

Therapeutic keratoplasty in fungal corneal ulcers

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The incidence of fungal corneal ulcers is increasing with the widespread injudicious use of corticosteroids and antibiotics. The present communication reports the results of surgical treatment in serious cases of fungal keratitis in which medical treatment has been unsuccessful.

Material and methods

The patients were seen at the hospital clinics in the years 1964 to 1969. Their ages ranged from 4 to 70 years, more than half of them being over 40 years of age. The following types of fungus were seen:

<i>Aspergillus fumigatus</i>	8	} Total 17
<i>Fusarium</i>	2	
<i>Candida albicans</i>	5	
<i>Penicillium citrinum</i>	2	

Unfortunately most of the patients did not come to the clinic before massive hypopyon or perforation of the cornea had developed and surgery had to be attempted in order to save the eye.

PREOPERATIVE TREATMENT

In every case Hamycin eye drops (10,000 units/ml.) were instilled locally four times a day, and Hamycin tablets were given orally (one three times a day). In one case hourly gutt. amphotericin-B (1 mg./ml.) were also given.

OPERATIVE TECHNIQUES

Lamellar keratoplasty (Table I, overleaf)

This was carried out in seven cases in which there was no perforation of the cornea. The hypopyon was drained in only one case. The diameter of the grafts varied from 7 to 10 mm.

Penetrating keratoplasty (Table II, overleaf)

This was carried out in ten cases; in two the cornea was perforated and in eight the infected tissue could not be totally replaced by a lamellar graft. The diameter of the grafts varied from 7 to 11 mm. The technique of cutting the grafts and suturing was that described by Malik and Singh (1971).

POSTOPERATIVE TREATMENT

Daily dressings were carried out with Hamycin eyedrops and atropine eye ointment for 21 days. Sutures were removed on the 21st postoperative day.

Table I Results of lamellar keratoplasty in seven cases of fungal ulcer followed by penetrating keratoplasty in four cases

Case No.	Age (yrs)	Sex	Fungus	Graft	Size (mm.)	Visual acuity		Status of infection	Graft		
						Preoperative	Post-operative		Trans-parent	Semi-trans-parent	Opaque
1	45	M	<i>Aspergillus</i>	Lamellar Lamellar Evisceration	8 × 0.45 9 × 0.5	PL accurate	PL	Not controlled Not controlled	—	—	—
2	50	M	<i>Candida albicans</i>	Lamellar	9 × 0.5	PL accurate	6/18	Controlled	Yes (Fig. 1)	—	—
3	38	F	<i>Aspergillus</i>	Lamellar	7	PL faulty	No PL	Not controlled	—	—	—
4	50	M	<i>Aspergillus</i>	Lamellar Lamellar Penetrating Evisceration	8 × 0.45 9 × 0.5 10	PL faulty CF	CF PL	Not controlled Not controlled Not controlled	— — —	— — —	— — —
5	70	M	<i>Candida albicans</i>	Lamellar Penetrating	8 9	PL CF 1 m.	PL CF	Not controlled Controlled	—	—	Yes
6	38	F	<i>Aspergillus</i>	Lamellar Penetrating	9 10	PL CF 1 m.	PL CF	Not controlled Controlled	Yes	—	—
7	22	M	<i>Candida albicans</i>	Lamellar Lamellar Penetrating	9 10 10	CF CF CF	CF CF 6/60	Not controlled Not controlled Controlled	— — Yes (Fig. 2)	— — —	— — —

Table II Penetrating keratoplasty in ten cases of fungal corneal ulcer as the primary procedure

Case no.	Age (yrs)	Sex	Type of ulcer	Fungus	Size of graft (mm.)	Visual acuity		Status of infection	Graft		
						Pre-operative	Post-operative		Trans-parent	Semi-trans-parent	Opaque
1	26	F	Hypopyon	<i>Aspergillus</i>	9	PL faulty	6/18	Controlled	Yes (Fig. 3)	—	—
2	4	F	Hypopyon	<i>Aspergillus</i>	7	PL faulty	HM	Controlled	—	—	Yes
3	45	M	Hypopyon	<i>Candida</i>	8-10	PL faulty	HM	Controlled	—	—	Opaque
4	28	M	Hypopyon	<i>Aspergillus</i>	8	PL faulty	6/60	Controlled	—	Yes	—
5	30	F	Hypopyon	<i>Aspergillus</i>	9	PL faulty	CF	Controlled	—	—	Opaque
6	52	M	Hypopyon	<i>Fusarium</i>	8	PL faulty	CF	Controlled	Yes	—	—
7	60	M	Hypopyon	<i>Fusarium</i>	9	PL faulty	PL	Yes	Clear	—	—
8	50	M	Hypopyon	<i>Penicillium</i>	8	PL faulty	HM	Yes	—	Yes	—
9	60	M	Hypopyon	<i>Candida</i>	11	PL faulty	6/60	Yes	—	Yes	—
10	40	F	Perforated corneal	<i>Penicillium</i>	9	PL accurate	CF	Yes	—	—	Opaque

Observations

A. LAMELLAR KERATOPLASTY (Table I)

Results

Of seven cases only one (Case 2) was controlled by this procedure with improvement in visual acuity (Fig. 1a, b). In three (Cases 5, 6, 7) the eye was saved structurally by a subsequent graft (Fig. 2a, b, c). In Case 1 the eye was lost through re-infection after a second lamellar graft. In Case 3 the eye remained blind. In Case 4 the eye was lost after a second lamellar graft and a subsequent penetrating graft.

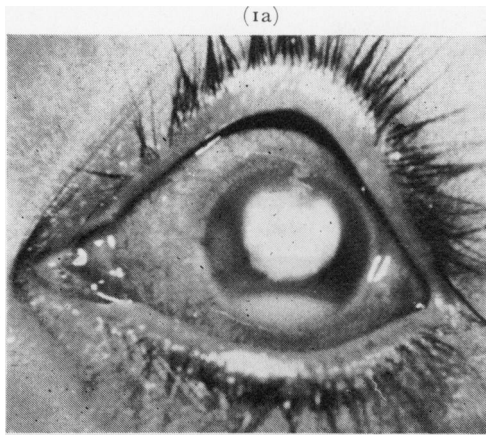


FIG. 1a Preoperative appearance of fungal hypopyon corneal ulcer (Case 2, Table I)

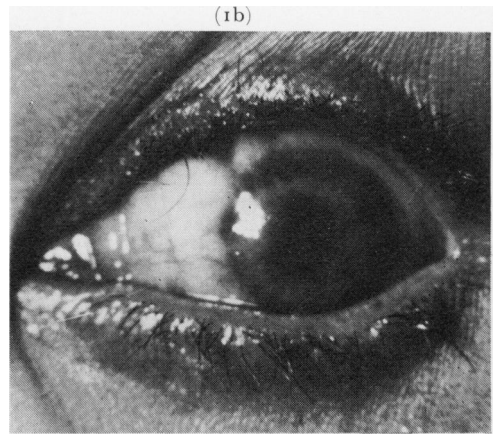


FIG. 1b Clear lamellar graft (Case 2, Table I)

Postoperative complications

Re-infection of the graft, which was seen in six cases, appeared after 48 hours in the form of small white dots in the bed of the graft (Fig. 2b). These dots increased in number and size in the next few days with increase in hypopyon, but the eye was successfully treated with a penetrating graft (Fig. 2c).

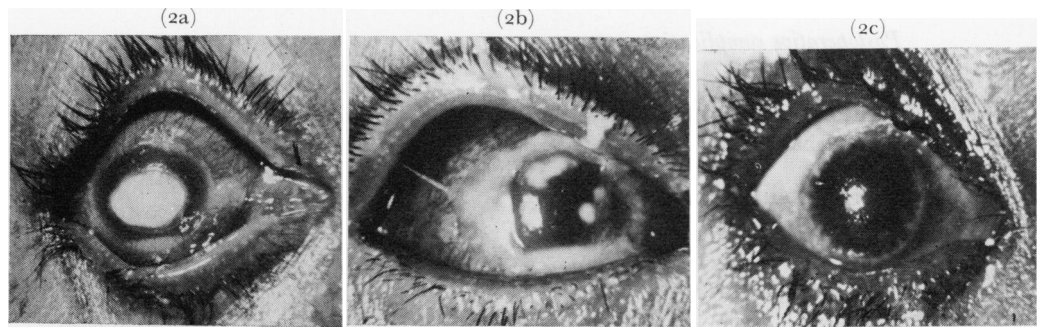


FIG. 2a Preoperative appearance of fungal ulcer (Case 7, Table I)

FIG. 2b Fungal infection in graft bed. Dots appear on third day after lamellar keratoplasty (Case 7, Table I)

FIG. 2c Successful penetrating graft (Case 7, Table I)

In each of these severe cases the cornea looked transparent after the operation and remained so for at least 48 hours. Some of these patients had visual improvement at the first postoperative dressing after 24 hours, but six of them became re-infected (Table I). The initial clarity of the graft is a deceptive sign in such cases compared with cases of pyogenic ulcer, in which once clarity is achieved the chance of re-infection is very rare (Malik and Singh, 1971). The re-infection is probably due to the fact that the fungus can penetrate the intact Descemet's membrane (Kaufman and Wood, 1965). Of the six re-infected cases, one eye was lost after a second lamellar graft, and in four others a penetrating keratoplasty was carried out as a second procedure. Three of these eyes were saved, but one was lost.

B. PENETRATING KERATOPLASTY AS A PRIMARY PROCEDURE (Table II)

Results

Nine out of ten eyes were saved structurally with control of infection (Fig. 3a, b, c). Visual acuity improved to 6/18 in one case (Case 1) and to 6/60 in two cases (Cases 4 and 9).

In three cases the graft became opaque, but the infection was controlled.

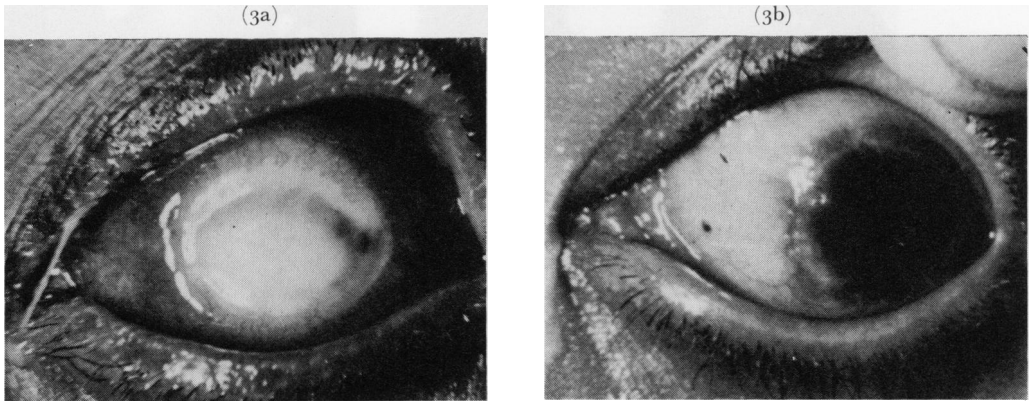


FIG. 3a Preoperative appearance of perforated fungal ulcer (Case 1, Table II)

FIG. 3b Clear penetrating graft (Case 1, Table II)

Postoperative complications

IRITIS (4 cases)

Controlled by a subconjunctival injection of mydracaine and other nonspecific treatment, *e.g.* oxyphenbutazone.

EPITHELIAL ULCERS (6 cases)

Controlled by medical treatment.

ANTERIOR SYNECHIAE (4 cases)

Anterior synechiotomy was successfully carried out in the 3rd postoperative week.

INFECTION (1 case)

Successfully controlled by regrafting on the 4th postoperative day (Case 3), but the graft became opaque.

Although all but one of these eyes were saved structurally, a visual acuity of 6/60 or more was achieved in only three cases. In the remaining seven cases the eyes were fit enough for subsequent regrafting in an attempt to improve the vision.

Discussion

Anderson, Roberts, Gonzales, and Chick (1959), Kaufman and Wood (1965), and Barrios (1965) were also of the opinion that lamellar keratoplasty was not a procedure of choice in fungal ulcers as it led to delay in treatment with resultant loss of the eye, though Leigh (1966) has stated that lamellar keratoplasty may be carried out in cases which have failed to respond to medical treatment. Sanders (1970) obtained good improvement in

visual acuity with penetrating grafts in three out of fifteen cases of fungal corneal ulcer. In the remaining twelve cases infection was controlled, but they were unfit for subsequent re-grafting because of secondary complications.

Summary

Keratoplasty was carried out in seventeen cases of fungal keratitis and the following conclusions were drawn:

- (1) Penetrating keratoplasty is the procedure of choice; this controls the infection and improves the visual acuity.
- (2) Lamellar grafting invariably fails, because the fungus is able to penetrate Descemet's membrane.

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