

Therapeutic ptosis with botulinum toxin in epikeratoplasty

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We present six cases in a consecutive series of patients undergoing epikeratoplasty, in whom a therapeutic ptosis induced with botulinum toxin was given at the time of surgery. All patients achieved primary re-epithelialisation of their lyophilised grafts within 8 days or less, and no case of secondary epithelial breakdown was observed, nor any significant complication from the botulinum toxin. In patients with keratoconus and eye rubbing, epikeratoplasty may be the preferred method of surgical treatment because it does not compromise the integrity of the globe. An additional advantage of the procedure is that it is not associated with graft rejection problems,¹ which is particularly important for patients with mental handicap, Down's

syndrome, and those who have poor compliance with treatment or follow up. However, graft failure in epikeratoplasty can occur through primary failure of re-epithelialisation of lyophilised graft tissue, or secondary epithelial breakdown.² If epithelial defects are persistent, the lyophilised graft will suffer from stromal melting, and so the standard postoperative management includes close follow up, frequent application of topical ointment, and the use of bandage contact lenses, patching, etc. In patients with poor compliance, therapeutic ptosis induced by botulinum toxin could be a useful adjunct in the management of epikeratoplasty grafts, as it has been shown to be an effective treatment of epithelial defects in disease states.³

Table 1 Patient details

| Case number | Ophthalmic diagnoses | Indication for therapeutic ptosis at time of epikeratoplasty surgery | Pre-ptosis graft cover achieved by | Age (years) | Time to full graft re-epithelialisation (days) | Follow up time (months) | Preop unaided acuity | Postop unaided acuity | Comments |
|-------------|---|--|------------------------------------|-------------|--|-------------------------|----------------------|-----------------------|--|
| 1 | Keratoconus, mature cataract | Down's syndrome, severe mental retardation, eye rubbing | Suture | 28 | ≤7 | 32 | NA | Fixes | Epikeratoplasty combined with cataract extraction and lens implant. Botulinum injection repeated at 5 weeks |
| 2 | Keratoconus, mature cataract | Down's syndrome, severe mental retardation, eye rubbing | Suture | 29 | ≤7 | 12 | NA | ? NPL | Other eye of case 1. Epikeratoplasty combined with cataract extraction and lens implant. Found to have inoperable total retinal detachment |
| 3 | Keratoconus | Down's syndrome, severe mental retardation | CL | 28 | ≤7 | 8 | NA | Fixes | Previous acute hydrops in other eye |
| 4 | Keratoconus | Severe mental retardation, eye rubbing | CL | 40 | ≤7 | 7 | NA | NA | Previous acute hydrops in other eye |
| 5 | Keratoconus, Leber's congenital amaurosis | Blind, away at college, difficult to follow up | CL | 18 | ≤8 | 5 | PL | PL | Previous acute hydrops. Epikeratoplasty carried out as a tectonic procedure |
| 6 | Keratoconus, vernal catarrh | Lives abroad, attending school, difficult to follow up | Suture | 10 | 3 | 3 | 4/60 | 6/18, N8 | Awaiting epikeratoplasty surgery to other eye |

CL=bandage contact lens; PL=perception of light; NPL=no perception of light; NA=not assessable.

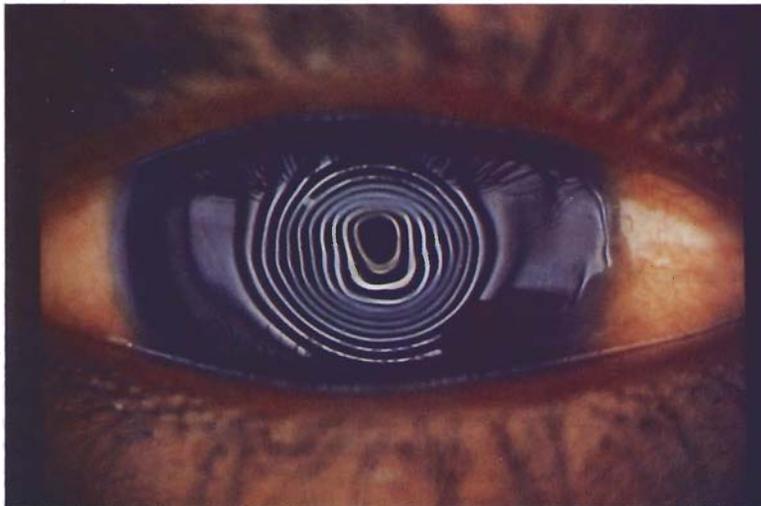


Figure 1A Case 6: preoperatively, showing irregular keratometric mires from advanced keratoconus, and bulbar conjunctival congestion from vernal catarrh (visual acuity 4/60).



Figure 1B Case 6: 3 months after epikeratoplasty, showing improvement of the corneal contour and good recovery from the botulinum toxin induced ptosis (visual acuity 6/18 and N8 unaided).

Case reports

A series of six cases of keratoconus managed by epikeratoplasty combined with botulinum toxin induced ptosis is summarised in Table 1, and illustrated in Figure 1.

All the patients were treated with lyophilised lenticules (Keratec Eye Bank, London) prepared from desiccated corneal tissue lathed at room temperature.⁴ The lenticules were plano powered and 9 mm in diameter, sutured into an 8.5 mm bed with multiple interrupted 11/0 mersilene.

The ptosis was obtained by making up 500 units of botulinum toxin A with 2.5 ml of saline (Porton International) and injecting 0.1 ml (20 units) into the levator palpebrae superioris muscle at the beginning of surgery. Kirkness *et al*³ used 62.5 µg of toxin (equivalent to 3 units) to induce ptosis, but had a higher rate of failure and repeat injections.

In three of the cases a 6/0 prolene tarsorrhaphy suture tied over a bolster was used to close the eyelids temporarily while the onset of the ptosis was awaited – usually 1–3 days. In the other three patients a collagen bandage lens was used as an alternative to give cover during this period, but was not retained in the uncooperative patients (cases 3 and 4).

Comment

The exact time to complete re-epithelialisation was not known in cases 1–4, since they were all discharged following surgery and returned after 7 days for examination under anaesthesia. Case 5 was similarly discharged following surgery and reviewed as an outpatient on day 8. However, case 6 was managed as an inpatient, and examination of the graft surface by manually assisted opening of the eyelids at the medial canthus showed full re-epithelialisation on day 3, at which time the tarsorrhaphy suture was removed. The ptosis persisted in all cases for a minimum of 6 weeks, and during this period the epithelium stabilised on the graft and there were no instances of secondary epithelial breakdown.

In cases 1-4 it was difficult to measure the visual function due to the patients' mental retardation and/or behavioural disturbance. Case 6 gives an indication of the degree of unaided visual improvement that can be expected in epikeratoplasty for keratoconus.⁵ Where there is significant corneal scarring deep lamellar keratoplasty with lyophilised tissue can be used,⁶ and this latter technique could perhaps also benefit from botulinum toxin induced ptosis as part of the early postoperative management.

In conclusion, our case reports suggest that therapeutic botulinum toxin ptosis is a useful adjunct in the management of patients undergoing epikeratoplasty with freeze dried tissue since it promotes stabilisation of the epithelium on the graft.

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