

Amniotic Membrane Transplantation for the Repair of Severe Conjunctival Dehiscence After Strabismus Surgery With Adjustable Sutures

Mehmet Cem Mocan, MD, and
Nathalie F. Azar, MD

PURPOSE: To evaluate the outcome of amniotic membrane transplantation (AMT) for the repair of severe conjunctival dehiscence that occurred during or after fornix-incision strabismus surgery with adjustable sutures.

DESIGN: Retrospective, interventional case series.

METHODS: Four patients in whom severe conjunctival dehiscence developed during or after strabismus surgery were treated with amniotic membrane grafts. The extent of conjunctival reepithelization over sclera, range of ocular motility, and patient comfort were evaluated immediately after the surgery and at 1, 2, and 4 weeks.

RESULTS: The mean follow-up period was 16 weeks (range 4 to 28 weeks). Conjunctival dehiscence was detected 0 to 14 days after surgery. AMT was performed 0 to 14 days later. The conjunctival defect was reepithelized in all patients by the fourth postoperative week without evidence of scarring or restriction of motility.

CONCLUSIONS: In the treatment of large conjunctival defects that may follow strabismus surgery, AMT may be an alternative to conservative management or primary conjunctival closure. (*Am J Ophthalmol* 2005;140:533–534. © 2005 by Elsevier Inc. All rights reserved.)

OCULAR SURFACE RECONSTRUCTION AFTER FORNIX-incision strabismus surgery may be challenging in patients who have previously scarred or atrophic conjunctiva. Amniotic membrane transplantation (AMT) has been successfully used in restoring conjunctival surface after pterygium removal and symblepharon excision.^{1–3} Here, we report the anatomic and functional outcomes of AMT for the management of severe conjunctival dehiscence in the setting of strabismus surgery with adjustable sutures.

The study was carried out with approval from the Institutional Review Board. Written informed consent was obtained from all patients. Clinical records of all patients who underwent strabismus surgery at a single university-based hospital clinic between January 2000 and July 2004 were reviewed. Patients who developed severe conjunctival dehiscence after or during fornix conjunctival incision

strabismus surgery with adjustable sutures were included in the study. The conjunctival dehiscence was regarded to be clinically important if the size of the defect was large enough to expose the adjusted extraocular muscle, and if conjunctival edges could not be apposed because of previous scarring or if apposition of conjunctiva resulted in restriction of extraocular motility and/or diplopia. The ocular ductions were graded from 0 to –4, with 0 indicating full ductions and –4 indicating no movement in the intended field of gaze.

All strabismus surgeries were performed under general anesthesia by the same surgeon (N.A.). A fornix incision was performed approximately 8 mm from the limbus. Extraocular muscles were placed on adjustable sutures on sliding-noose configuration as described by Scott and associates.⁴ The conjunctival closure was performed by preplacing 6-0 fast-absorbing gut sutures (Ethicon, Somerville, New Jersey, USA) and subsequently closing the wound after adjustment.

AMT was performed by use of a synthetic amniotic membrane (Ambiodry; Okto Ophtho, Costa Mesa, California, CA, USA). The amniotic membrane was placed into the area of dehiscence and sutured with multiple interrupted 8-0 polyglactin 9-0 (Vicryl, Ethicon) (Figure 1); the technique employed is described in detail elsewhere.^{1,3} Follow-up examinations were performed at 1, 2, and 4 weeks postoperatively, after which patients were evaluated at intervals as deemed necessary by the operating surgeon.

The mean age of the four subjects was 63.5 years (range 42 to 84 years). The mean follow-up period was 16 weeks (range 4 to 28 weeks). The clinical characteristics, orthoptic measurements, and surgical outcomes for AMT of these patients are summarized in the Table.

All patients had successful outcomes after AMT with complete reepithelization of the conjunctival defect (Figure 2). At the time of their final follow-up examination, no scarring that resulted in secondary restriction was identified in the area of AMT. Only Patient 4 had appreciable limitation of restriction in abduction postoperatively, which was attributable to severe Graves ophthalmopathy. Patients 1 to 3 had no diplopia at their final visits. Patient 4 had residual esotropia and left hypotropia that resulted in diplopia and required patching.

Conjunctival dehiscence is a potential complication of strabismus surgery. It can lead to exposure of sclera and the recessed muscle. Previous surgeries of the conjunctiva make tissue manipulation difficult and increase the probability of conjunctival rips or uncontrolled tears. In our study, all of the patients had predisposing factors for conjunctival dehiscence. On the basis of our observations, we advise caution during manipulation of conjunctiva in patients who have previously had ocular surgeries or who have atrophic conjunctiva.

Accepted for publication Feb 23, 2005.

From the Massachusetts Eye and Ear Infirmary, Boston, Massachusetts. Inquiries to Nathalie F. Azar, MD, Massachusetts Eye and Ear Infirmary, Pediatric Ophthalmology and Strabismus Service, Floor 1, 243 Charles Street, Boston, MA 02114; fax: (617) 573-4484; e-mail: nathalie_azar@meei.harvard.edu

TABLE. Clinical Characteristics and Surgical Details of Patients Who Developed Conjunctival Dehiscence After Fornix Incision Strabismus Surgery

Characteristic	Patient			
	1	2	3	4
Age (years)/Sex	84/F	62/F	66/F	42/M
Reoperation	–	+	+	+
Preoperative Dcc (pd)	XT-55	XT-35	ET-10	ET-110, RHoT-20
Preoperative Ncc (pd)	XT-70	XT-35	Ortho	ET-110, RHoT-20
Preoperative ductions	Add: –1 OU	Add: –1 OD	Abd: –2 OD	Abd: –4 OU Supraduc: –4 OU
Surgical procedure	BLR rec. adj. OD MR resect. OD	LR rec. adj. OD MR adv. OD	LR adv. adj. OD	MR rec. adj. OD MR rec. OS IR rec. adj. OD
Postoperative Dcc (pd)	Ortho	XT-6	Ortho	ET-40, RHT-20
Postoperative Ncc (pd)	X-5	X(T)-4	X-4	ET-25, RHT-20
Postoperative ductions	Full	Full	Abd: –1 OD	Abd: –3 OD, –2 OS Supraduc: –2 OU
Postoperative diplopia	–	–	–	+
Dihiscence quadrant	Temporal OD	Temporal OD	Temporal OD	Nasal OD
Onset of dehiscence (days)	5	14	0	0
Size of defect (mm)	9×5	7×6	8×4	8×5
Dehiscence of AMT (days)	2	14	2	0
Successful outcome	+	+	+	+
Follow-up (months)	1	6	2	1

Add = adduction; Abd = abduction; adj = adjustable suture; adv = advancement; AMT = amniotic membrane transplantation; BLR = bilateral lateral rectus; Dcc = distance deviation with optical correction; ET = esotropia; Supraduc = supraduction; IR = inferior rectus; LR = lateral rectus; MR = medial rectus; resect = resection; Ncc = near deviation with optical correction; pd = prism diopters; RHoT = right hypotropia; RHT = right hypertropia; Ortho = orthotropia; X = exophoria; X(T) = intermittent exotropia; XT = exotropia.

We observed the timing of onset of conjunctival dehiscence to be variable. Although all patients in our study developed dehiscence in the first 2 weeks after surgery, the differences in the time of onsets warrant careful postoperative examinations in patients who may be predisposed to developing this complication.

Most patients who develop dehiscence during or after fornix-incision adjustable suture surgery can be treated conservatively if the size of the defect is small and does not cause marked scleral exposure. The results of our studies indicate that AMT may be an alternative way to treat large conjunctival defects, and it is associated with good functional and anatomic outcomes.

REFERENCES

1. Solomon A, Pires RTF, Tseng SCG. Amniotic membrane transplantation after extensive removal of primary and recurrent pterygia. *Ophthalmology* 2001;108:449–460.
2. Shimazaki J, Shinozaki N, Tsubota K. Transplantation of amniotic membrane and limbal autograft for patients with recurrent pterygium associated with symblepharon. *Br J Ophthalmol* 1998;82:235–240.
3. Solomon A, Espana EM, Tseng SCG. Amniotic membrane transplantation for reconstruction of the conjunctival fornices. *Ophthalmology* 2003;110:93–100.
4. Scott WE, Martin-Casals A, Jackson OB. Adjustable sutures in strabismus surgery. *J Pediatr Ophthalmol* 1977;14:71–75.

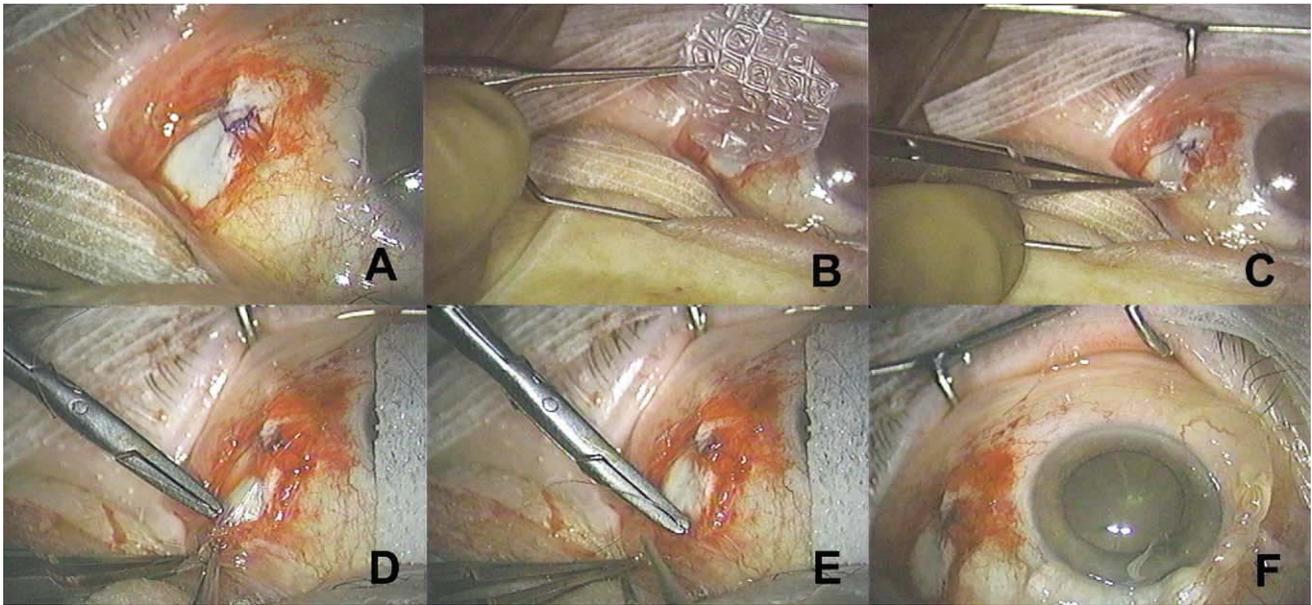


FIGURE 1. The technique of AMT is demonstrated in Case #1. A. The initial area of conjunctival dehiscence exposing bare sclera and the 6 0 Vicryl sutures. B. Amniotic membrane with a size larger than the initial defect is prepared and the stromal side is identified. C. The amniotic membrane is placed over the area of defect with the stromal side down and is allowed to be rehydrated. D. The amniotic membrane is sutured in an edge-edge fashion to conjunctival edges. E. The amniotic membrane is attached to conjunctiva with multiple interrupted sutures. F. AMT is completed following subconjunctival antibiotic and steroid injection into the nasal quadrant.

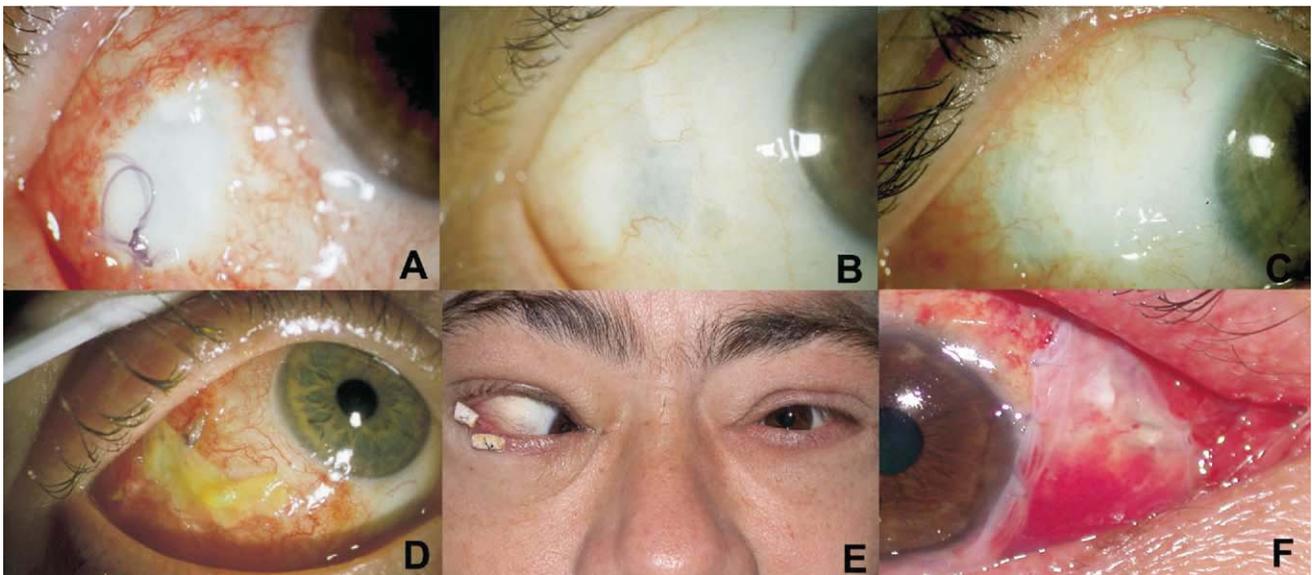


FIGURE 2. Anterior segment photos of Cases #1–4. A. The appearance of the amniotic membrane graft two weeks after AMT procedure in Case #1. B. The appearance of the temporal quadrant of Case #1 at final follow-up 7 months after the AMT revealing a completely healed conjunctiva. C. The temporal conjunctiva of Case #2, 6 months after the AMT, demonstrating completely reepithelialized conjunctiva. D. Temporal conjunctiva of Case #3 demonstrating edge-edge attachment of amniotic membrane to the conjunctiva. E. Preoperative large-angle ET and severe restriction of abduction in Case #4. F. The amniotic membrane graft after being fashioned over the nasal sclera in Case #4.