Case Report

Successful repair of a full upper eyelid defect following traumatic amputation by simply suturing it back in place

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Abstract

There is a general belief that a full-thickness eyelid defect is best repaired using a vascularized flap in combination with a free graft, and that a free full-thickness eyelid graft would not survive due to poor blood perfusion. However, we describe a case in which an upper eyelid was traumatically amputated. The eyelid was sutured in place and healed well in situ. The long-term outcome was good regarding motility and function. This raises the question of whether a blood-supplying pedicle is necessary for the survival of the graft when repairing large eyelid defects.

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Case report

A 15-year-old healthy boy fell while holding a metal pipe in his hand. The pipe hit his right eye, perforating the eye bulb and fracturing the orbit. Part of the lateral and central part of the upper eyelid was severed. The patient was transported to the Skåne University Hospital, Sweden, and the amputated eyelid was transported on ice.

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Figure 1. Before traumatic amputation of right eyelid (top), and 1 month, 1 year and 10 years after suturing the eyelid back in place.

The patient had no cardiovascular disease, was taking no medication and suffered from no other known conditions that might have compromised the wound-healing process. Approximately 15 h after the trauma the patient was taken to the operating room and anesthetized. The perforated cornea was prioritized and sutured first, according to normal practice. The damaged superior and inferior rectus muscles were identified and sutured. After the bulb had been sutured, attention was directed to the defect of the upper eyelid. The amputated tissue corresponded to the lateral 2/3 of the upper eyelid, and measured 20 × 9 mm. It included the lid margin and the lash line. This was sutured to the remaining tarsal plate laterally and medially using 5/0 resorbable sutures (Vicryl 5-0®, Ethicon, Somerville, N.J., USA). The caudal part of the levator muscle was included in the amputated tissue, and this was sutured to the remaining levator muscle using 5/0 resorbable sutures. The skin was approximated using 6/0 non-resorbable sutures (Ethilon 6-0®, Ethicon, Ethicon, Somerville, N.J., USA).

Lateral canthotomy of the lower eyelid was then performed. The lower and upper eyelids were temporarily sutured together centrally and medially using two 4/0 silk sutures (Silk, Ethicon), in order to apply downward tension so that the upper eyelid did not retract upon healing. Chloramphenicol ointment (Chloramycetin 1%, Pfizer, New York, N.Y.) was applied 3–4 times daily for the next 7 weeks. The temporary sutures holding the eyelids together were removed after two days.

After two weeks, the patient started to notice a subtle twitching of the upper eyelid. At a consultation 19 days later, the surgeon noticed slight motion of the upper eyelid, indicating at least some remaining function of the levator or Muller muscle. When the skin sutures were removed and the canthotomy repaired after 20 days, the conjunctiva was thin and pale, and the white tarsal plate was clearly visible, but the skin showed adequate perfusion. The eyelashes started to fall out after 7 weeks, and did not return. The elevation function of the upper eyelid was slowly regained. The graft take was thus judged successful.

The patient received a custom-made eye prosthesis. The positions of the eyelids have required some adjustment postoperatively. After 20 months, the patient underwent levator aponeurosis reinforcement due to ptosis. After 27 months, the lower right eyelid was tightened by performing a lateral canthal sling procedure. After three years, medial levator aponeurosis reinforcement was performed to correct residual ptosis. After 10 years a blepharotomy was performed to lower the eyelid by 1.5 mm, due to overcorrection during the previous ptosis repair.

It has now been 10 years since the trauma, and the eyelid is still viable, and the scar barely visible (Figure 1). The eyelash follicles did not survive, and the patient now lacks eyelashes in the central and lateral 2/3 of the eyelid. The sutured tarsus does not have the same firmness as the rest of the tarsus and the contralateral tarsus, but it still fulfills its purpose of stabilizing and protecting the eye bulb.
The levator function is now 12 mm in the reconstructed eyelid and 15 mm in the contralateral eyelid. The eyelid has good motility, and the functional and esthetic outcome is good.

Discussion

The graft was a full-thickness eyelid, and thus a composite graft that was nourished by passive diffusion from the surrounding tissue. The fact that this was a non-smoking youngster without cardiovascular disease may have provided favorable healing conditions. The inset of the levator was presumably important for the postoperative function of the eyelid.

When there is penetrating injury there is always a risk of sympathetic ophthalmia. In this case, there was only penetration of the cornea, and no injury to the uvea, or any need for vitreoretinal surgery, limiting the risk of sympathetic ophthalmia. However, one month after the trauma, the eye had to be eviscerated due to phthisis bulbi, and a silicone ball was implanted in the orbit. During the follow-up of the patient no sign of granulomatous intraocular inflammation was observed in the contralateral eye.

It is generally believed that a full-thickness eyelid defect is best repaired using a vascularized flap in combination with a free graft, and that free full-thickness eyelid grafts are not viable. This case report describes the re-attachment of an upper eyelid that was traumatically amputated. The eyelid survived and healed well, resulting in good long-term outcome regarding motility and function. The fact that this case required four further eyelid procedures may limit its application.

This raises the question of whether a blood-supplying pedicle is necessary for the survival of a full-thickness eyelid graft when repairing large eyelid defects, for example, after surgery to remove tumors. Defects involving more than 50% of the eyelid are traditionally repaired using an orbicularis myocutaneous advancement flap, a modified Hughes procedure, the Cutler–Beard technique or regional flaps. In all of these techniques, a flap pedicle maintains vascularization. When performing the Cutler–Beard or the modified Hughes procedure, the flap pedicle is created from the eyelid and sutured to the defect in the opposing eyelid, thus occluding the eye. This may have several effects on the patient, such as discomfort, traumatic falls and difficulties in taking care of oneself due to impaired/limited vision. This is especially troublesome in cases of amblyopia and in patients with poor eyesight in the contralateral eye. A second surgical procedure is also required to re-open the eye.

Other studies and case reports have been published on the survival and good outcome of replaced amputated eyelids. We have also found experimental evidence of the survival of tarsocconjunctival flaps in pigs, despite minimal perfusion through the pedicle. In another case in 2016, a full-thickness defect resulting from tumor surgery was repaired using a free full-thickness eyelid graft from the opposing eyelid, with excellent postoperative outcome. Bartley et al. reported premature flap dehiscence 1 to 11 days postoperatively as a result of accidental trauma in 8 patients with tarsocconjunctival flaps following the modified Hughes procedure, however, this did not compromise the survival of the flaps, and the postoperative results were good. It is not known why a free full-thickness eyelid survives despite a lack of blood supply, but probable reasons are the richly nourished and oxygenated tear film and the well-perfused receiving eyelid.

In conclusion, this case describes a traumatically amputated eyelid which was sutured in place and survived with good long-term outcome. This raises the question of whether a blood-supplying pedicle is necessary for the survival of the graft when repairing large eyelid defects.

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