

Figure 2 Pupillary margin, lined with pigmented flocculi obstructing the vision in the right (A, B) and left (D, E) eyes. The postoperative images of the iris are superimposed on C and F. The patient's mother had partly collapsed flocculi lining the iris with anterior synechiae (G, H).

contained substantial numbers of cells similar to goblet cells in nonpigmented cysts.

The *ACTA2* gene, encoding vascular smooth muscle actin and the most abundant protein in smooth muscle cells (SMCs), plays an important role in actin filament assembly and SMC contractions.³ It is also reported to be expressed in SMCs of the iris, functioning as the contracting protein to move the iris. Guo *et al* reported a large family with autosomal dominant TAAD with iris flocculi caused by an aortic aneurysm and familial thoracic 6 (AAT6), an allelic variant of *ACTA2*, Arg149Cys.³ We confirmed that both of the current patients had this mutation. The reason why a mutation of *ACTA2* causes cystic iris malformation with numerous goblet cells remains to be elucidated. We speculated that SMC hyperplasia and disarray caused by AAT6 could result in damage to the structural integrity of the iris and formation of iris flocculi.

Considering the concomitant TAAD among patients with iris flocculi, recognition

of the ocular manifestations can result in recognition of cardiovascular disorders.

N Hashida,¹ N Ohguro,¹ Y Morimoto,¹ E Oiki,² H Morisaki,³ T Morisaki,³ Y Tano¹

¹ Department of Ophthalmology, Osaka University Medical School, Osaka, Japan; ² Center for Medical Research and Education, Osaka University Graduate School of Medicine, Osaka, Japan; ³ Department of Bioscience, National Cardiovascular Center Research Institute, Osaka, Japan

Correspondence to: Dr N Hashida, Department of Ophthalmology, Osaka University Medical School, E7, 2-2 Yamadaoka, Suita, Osaka, 565-0871, Japan; nhashida@ophthal.med.osaka-u.ac.jp

Competing interests: None.

Ethics approval: Ethics approval was provided by The Institutional Review Board of the Osaka University Medical School.

Patient consent: Obtained.

Provenance and peer review: Not commissioned; not externally peer reviewed.

Accepted 2 February 2009

Br J Ophthalmol 2009;**93**:1409–1410.
doi:10.1136/bjo.2009.158998

REFERENCES

1. **Shields JA.** Primary cysts of the iris. *Trans Am Ophthalmol Soc* 1981;**79**:771–809.
2. **Lewis RA,** Merin LM. Iris flocculi and familial aortic dissection. *Arch Ophthalmol* 1995;**113**:1330–1.
3. **Guo DC,** Pannu H, Tran-Fadulu V, *et al.* Mutations in smooth muscle alpha-actin (*ACTA2*) lead to thoracic aortic aneurysms and dissections. *Nat Genet* 2007;**39**:1488–93.
4. **Sallo FB,** Hatvani I. Recurring transitory blindness caused by primary marginal pigment epithelial iris cysts. *Am J Ophthalmol* 2002;**133**:407–9.
5. **Sallo FB,** Hatvani I, Milibak T, *et al.* Surgical treatment of symptomatic primary pupillary pigment epithelial iris cysts. *Acta Ophthalmol Scand* 2003;**81**:191–2.
6. **Grutzmacher RD,** Lindquist TD, Chittum ME, *et al.* Congenital iris cysts. *Br J Ophthalmol* 1987;**71**:227–34.

Tachosil: a new alternative for the treatment of non-traumatic corneal perforations

TachoSil is a collagen sponge with human fibrinogen 5.5 mg, and human thrombin 2.0 IU.

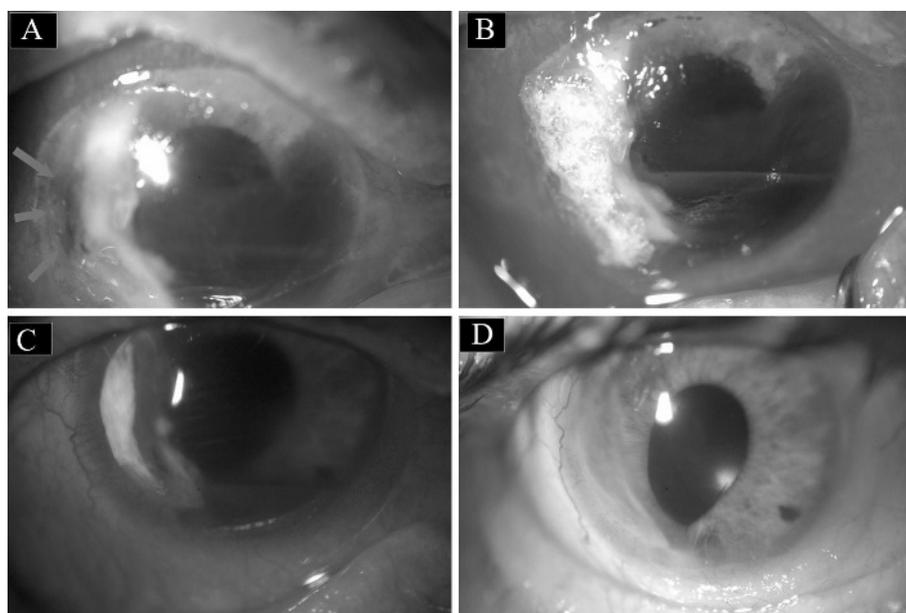


Figure 1 (A) Corneal thinning with perforation and anterior chamber bleeding (see arrows). (B) Slit-lamp image at the moment of the procedure with the TachoSil patch. (C) Follow-up 3 weeks after the procedure. (D) Follow-up after 3 months, showing successful healing of the corneal perforation.

Upon contact with physiological fluids or saline solution, the components of the coating dissolve and partly diffuse into the wound surface, creating a firm, mechanically stable network with good adhesive properties as well as sealing. Here we report the first case of the use of a collagen sponge combined with human fibrin sealant (TachoSil) in ophthalmology to patch a corneal perforation after infectious keratitis.

CASE REPORT

An 84-year-old Caucasian male with a history of heart disease treated with acenocoumarin and chronic obstructive pulmonary disease (COPD) reported to the emergency room with red eye, ocular pain, photophobia, decreased vision and discharge. At the slit-lamp examination, a large corneal stromal infiltrate with hypopyon was observed. A bacterial culture revealed *Streptococcus pneumoniae*. The keratitis responded to topical vancomycin, the stromal infiltrate decreased, and the hypopyon regressed, but the patient developed local corneal thinning that evolved towards manifest corneal perforation with anterior chamber bleeding (fig 1A).

We decided to apply a patch of collagen sponge with human fibrin (TachoSil) at the site of the corneal perforation at the slit lamp, using topical anaesthesia (procaine). After removal of TachoSil from the sterile package, the sponge can be cut to the correct size, extending beyond the margins of the

site of perforation. It is then premoistened in saline solution and applied immediately. The yellow, active side of the sponge is applied to the leaking surface and held against it for 3–5 min with forceps. This procedure enables easy adhesion of TachoSil (fig 1B). We patched the eye for 24 h. On the following day, a fine layer of fibrin and collagen remained on the cornea with no need for bandage contact lens. Three weeks (fig 1C) and 3 months after the procedure (fig 1D), successful healing of the corneal perforation was observed with no recurrence of the infectious process.

DISCUSSION

Corneal perforation is an unfortunate sequel of infectious, sterile or inflammatory keratitis that requires urgent management to reduce subsequent ocular morbidity. Conjunctival flaps, amniotic membrane transplantation, tissue adhesives and penetrating keratoplasty have been advocated in its treatment.^{1–4} The active side of TachoSil, which is coated with the fibrinogen and thrombin, is marked by a yellow colour. This is indicated for supportive treatment in surgery for improvement of haemostasia where standard techniques are insufficient but has also been used by surgeons in the management of cerebrospinal fluid leakage after the surgical removal of pituitary adenomas⁵ and to reduce pericardial effusions.⁶ Upon contact with physiological fluids or saline solution, the components of the coating dissolve and partly diffuse into

the wound surface. This is followed by the fibrinogen–thrombin reaction, which initiates the last phase of physiological blood coagulation. Fibrinogen is converted into fibrin monomers which spontaneously polymerise to a fibrin clot, which holds the collagen sponge tightly to the wound surface. The fibrin is then cross-linked by endogenous factor XIII, creating a firm, mechanically stable network with good adhesive properties and provides sealing as well. Based on this mechanism of action, we have tried it with favourable results in our case.

We think TachoSil patching has its use in ophthalmology and may be regarded as an alternative to cyanoacrylate tissue adhesives, amniotic membrane transplantation and conjunctival flaps in the treatment of corneal perforations under 3 mm in size. TachoSil has the advantages of easy application at the slit lamp (obviating the need to use an operating room), patient comfort and good retention of the fibrin glue (which accelerates the corneal healing process) thanks to the collagen-sponge with no need for a bandage contact lens.

M Hurtado-Sarrió,¹ A Duch-Samper,² A Cisneros-Lanuza,¹ M Díaz-Llopis¹

¹ Ophthalmology Service, La Fe University Hospital, Valencia, Spain; ² Ophthalmology Service, Arnau de Vilanova Hospital, Valencia, Spain

Correspondence to: Dr M Hurtado-Sarrió, Ophthalmology Service, La Fe University Hospital, Valencia, Spain, Esmeralda I, Casa 7, Mas Camarena, 46117 Betera, Valencia, Spain; hurtado_mer@gva.es

Competing interests: None.

Ethics approval: Ethics approval was provided by the Educational and Investigation Department of La Fe University Hospital, Valencia (Spain).

Patient consent: Obtained.

Provenance and peer review: Not commissioned; externally peer reviewed.

Accepted 21 March 2009

Br J Ophthalmol 2009;**93**:1410–1411.
doi:10.1136/bjo.2009.158949

REFERENCES

1. **Sharma A, Kaur R, Kumar S, et al.** Fibrin glue versus N-butyl-2-cyanoacrylate in corneal perforations. *Ophthalmology* 2003;**110**:291–8.
2. **Setlik DE, Seldomridge DL, Adelman RA, et al.** The effectiveness of isobutyl cyanoacrylate tissue adhesive for the treatment of corneal perforations. *Am J Ophthalmol* 2005;**140**:920–1.
3. **Azuara-Blanco A, Pillai CT, Dua HS.** Amniotic membrane transplantation for ocular surface reconstruction. *Br J Ophthalmol* 1999;**83**:399–402.
4. **Nobe JR, Moura BT, Robin JB, et al.** Results of penetrating keratoplasty for the treatment of corneal perforations. *Arch Ophthalmol* 1990;**108**:939–41.
5. **Tamasaukas A, Sinkunas K, Drafi W, et al.** Management of cerebrospinal fluid leak after surgical removal of pituitary adenomas. *Medicina (Kaunas)* 2008;**44**:302–7.
6. **Onorati F, Pasceri E, Scallan C, et al.** Aortic tube grafts wrapping with hemostatic fleeces reduces postoperative pericardial effusions. *J Cardiovasc Surg* 2008;**49**:393–7.



Tachosil: a new alternative for the treatment of non-traumatic corneal perforations

M Hurtado-Sarrió, A Duch-Samper, A Cisneros-Lanuza and M Díaz-Llopis

Br J Ophthalmol 2009 93: 1410-1411
doi: 10.1136/bjo.2009.158949

Updated information and services can be found at:
<http://bjo.bmj.com/content/93/10/1410>

These include:

References

This article cites 6 articles, 1 of which you can access for free at:
<http://bjo.bmj.com/content/93/10/1410#BIBL>

Email alerting service

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
<http://group.bmj.com/group/rights-licensing/permissions>

To order reprints go to:
<http://journals.bmj.com/cgi/reprintform>

To subscribe to BMJ go to:
<http://group.bmj.com/subscribe/>