

SHORT COMMUNICATION

A successful alternative: Repair of a penetrating limbal wound by lamellar keratoplasty

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PURPOSE. *To report repair of a penetrating limbal wound by lamellar keratoplasty 1 year post-traumatically.*

METHODS. *Interventional case report.*

RESULTS. *A 5-year-old boy had a self-inflicted injury leading to a limbal penetrating wound. The wound closed spontaneously by prolapsed subconjunctival uveal tissue and no intervention was planned. One year later surgical closure of the defect was necessary, as the amount of prolapsed tissue had increased. After excising the prolapsed tissue the wound was closed with a lamellar corneal graft, resulting in a quiet and stable anterior segment and a best-corrected visual acuity of 20/16.*

CONCLUSIONS. *Lamellar keratoplasty can be a useful technique to repair a limbal penetrating wound. Corneal allografts have adequate tensile strength, low immunogenicity, and are easy to obtain. (Eur J Ophthalmol 2007; 17: 117-20)*

KEY WORDS. *Childhood, Lamellar keratoplasty, Penetrating ocular injury, Trauma, Uveal prolapse*

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INTRODUCTION

Ocular injuries are a major cause of monocular visual disability in children (1-11). We present a case report of a boy who sustained penetrating ocular trauma. Initially, the anterior scleral wound appeared self-sealing due to prolapsed subconjunctival uveal tissue. However, 1 year later surgical closure of the wound was necessary, as the amount of prolapsed tissue increased and the tissue looked more fragile. The operation was performed using a lamellar corneal allograft. To our knowledge, the use of lamellar corneal graft tissue for the closure of a traumatic scleral defect has not been documented.

Case report

A 5-year-old boy was seen with a penetrating ocular injury to the right eye. The injury had been sustained while play-

ing with a barbecue fork 5 weeks before. After the accident the eye was red for some days. In the absence of pain, discomfort, or visual complaints, the parents, who were not aware of the seriousness of the injury, did not take the child to an ophthalmologist. Five weeks later the father noticed a brown spot underneath the right cornea, and consulted an ophthalmologist.

On presentation, visual acuity (VA) of the injured right eye was 20/25 and of the left eye 20/20. Stereoacuity was intact. Slit lamp examination showed a quiet right anterior segment with a clear cornea and deep anterior chamber. A small filtering bleb formed by prolapsed subconjunctival iris tissue was visible nasal and inferior to the right cornea (Fig. 1). Apart from a small notch in the inferior pupillary margin, the intraocular iris looked normal. The pupil was well-centered. Right intraocular pressure was 12 mmHg. Examination of the right lens, vitreous, and retina was normal. Considering the lack of complaints and stable

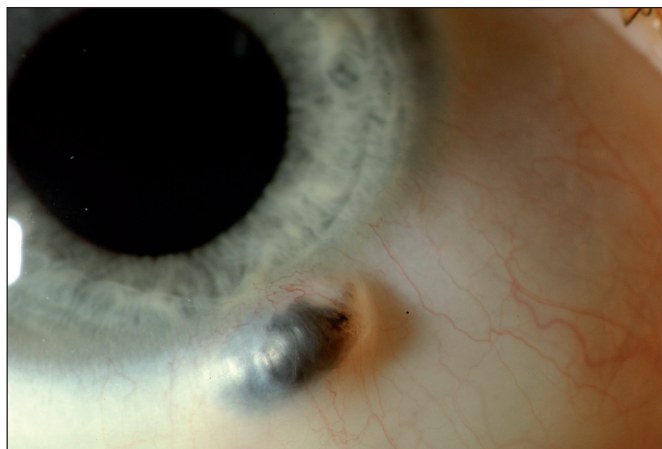


Fig. 1 - Prolapsed subconjunctival uveal tissue forms a filtering bleb 5 weeks post-traumatically. The anterior segment is quiet.



Fig. 2 - One year later, the filtering bleb has enlarged and the covering uveal tissue thinned. The anterior segment remains quiet.

and quiet anterior segment, it was decided not to perform any surgical intervention.

At the 1-year follow-up appointment, the child stated not having had any complaints of the right eye during the past year. However, his parents considered the filtering bleb to be enlarged. Right uncorrected VA was 20/16 and left uncorrected VA was 20/12. Both eyes had spherical keratometry. On examination the amount of prolapsed tissue had increased and the covering uveal and conjunctival tissue thinned compared to photographs taken the previous year (Fig. 2). In consideration of the risk of accidental perforation during play, we decided to excise the prolapsed tissue and strengthen the underlying scleral defect with a lamellar corneal transplant to provide a watertight seal.

During the operation, conjunctiva and Tenon capsule were locally dissected away from the wound. The prolapsed tissue was excised. The anterior sclera showed an oval penetrating wound covered on the inside with scarred uveal tissue. No more iris tissue prolapsed while the wound was open, although a small trickle of aqueous did flow out. The defect measured 3.5 x 3 mm. A lamellar corneal transplant was prepared by removing endothelium and Descemet membrane of a donor cornea button with a dry sponge. A punch trephine of 4.0 mm was used to cut the donor cornea. The lamellar transplant was sutured to the recipient cornea and sclera surrounding the defect with interrupted 10.0 nylon sutures. The transplanted corneal tissue was covered by conjunctiva which was sutured with interrupted 8.0

Vicryl sutures. During the first postoperative week, a combination of tobramycin 0.3% and dexamethasone 0.1% ointment was administered four times daily.

One week postoperatively, VA in the operated right eye was 20/12.5 and in the left eye 20/10. The lamellar corneal transplant was partly covered by conjunctiva and had completely epithelialized (Fig. 3). The cornea was clear and the anterior chamber deep and quiet. Location and form of the pupil were not changed. One month later, uncorrected VA in both eyes was 20/16. Right keratometry was spherical. The right anterior segment was well-healed without any inflammatory signs.

DISCUSSION

In a large percentage of ocular injuries (20–55%), children are affected (1, 2, 4, 6-9, 11). Pediatric ocular trauma is an important cause of noncongenital unilateral visual loss and may result in permanent physical disability with profound developmental, social, and emotional consequences (1, 3-5, 8-10).

Boys are at increased risk for ocular injury with a reported boy-to-girl ratio from 2:1 to 6:1 (1-11). This male predominance is most likely due to behavioral differences between boys and girls (1, 3, 9, 10). Changing activities and behavior with increasing age also leads to a risk of more severe ocular trauma (1, 3, 5, 11). School-aged children are more prone to traumatic events, as they develop independent behavior and participate in sports

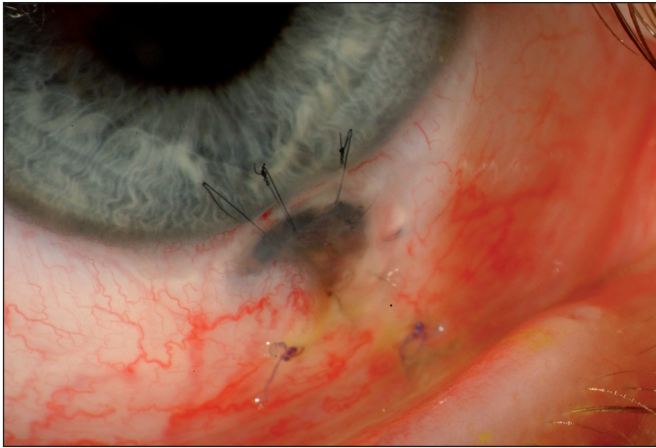


Fig. 3 - One week postoperatively the lamellar corneal transplant has epithelialized and is partly covered by conjunctiva.

and adventurous recreational activities (1, 3, 6, 10). Especially unsupervised play is potentially dangerous (5, 10). As this more often takes place at home than at school or in childcare, the domestic setting is the site where most injuries occur (more than 50% of all accidents) (1-4, 10). As in this case report, many children are injured by careless use of ordinary household items, like toys or domestic utensils (1, 4, 5, 7, 9, 10). Other frequent causes of childhood eye injuries are accidental blows and falls, motor vehicle accidents, burns, sports activities, and projectiles or airguns (1-5, 8, 10, 11). Visual outcome is related to the severity of the ocular injury: penetrating anterior segment injuries are generally associated with considerable morbidity and a high likelihood of significant visual loss (3, 6, 9, 10). Wounds involving the cornea or the limbus give a substantial risk of astigmatism, resulting in reduced visual outcome (2). Missile-like objects and firearms are well known risk factors for a poor visual prognosis, as they often damage the eye excessively and may lead to a permanent visual deficit or even loss of the eye (1-7, 10, 11). Patient age is also an important prognostic factor, as children younger than 8 years are at particular risk for visual disability due to the threat of amblyopia (2, 6, 8). Baxter et al report that the time delay between trauma and surgical repair does not influence visual prognosis (2). Most of the delay is frequently due to late presentation in hospital, because the severity of the injury is often not apparent to parents, as in this case report (2). Conflicting results have been reported as to the reliability of initial

visual acuity as a prognostic indicator (2, 6-8). Visual prognosis is generally good if the wound does not involve the central cornea, can be managed by primary repair, and if there is minimal postoperative astigmatism (2, 9).

In this case report, penetrating trauma resulted in loss of scleral tissue immediately adjacent to the limbus and the formation of a bleb of prolapsed subconjunctival uveal tissue. One year postoperatively it was necessary to excise the prolapsed tissue and repair the scleral tissue defect. The use of several types of tissue for closing of scleral tissue defects has been described, including conjunctiva, cartilage, fascia lata, periosteum, dura mater, amniotic membrane, scleral, or corneal graft (12). We needed a graft that could provide sufficient strength to support the eye wall, considering the size of the defect. The young age of the patient made it particularly necessary to minimize the risk of immunologic rejection. Lamellar corneal grafts meet both requirements, as they preserve their strength while at the same time contain few cellular elements and no blood vessels and thus reduce the risk of rejection (12, 13). Moreover, they are easy to obtain, which made planning of the surgery possible in the short term. As the preparation of the graft in the operating theater is straightforward, operating time can be brief. The postoperative result was excellent. The graft epithelialized within 1 week postoperatively, there were no signs of postoperative inflammation or rejection, and visual acuity remained normal.

Considering the possible severe consequences of ocular trauma in childhood, prevention of future injuries should have high priority to reduce morbidity and costs (1, 5, 7). Special attention should be given to the dangers of the domestic setting, although it is difficult to avoid domestic traumas, as dangers of household items and toys are often not evident until it is too late (1, 2, 10).

This case report described a 5-year-old boy who had a self-inflicted penetrating ocular injury and who underwent surgical closure of the scleral defect 1 year post-traumatically. We described an alternative technique for closure of the scleral defect with a lamellar corneal allograft. The postoperative result was excellent with rapid epithelialization of the corneal graft and no signs of rejection or inflammation.

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