforation with iris plugging in the left cornea. The microperforation was treated with cyanoacrylate glue, topical antibiotics, and bandage contact lenses which were changed every month.

The lagophthalmos of both eyes increased and the exposure keratopathy worsened. To treat this, at 21 months of age, the anterior lamellae of the upper and lower lids were lengthened with full thickness skin grafts harvested from the right upper inner arm [Fig. 2c]. The skin grafts healed well with improved lid closure and reduced lagophthalmos [Fig. 2d].

At 23 months of age intraoperative AS-OCT of the left eye showed corneal ectasia at the site of the previous microperforation. Two months later, the right eye developed a corneal melt with an inferior descemetocele [Fig. 3a]. An emergency tectonic graft was performed to manage the severe corneal thinning [Fig. 3b]. Early corneal graft rejection with ruptured sutures occurred 6 weeks postoperatively and was unresponsive to topical steroids [Fig. 3c]. The corneal graft subsequently failed with ectasia at the graft host junction [Fig. 3d]. Further episodes of recurrent bilateral keratitis and progressive corneal thinning lead to the decision to perform a complete tarsorrhaphy of the right eyelids and a temporal tarsorrhaphy of the left eyelids.

At 24 months the child is doing well and has a younger sibling without AEC. He has functional vision out of his left

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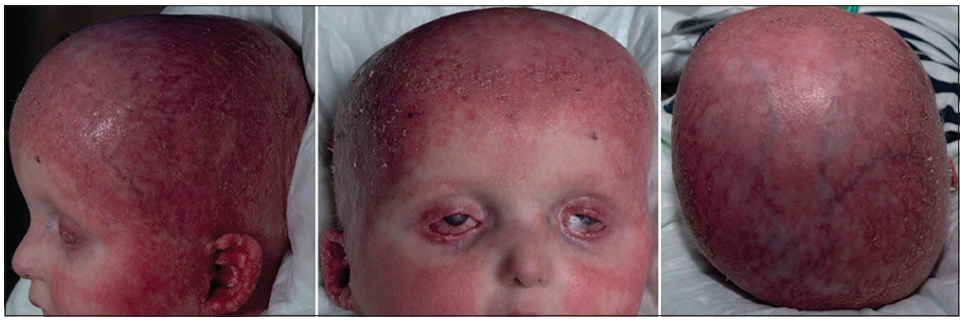

Figure 1: Systemic manifestations of AEC syndrome: Repaired cleft lip and palate, alopecia, scalp erosions, and low set ears

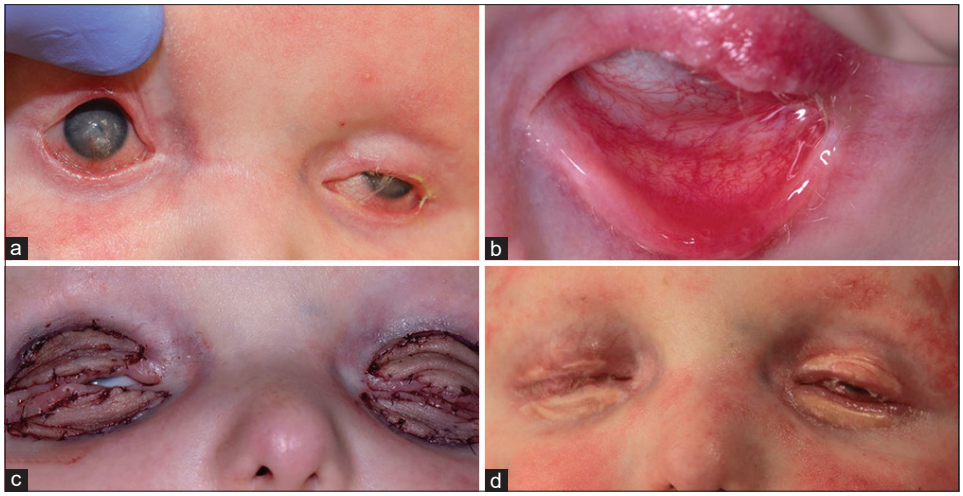

Figure 2: Examination under anesthetic of right and left eyes in child with ankyloblepharon-ectodermal dysplasia syndrome. (a) Bilateral exposure keratopathy with neovascularization and corneal scarring. (b) Abnormal eyelid margins with upper and lower lid anterior lamellar cicatrization, absent meibomian glands, and minimal eyelashes. (c) Bilateral upper and lower lid anterior lamellar full thickness skin grafts. (d) Bilateral upper and lower lids 8 months after full thickness skin grafts displaying full closure of the right eye and persistent lagophthalmos of the left eye

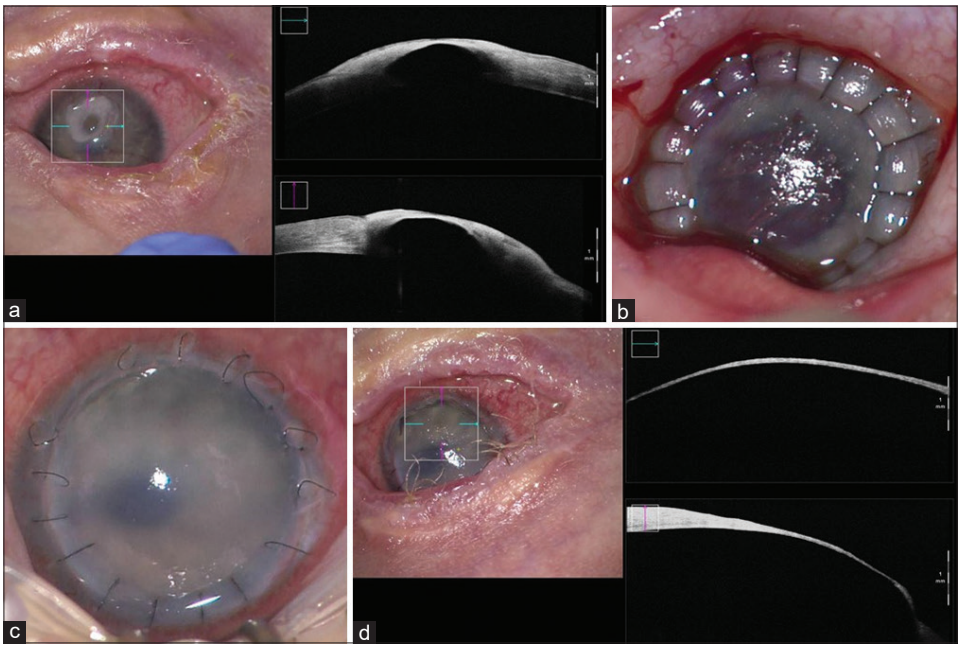

Figure 3: Imaging of intraoperative anterior segment optical coherence tomography (AS-OCT). (a) Descemetocele in inferior cornea with central corneal melt. (b) Right cornea immediately after emergency tectonic graft. (c) Early corneal graft rejection with loose sutures prior to removal 6 weeks post-tectonic graft. (d) Ongoing ectasia 8 weeks post-tectonic graft

eye, can interact with his family, and is able to pick up small objects from the floor.

Discussion

AEC syndrome is a rare form of ED with limited information on the ocular manifestations. Ocular manifestations of ED include ankyloblepharon, absent to minimal eyelashes and eyebrows, lid laxity, and partial to complete absence of meibomian glands.[3-6] Poor blink, lagophthalmos and tear deficiency from insufficient meibomian secretions combine to create an unstable ocular surface with a high risk of exposure keratopathy, microbial keratitis, and corneal ectasia.[3,4,7-9]

In the current case report, lengthening of the anterior lamella with full thickness skin grafts was undertaken with the aim of reducing the exposure keratopathy. However, in AEC syndrome and ED, there can be a paucity of available skin to harvest due to incomplete development of ectodermal tissues.[10] Nonpermanent filler materials, such as nonanimal stabilized hyaluronic acid, may be an option to improve palpebral closure.[11,12]

This case highlights the ocular manifestations of AEC and the importance of early and aggressive management to preserve vision and limit the risk of amblyopia. The authors posit that early aggressive ocular surface management in similar cases may obviate long term corneal ectasia. The balance between lid closure procedures aimed at maintaining the ocular surface and managing amblyopia risk is difficult and requires detailed discussions and consent from the child's guardians. This case report highlights the importance of early and aggressive management of lagophthalmos and exposure keratopathy and the utility of intraoperative AS-OCT imaging as an adjunct to monitor corneal thickness and guide management. The risk of amblyopia in similar cases must be balanced against the significant risk of infection and perforation.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the parents have given their consent for their child images and other clinical information to be reported in the journal. The parents understand that their child name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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