Mooren's ulcer

Treatment by conjunctival excision

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Mooren's ulcer is a chronic, painful ulceration of unknown aetiology beginning in the corneal periphery and progressing relentlessly, first circumferentially and then centrally, to involve the entire cornea. Many different forms of therapy have been proposed—for example, debridement and cauterization, conjunctival flap procedure, peripheral or total lamellar grafts, etc. However, healing after these techniques has not been consistently successful although it has occasionally been so. Consequently, treatment of Mooren's ulcer has generally been considered unsuccessful. The results of various types of surgical treatment of nine patients with Mooren's ulcer were reported by Wood and Kaufman (1971). The eyes of four patients healed. The authors suggested that there are two types of Mooren's ulcer, progressive and non-progressive. The progressive type is usually bilateral and does not heal regardless of treatment, while the non-progressive is usually unilateral and heals after conjunctival flap procedure or lamellar keratoplasty.

Finally, Aviel (1972) reported that four cases of progressive Mooren's ulcer healed after peritomy and repeated freezing of the cornea in the area of the ulcer.

The paper presents the results of excision of limbal conjunctiva in eyes with progressive Mooren's ulcers.

Patients

PATIENT 1

A 64-year-old black woman developed in 1970 a peripheral corneal ulcer in the left eye that slowly deepened and progressed peripherally (Fig. 1). Treatment with antibiotics, corticosteroids, a soft contact lens, subconjunctival injections of heparin, and topical applications of CaEDTA and cysteine did not appear to alter the progress of the ulcer. She was treated with a 10 mm lamellar graft which ulcerated and almost com-

pletely disappeared. She was referred to the author and the ulcerated cornea was covered with a conjunctival flap. Four days postoperatively, the conjunctival flap and the underlying cornea perforated with extrusion of the crystalline lens and a large quantity of vitreous. The perforation was repaired with a total corneal graft with a 3 mm rim of sclera. The excised host tissues were saved for the comparison study. The graft healed and the corrected visual acuity one year after surgery was 20/400.

In February 1972, this patient complained of a foreign body sensation in her right eye and a discrete peripheral ulcer was noted between 1 and 3 o'clock in the periphery of the right cornea (Fig. 2). The eye was treated with topical antibiotics, epsilon amino caproic acid, CaEDTA 0.2M, and cysteine 0.3M. The ulcer rapidly progressed to encircle the cornea during the next 3 weeks and the epithelium of the central remaining cornea eroded (Fig. 3). During this period, the nasal half of the left cornea and its limbal sclera rapidly ulcerated resulting in a large descemetocoele in the superior half of the cornea that measured approximately 4 × 7 mm (Fig. 4). In order to assay the conjunctiva for proteolytic enzymes and to test for their inhibitors, the patient was asked for permission to remove the conjunctiva adjacent to the ulcers. Permission was granted and a 3 mm-wide ring of limbal conjunctiva was removed from both eyes. On the fifth postoperative day, both eyes immediately became free of discomfort and

FIG. 1. (Patient 1.) Left cornea with early Mooren's ulcer

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FIG. 2 (Patient 1.) Right cornea with early Mooren's ulcer

FIG. 3 Ulcer in Fig. 2 has progressed to involve 180° of corneal periphery. Ulcer progressed to involve all but 5 mm central corneal button

free of the conjunctival vascular dilatation. The conjunctival epithelium gradually grew in from the limbus to cover most of the descemetocoele in the left eye and the bed of the ulcer in the right eye (Fig. 5). This permitted the use of a corneal transplant of only 7.5 mm diameter when the remaining descemetocoele threatened to rupture. The corneal transplant rapidly healed and the patient attained a corrected visual acuity of 20/100 (Fig. 6).

In the right eye the conjunctival epithelium grew to the rim of the remaining central cornea but did not cover the de-epithelialized central cornea. The remaining cornea gradually eroded during the next 2 months, leaving a 5 mm central disc completely free of epithe-

lium. In July 1972, a descemetocoele was noted in the periphery of the right cornea. The conjunctiva surrounding the descemetocoele was excised. Conjunctival epithelium quickly covered the ulcer and the central cornea. The cornea remained healed for 5 months and in September 1972, a 7 × 9 mm oval penetrating corneal graft was performed. The graft has remained transparent. A cataract extraction was performed in May 1973 and the visual acuity in May 1974 was 20/100.

PATIENT 2

A 45-year-old black woman developed in 1967 a Mooren's ulcer in the left eye which progressed to en-

FIG. 4 Patient 1, left cornea. Large descemetocoele in total corneal graft

FIG. 5 Patient 1, left cornea. After conjunctival resection the regrowing conjunctiva covered much of descemetocoele

circle the cornea despite treatment with corticosteroids and antibiotics. In January 1970 this eye was treated with a corneal transplant which ulcerated in the second postoperative week. In the second month after surgery, the cornea was covered with a total conjunctival flap. Two months postoperatively the flap and the underlying cornea ulcerated. She was referred to the author and a narrow piece of conjunctiva surrounding and adjacent to the ulcer was removed. The ulcer began to heal immediately after the biopsy. Healing was complete in 3 weeks.

In December 1971 the patient experienced pain in the right eye and was found to have a small peripheral ulcer which slowly progressed to involve the cornea from 11 to 4 o'clock (Fig. 7). In addition, there were infiltrates and shallow ulcers approximately 1 mm from the limbus that almost completely encircled the cornea. The patient complained of constant excruciating pain. In February 1972, a 4-5 mm wide ring of limbus conjunctiva was excised. After 1 week, the conjunctival epithelium had regrown to the limbus. The eye appeared

FIG. 6 Patient 1, left cornea. Corneal transplant, 8 months postoperatively

FIG. 7 Patient 2, right cornea.
Relatively early Mooren's ulcer

FIG. 8 Patient 2, right cornea.
Healed cornea after seven recurrences of Mooren's ulcer

free of inflammation and her pain was relieved. Over the next $1\frac{1}{2}$ weeks, the conjunctival epithelium followed by superficial blood vessels covered the corneal ulcers. Two weeks later the patient returned with severe pain and another epithelial defect. When the stroma began to ulcerate, the patient was readmitted to the hospital and only the conjunctiva adjacent to the ulcer was excised. Within 3 days the eye was no longer inflamed and the conjunctival epithelium gradually grew over the ulcerated cornea which healed after 2 weeks. Again, the patient was discharged from the hospital but returned in 2 weeks with an epithelial defect and stromal infiltration in the previous ulcer bed. The conjunctiva was excised from the immediate area of the ulcer which epithelialized after 5 days.

Three additional episodes of epithelial erosions with minimal stromal infiltration occurred during the

first 2 months of 1972. All healed after excision of the conjunctiva surrounding the ulcerations. In one of these episodes the conjunctiva surrounding the ulcer was frozen repeatedly. This treatment appeared to stop the progress of the ulcer but there was no epithelial healing until the conjunctiva was removed. There was no recurrence of the Mooren's ulcer in this eye for the next 3 months and the corrected visual acuity was 20/80 (Fig. 8). A recurrence of the ulcer was complicated by a corneal abscess which was caused by *Staphylococcus aureus*. Antibiotic treatment eventually healed the infection but the cornea was opaque and vascularized.

PATIENT 3

A 60-year-old white man had a history of a painful Mooren's ulcer in the right eye that began in 1972. In

FIG. 9(a) *Mooren's ulcer of superior cornea before conjunctival excision*

FIG. 9(b) *Ulcer bed of cornea from 9a has epithelialized after conjunctival excision. Ulcer has remained healed*

spite of medical treatment and a ring lamellar graft the ulcer had progressed to the anterior four-fifths of the whole cornea.

In January 1974, he was examined at the Illinois Eye and Ear Infirmary and found to have Mooren's ulcer in the periphery of the superior half of the left

cornea. The ulcer deepened and a 2-3 mm wide piece of limbal conjunctiva adjacent to the ulcer was removed. The ulcer did not completely heal during the next 2 weeks and the patient was referred to the author who repeated the excision of the conjunctiva adjacent to the ulcer. After 5 days of patching there was no further

FIG. 10(a) *Right eye with Mooren's-type ulcer that encircles the cornea*

FIG. 10(b) *Left eye with Mooren's ulcer or ulcer associated with rheumatoid arthritis*

fluorescein staining of the ulcerated area. This cornea has remained healed for 4 months (Figs 9a, b).

PATIENT 4

A 56-year-old white woman, who had had rheumatoid arthritis for more than 5 years, was treated for at least a year with both gold injections and prednisone, 10 mg every other day. In January 1973, she complained of severe pain in both eyes and peripheral furrow ulcers were observed in both eyes. The eyes were treated with acetylcysteine and topical corticosteroids. The ulcers progressed (Figs 10a, b) and in May 1973 the conjunctiva adjacent to the ulcers in both eyes was excised. The ulcers in both eyes healed within 10 days and the pain was completely relieved (Figs 11a, b). There has been no recurrence of ulcerations in either eye.

PATIENT 5

A 56-year-old white woman had a history of Mooren's ulcer in the left eye in 1967 which had healed after debridement and trichloroacetic acid. In late 1973, the

ulcer, accompanied by severe pain and photophobia, recurred in the same eye but did not respond to debridement and trichloroacetic acid (Fig. 12). In January 1974, a ring of limbal conjunctiva was excised from this eye and the ulcer healed within 1 week. There have been no recurrences (Fig. 13).

PATIENT 6

A 62-year-old white man complained of pain in the left eye beginning in November 1973. This pain increased over the next few months and in February 1974, he was examined by his ophthalmologist who observed a peripheral ulcer involving about one-third of the circumference of the superior cornea. This ulcer progressed to involve approximately 200° of the circumference of the cornea (Fig. 14). On 8 May, a conjunctival excision was performed. Five days postoperatively the eye was free of pain and the epithelium had healed over the ulcer. The ulcer has remained healed for 4 months (Fig. 15) and the visual acuity has improved from 10/600 to 20/60.

PATIENT 7

A 74-year-old white woman, who was referred to the author, had a history of herpes zoster on the left side

FIG. 11(a) *Healed right cornea 7 months after conjunctival excision*

FIG. 11(b) *Healed left cornea 7 months after conjunctival excision*

FIG. 12 Patient 5, Mooren's ulcer of right cornea

FIG. 13 Healed Mooren's ulcer of eye in Fig. 12 1 month after conjunctival excision

of the face beginning in June 1973. Soon afterwards she developed a low-grade uveitis in the left eye, and 3 months later she complained of excruciating pain in both eyes and was found to have peripheral corneal ulcers in both eyes. The ulcers progressed to encircle the cornea. Conjunctival excision in both eyes was performed in May 1974. Postoperatively, the ulcers began to heal and the patient became free of pain, but healing stopped and the ulcers began to enlarge once more. Conjunctival excision was repeated twice more with similar results. Similarly, there was no improvement after two series of cryo applications to the ulcerated areas of both eyes. A ring lamellar graft was recently performed on the right eye.

Discussion

This study showed that excision of the limbal conjunctiva adjacent to progressing Mooren's and similar ulcers resulted in healing of the ulcers in eight of ten eyes treated. In one of the eight healed eyes, the ulcer repeatedly recurred, but repeated

conjunctival excision limited its progress to the periphery until a secondary infection caused a dense central corneal opacity. In the two eyes that did not heal, repeated conjunctival excision has reduced the severe pain and the size of the ulcers.

The healing time of the ulcers after conjunctival excision has been variable with complete healing taking from 5 days to 3 weeks. Patching the lids closed until healing was complete followed by hypertonic salt solutions seemed to aid and maintain healing. When conjunctival excision had to be repeated, the author found that sharp dissection

FIG. 14 Patient 6, Mooren's ulcer of left cornea

FIG. 15 Healed Mooren's ulcer 2 months after conjunctival excision

with a curved Vannas scissor facilitated the excision of the conjunctiva that was tightly stuck to the sclera.

It is difficult even to speculate on the reason why the ulcers healed after conjunctival excision. If the ulcerations were due to an autoimmune phenomenon where the cornea was the antigen and the limbal conjunctiva both housed the antibodies and produced cornea-destroying enzymes, removal of the conjunctiva could have interrupted the process and allowed healing to take place. The finding that most ulcers healed without recurrence while others recurred or did not heal is also difficult to explain. Perhaps, as Wood and Kaufman (1971) suggested, there is a severe form of Mooren's ulcer for which no treatment is successful and a relatively benign form which heals after a lamellar graft or conjunctival flap procedure. If the eight eyes that healed in the present study represent the benign form, then conjunctival excision is certainly much less formidable.

The present study may offer an explanation for

the reports of successful treatment of Mooren's ulcer by peritomy and freezing of the conjunctiva (Aviel, 1972)—that is, interrupting the attachment of the conjunctiva to the cornea and freeze-destroying the cells of the limbal conjunctiva. Freezing of the conjunctiva surrounding the ulcer was tried only for a recurrence in patients 2 and 6 of the present series. The progress of the ulcers stopped temporarily, but did not heal until the conjunctiva was excised.

Summary

Ten eyes with progressing Mooren's or similar ulcers were treated by excising a 3 to 4 mm ring of limbal conjunctiva adjacent to the ulcer. Eight eyes healed within 3 weeks. Seven of these eyes have remained healed, while one eye has had repeated ulcers which healed when re-treated with conjunctival excision.

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References

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