

Aberrant conjunctival stricture and overgrowth in the rabbit

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Abstract

Six dwarf rabbits with unilateral ($n = 2$) and bilateral ($n = 4$) aberrant conjunctival growth underwent surgical correction. The applied technique involved centrifugal incisions of the overgrowing conjunctiva to the limbus and a transpalpebral fixation of the conjunctiva. In this way the conjunctival fornix was reconstructed. No relapses were noted within the observation period (5–72 months).

Key Words: aberrant conjunctival stricture, conjunctival overgrowth, epicorneal membrane, pseudopterygium, rabbit conjunctiva, rabbit

INTRODUCTION

Aberrant conjunctival stricture (ACS) and overgrowth is an unusual abnormality unique to the rabbit.^{1,2} It appears as a thin, double layered, elastic fold of the bulbar and palpebral conjunctiva, which progressively covers the cornea 360°. ^{3,4} Instead of its anatomic position within the fornix, the conjunctiva constricts centrally. This condition is poorly documented in the literature and because of its unknown etiology is referred to by multiple different terms based on macroscopic appearance: conjunctival stricture, pseudopterygium, conjunctival centripetalization, precorneal or epicorneal membranous occlusion, circumferential conjunctival hyperplasia and plication, and conjunctival hyperplasia.^{1,3–8} It is described as a centripetal symmetric movable extension of conjunctiva from the limbal circumference without adhesions or penetration into the superficial corneal layers.^{3,4,6} In ACS only loose to moderately firm, focal adhesions to the peripheral cornea have been described.⁹ Usually conjunctivitis is absent or minor^{2,9} and there may be some corneal edema in the central opening.¹⁰ This fine vascular conjunctival membrane lies over unaltered corneal surface, remaining adherent at the limbus and at the base of the tarsal plate of the lid margin. ACS is therefore a different entity from the pterygium in humans^{3,11} or the symblepharon in the cat. In these two conditions there is a conjunctival overgrowth that is intimately attached to the cornea, replacing the corneal epithelium. Uni- or bilateral visual impairment may occur as the aberrant conjunctival fold progresses towards the cornea's center.^{2,3,5,12} Aberrant conjunctival stricture and overgrowth was once reported as a congenital defect; however, it also occurs in adult animals.^{1,8,13} A higher incidence in dwarf young male rabbits has been suggested.^{8,9,11,12} Histopathologic examination of the resected conjunctival membrane shows normal conjunctival epithelium and a focal

excess of conjunctival collagen, probably as a result of a collagenous dysplasia.^{3,11} Treatment consists of preventing or removing the obstruction of the visual axis. Surgical repositioning, using splitting of the strictured, double conjunctiva medially and laterally, followed by relocation to the fornix, where it is fixed to the outside skin using resorbable 6-0 U-sutures has been advocated.¹⁰ Simple surgical resection of the advancing conjunctiva tends to result in regrowth within weeks or months.^{1,2,5}

Herein we describe the clinical presentation, histopathology and therapy of 10 eyes of six dwarf rabbits with aberrant conjunctival stricture and overgrowth.

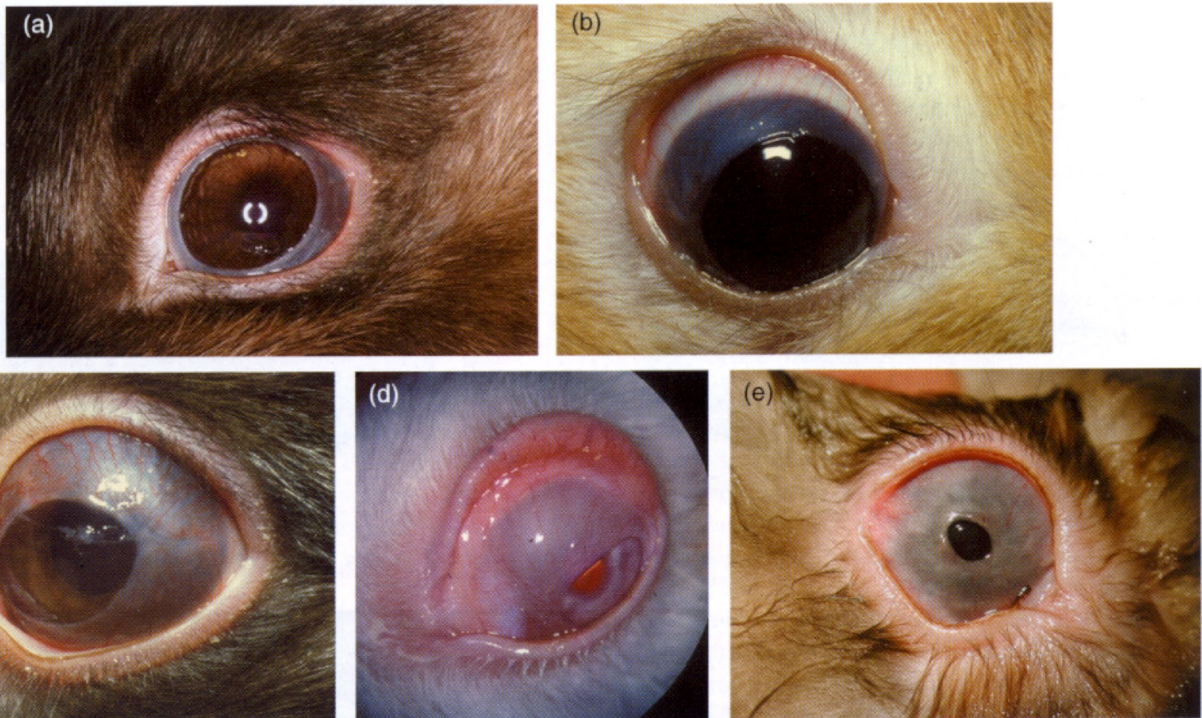
PATIENTS AND METHODS

Ten eyes of six dwarf rabbits, three male and three female, were diagnosed with aberrant conjunctival stricture or overgrowth (Table 1). Age ranged between 8 and 18 months (mean age, 12.5 months). Two rabbits were unilaterally, and four were bilaterally affected. Three animals with bilateral involvement had undergone surgery performed by another veterinarian (simple resection of the overgrowing conjunctival fold at the limbus) 4 to 12 weeks prior to presentation. The overgrowth recurred shortly after the removal of the stricture, with a similar clinical appearance to cases that had not been surgically treated.

Ophthalmic examination revealed a conjunctival fold stretching to variable degrees over the cornea in all affected eyes (Fig. 1a–e). The fold originated at the limbus and was inserted at the base of the tarsal plate at the lid margin. It was vascularized and centrally thickened and hardened. There were no attachments to the corneal epithelium. The fold was elastic, could be easily lifted (Fig. 2), and was not attached to the cornea. A mild conjunctivitis was present in all affected eyes.

Table 1. Details of patients

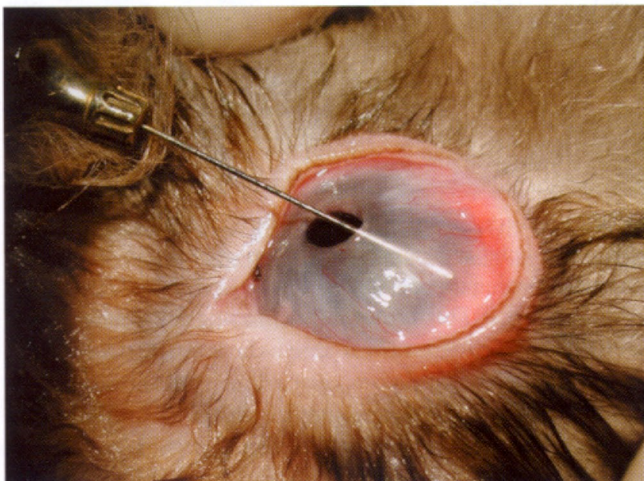
| Breed | Age | Gender | Eye(s) affected | Pretreated | Follow-up time | Figure in text |
|--------------|-----------------|--------|-----------------|------------|----------------|----------------|
| Dwarf rabbit | 1 year | F | OS | No | 5 months | 1a |
| Dwarf rabbit | 8 months | F | OS | No | 3 years | — |
| Dwarf rabbit | 1 year | M | OU | Yes | 6 years | 1c |
| Dwarf rabbit | 1 year 2 months | M | OU | No | 5 years | 1b |
| Dwarf rabbit | 1 year | F | OU | Yes | 1 year | 1d |
| Dwarf rabbit | 1 year 6 months | M | OU | Yes | 3 years | 1e |

**Figure 1.** (a–e) Aberrant conjunctival growth in dwarf rabbits, with variable presentation of degrees.

The remainder of the ophthalmologic examination, as well as the general examination, was unremarkable in all rabbits.

Surgical technique

Surgery was performed under general anesthesia. The conjunctival fold was incised centrifugally up to its attachment at the limbus and the lid margin using small scissors (Stevens tenotomy), in six equally sized segments (Fig. 3a,b). The central rim of the segment was then replaced to its normal position in the fornix and fixed with mattress sutures (Prolene 7/0) passing through to the outside skin. The suture penetrated the lid from the outside, then passed through the conjunctival fold of the segment at the central

**Figure 2.** The aberrant conjunctiva has no adhesions to the corneal epithelium. A lacrimal canula can easily be moved between the conjunctival fold and cornea.

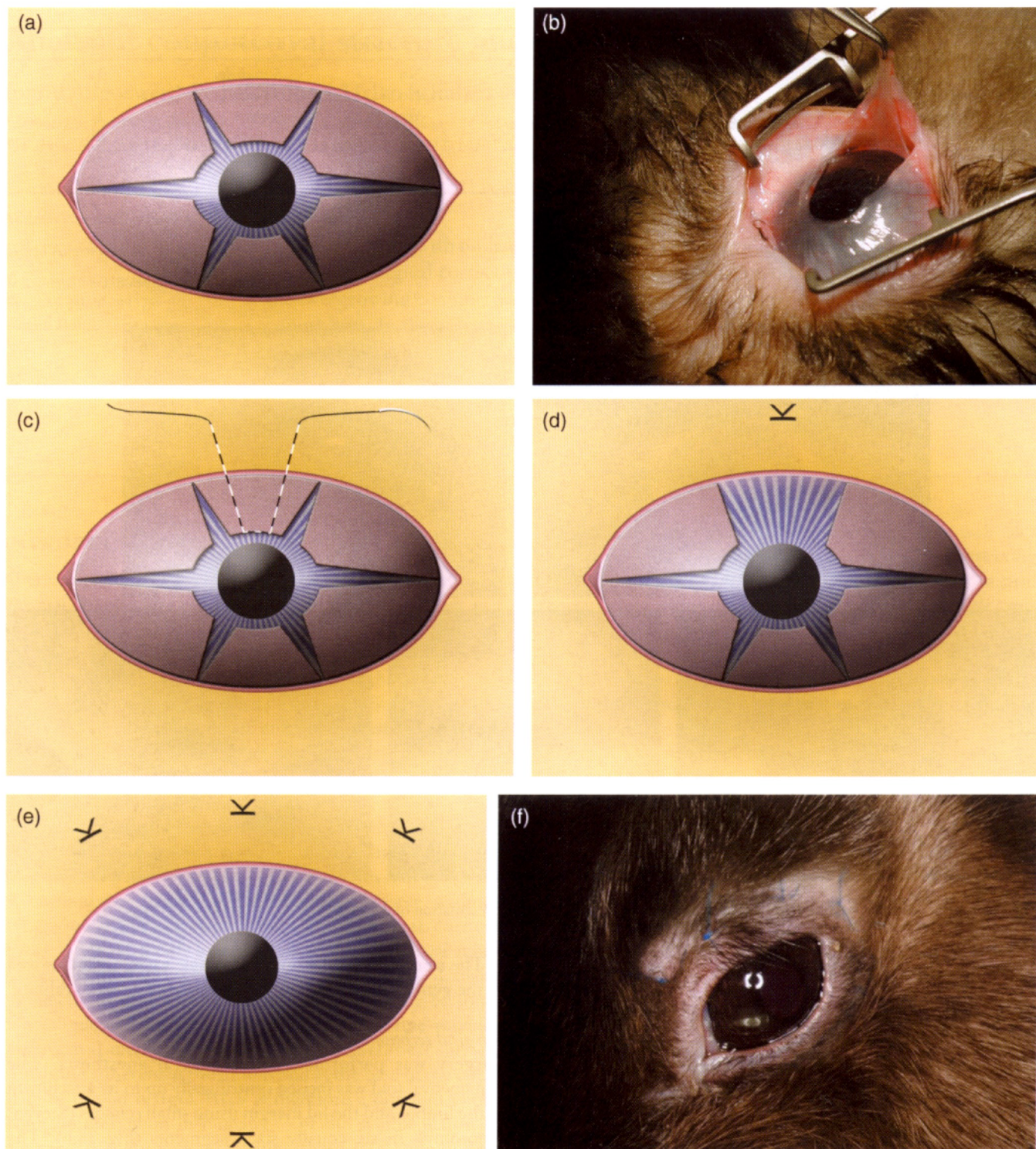


Figure 3. (a–f) Surgical technique. (a) Six centrifugal cuts are placed into the conjunctival fold up to the limbus and lid margin. (b) The appearance after cutting of the first segment is shown. The everted conjunctiva and its attachment at the limbus are illustrated. (c) The suture is passed transpalpebrally. It reaches the central rim of the conjunctival fold. (d) By fastening the knots on the skin the conjunctival fornix is re-established in its physiologic position. (e) The postoperative appearance is shown. All knots are fastened. (f) Dwarf rabbit, female, 1 year old. Immediate postoperative appearance of the left eye is shown. The 7-0 prolene knots are apparent in the eyelids.

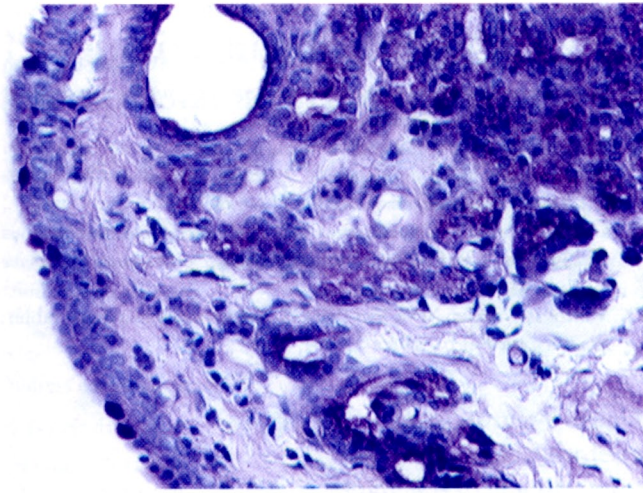


Figure 4. Conjunctival sample of a rabbit with aberrant conjunctival growth, PAS $\times 200$. The conjunctival epithelium does not contain goblet cells. Single epithelial cells contain PAS-positive vacuoles (acid mucopolysaccharides). The neovascularized subepithelial lamina is sparsely infiltrated by round cells (lymphocytes and plasma cells) and few eosinophils, which migrate transepithelially. Accessorial seromucoid PAS-positive acini are seen close to the conjunctival fornix. A low-grade purulent chronic conjunctivitis is also present.

rim (Fig. 3c). The segment of the conjunctival fold was then stretched over the sclera into the fornix. The suture was completed by exiting approximately 5 mm from the entrance on the skin and was tied (Fig. 3d). All remaining conjunctival segments were cut, pulled into the fornix, and sutured similarly (Fig. 3e,f).

Postoperative treatment and course

After the surgery eye drops containing dexamethasone, neomycin and polymyxin were applied twice daily for 3 weeks. The sutures were removed after 3 weeks in one case. In all other cases they were left in place until they dropped out. At re-examination after 12 weeks all sutures were gone. Within the observation period (5 and 12 months, 3, 5 and 6 years) no recurrence was noted.

Histopathology

Conjunctival samples were obtained from case 1 and processed for histopathologic examination. The tissue samples were H&E and PAS stained (Fig. 4). Immunohistochemistry was not performed. The conjunctival epithelium was transdifferentiated into squamous epithelium. It contained no goblet cells, but single epithelial cells contained PAS-positive vacuoles (acid mucopolysaccharides). The subepithelial conjunctival substantia propria was significantly neovascularized. It was mildly infiltrated by some round cells (lymphocytes and plasma cells) and several eosinophils had migrated transepithelially. There was an accessory accumulation of seromucous PAS-positive glandular acini.

DISCUSSION

So far, aberrant conjunctival stricture or overgrowth has only been known to occur in the dwarf rabbit. The dwarf rabbit appears to be predisposed, as the dwarf breeds seem to be affected with an increased frequency. Etiopathogenesis remains unclear. Collagen dysplasia has been postulated as a possible cause for the deranged conjunctival growth resulting in a centrifugally constricting sheet of conjunctival tissue. This everted conjunctival part covers variable percentages of the corneal surface to an extent where only a small hole remains open in the center. The driving force for the conjunctiva to translocate has not yet been identified.

In the literature, Stades describes a surgical technique consisting of a medial and lateral cut of the conjunctival stricture. The conjunctiva is fixed from the fornix to the outside skin, using two U-sutures in the upper, and two sutures in the lower lid (6-0, absorbable material).¹⁰

Other authors describe simple surgical resection of the fold at the limbal attachment as the treatment of choice. However, this may result in rapid regrowth of the fold within weeks after surgery. Six of our 10 cases underwent such a resection elsewhere before the recurrence of the conjunctival fold to its initial state within 4 to 6 weeks.

The technique described here includes six radial incisions of the conjunctival fold, resulting in greater release of tension and thereby greater ease in re-establishing a stable fornix. The lack of recurrences with this surgical technique may be attributable to fibrosis and cicatrization of the conjunctival flaps within the fornix. The transcutaneously placed sutures did not cause any irritation or granulation, nor did they act as an entry port for infections. The technique did not seem to interfere with normal conjunctival secretions and their directional flow. The surgical procedure is quick and simple. The rate of relapses appears to be lower when compared to simple resection. In our follow-up period of 5 to 72 months no recurrence was noted.

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