Penetrating keratoplasty in trachomatous patients

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Several authors have reported conflicting long-term results of penetrating keratoplasty in trachomatous eyes. For, example, Kamel (1965) blamed his poor results on the trachomatous vascularization of the host cornea. Forster and Fine (1971) placed trachomatous eyes in the unfavourable prognostic group. Moreover, Dhanda (1963) and Dhanda and Kalevar (1963), enumerated several disadvantages in operating on trachomatous eyes;

- (1) Premature falling out of stitches.
- (2) More frequent graft ulcers.
- (3) A superficial tissue more friable for suturing.
- (4) Vascularized grafts carrying more immunological materials and so a large incidence of graft disease.

On the other hand, Biswell (1969) reported excellent results in trachomatous eyes. Blumenthal (1968) reported 46.4 per cent. success in trachomatous eyes and Mueller, O'Neil, and Trevor Roper (1967) had equally good results in trachomatous and non-trachomatous eyes.

The purpose of this report is to compare the results of penetrating keratoplasty in sixteen trachomatous and fourteen non-trachomatous eyes which were followed up adequately for at least 6 months after discharge from hospital.

Materials and methods

The charts of patients who had penetrating keratoplasty for optical purposes were reviewed, and those which had enough information on the preoperative corneal condition and at least 6 months follow-up were included. Thirty charts fulfilled these criteria.

Sixteen patients had healed trachoma; none had active trachoma or xerosis at the time of surgery. Entropion and trichiasis when present were surgically corrected before the corneal surgery. Fourteen patients had no evidence of trachoma.

The patients' ages ranged from 13 to 64 years (mean 28). There were twenty males and ten females. Table I (overleaf) shows the corneal conditions for which keratoplasty was undertaken.

The preoperative visual acuity was as a rule very poor. Table II (overleaf) shows the visual acuity of trachomatous and non-trachomatous eyes.

All the surgery was performed at the American University of Beirut Medical Center. Donor material was obtained through the courtesy of the International Eye Bank of Washington, D.C., and surgery was performed within 50 to 70 hours after death. As there is no eye bank in Lebanon, donor material was obtained locally in only a few cases. Most of the grafts had a diameter of 6 to 7 mm.; one was 5 mm., three 8 mm. and one 9 mm. Surgical approximation was by interrupted direct sutures of 6-0 or 7-0 silk. Few early cases had overlying sutures.

Table I *Corneal conditions for which keratoplasty was performed in the thirty eyes.*

<i>Preoperative diagnosis</i>	<i>Trachoma</i>	<i>No trachoma</i>
Keratoconus	4	5
Familial corneal dystrophy	—	2
Leucoma adherens following ulcer perforation	2	3
Leucoma following herpes simplex	2	2
Leucoma following bacterial ulcer	4	1
Interstitial keratitis	1	—
Leucoma following trachoma	2	—
Alkali burn	1	1
Total	16	14

Table II *Preoperative visual acuity in trichomatous and non-trichomatous eyes.*

<i>Preoperative visual acuity</i>	<i>Trachoma</i>	<i>No trachoma</i>
Hand motion (HM)	2	—
Counting fingers (CF) 1/2 m–5 m	14	12
6/60	—	2
Total	16	14

Results

CLARITY OF THE GRAFT:

The effect of trachoma on the clarity of the graft is shown in Table III. Taking the two groups as a whole, we find that six out of sixteen trichomatous eyes had a clear graft (37.5 per cent.), compared to nine out of the fourteen non-trichomatous eyes (64 per cent.). This difference is not statistically significant ($P=0.157$).

Table III *Effect of trachoma on the clarity of the graft.*

<i>Preoperative diagnosis</i>	<i>Trachoma</i>			<i>No trachoma</i>		
	<i>Clear</i>	<i>Nebulae</i>	<i>Oedematous</i>	<i>Clear</i>	<i>Nebulae</i>	<i>Oedematous</i>
<i>Clarity of graft</i>						
Keratoconus	4	—	—	4	—	1
Hereditary corneal dystrophy	—	—	—	2	—	—
Leucoma adherens following perforating ulcer	—	—	2	1	1	1
Leucoma following herpes simplex keratitis	1	1	—	1	1	—
Leucoma following bacterial ulcer	1	2	1	1	—	—
Interstitial keratitis	—	1	—	—	—	—
Leucoma following trachoma	—	—	2	—	—	—
Alkali burn	—	—	1	—	—	1
Total	6	4	6	9	2	3

On the other hand, if the trichomatous and non-trichomatous eyes were divided into three prognostic groups as suggested by Forster and Fine (1971), where Group I has a favourable prognosis, Group II moderately favourable, and Group III unfavourable, it becomes obvious that trachoma has no adverse effect on the clarity of the graft (Table IV).

Table IV *Effect of trachoma on the clarity of the graft in all the eyes arranged in three prognostic groups.*

Preoperative prognostic groups	Trachoma				No trachoma			
	No. of eyes	Clarity of the graft			No. of eyes	Clarity of the graft		
		Clear	Nebulae	Opaque		Clear	Nebulae	Opaque
Group I	4	4	—	—	7	6	—	1
II	9	2	4	3	6	3	2	1
III	3	—	—	3	1	—	—	1
Total	16	6	4	6	14	9	2	3

Group I: Keratoconus and hereditary corneal dystrophy

Group II: Leucoma adherens, leucoma following herpes simplex and bacterial ulcers, and interstitial keratitis

Group III: Severe trachoma and alkali burn

POSTOPERATIVE VISUAL ACUITY

The postoperative visual acuity for both groups is shown in Table V. Six out of sixteen trachomatous eyes achieved vision of 6/6 to 6/60 (37.5 per cent.) and nine out of fourteen nontrachomatous eyes achieved this vision (64 per cent.); the difference is not statistically significant ($P=0.157$). Moreover, if only the keratoconus cases are taken, this uniform group shows no effect of trachoma on the postoperative visual acuity (Table VI).

Table V *Postoperative vision in whole group*

Visual acuity	6/6-6/15	6/20-6/60	CF		HM-PL	No PL	Total
			6 m.-3 m.	3 m.-2 m.			
Trachoma	3	3		4	5	1	16
No trachoma	6	3	1	3	1		14

CF = counting fingers. HM = hand movements. PL = perception of light.

Table VI *Postoperative vision in keratoconus cases*

Visual acuity	6/6-6/15	6/20-6/60	CF		HM-PL	No PL	Total
			6 m.-3 m.	2 m.-1/2 m.			
Trachoma	3	1					4
No trachoma	4				1		5

The effect of the extent of the corneal vascularization on the postoperative visual acuity in both groups is shown in Table VII. These findings confirm the well-established fact (Roberts, 1950; Paton, 1955) that corneal vascularization, especially when deep, exerts a deleterious effect on the clarity of the graft and therefore on the visual acuity.

POST-OPERATIVE COMPLICATIONS

Table VIII summarizes the postoperative complications encountered in the two groups. It is clear from this Table that the incidence of complications is not affected by the presence or absence of trachoma.

Table VII *Postoperative vision and vascularization of host cornea*

Visual acuity		6/6-6/15	6/20-6/60	CF		HM-PL	No PL	Total
				6 m.-3 m.	2 m.-1/2 m.			
No vascularization	Trachoma	2	2		1			5
	No trachoma	6	1	1		1		9
Superficial vascularization	Trachoma	1	1		1	2		5
	No trachoma		1		2			3
Deep vascularization	Trachoma				2	3	1	6
	No trachoma		1		1			2
Total		9	6	1	7	6	1	30

Table VIII *Postoperative complications.*

Trachoma	Case no.	Wound gape	Anterior synechiae	Glaucoma	Retrocorneal membrane
Present	1		+	+	
	2		+		
	3			+	
	4	+		+	
	5	+	+	+	
	6		+	+	
	7		+		
Total		2	5	5	
Absent	1		+		
	2	+			+
	3	+			
	4	+	+		+
	5	+			
	6	+	+	+	
Total		5	3	1	2

Discussion

Although this review suffers from the small number of cases in the two groups, certain conclusions can be drawn from this study:

- (i) Trachoma has no adverse effect on the postoperative clarity of the graft.
- (ii) Trachoma has no significant deleterious effect on the postoperative visual acuity.
- (iii) However, vascularization of the host cornea, no matter what the cause, especially deep vascularization, is well known to affect adversely the visual prognosis after keratoplasty.

Our findings are in agreement with those of Mueller and others (1967) who reported that vision improved to at least 6/60 in fifteen out of 26 of their trachoma patients (58 per cent.) and quoted fifteen out of 35 (43 per cent.) for Paufigue and Charleux (1964) and six out of 22 (27 per cent.) for Dhanda (1963).

Finally, one must point out that several authors have advised a lamellar graft as a preparation for penetrating keratoplasty, because the "trophic function" of the lamellar graft improves the condition of the host cornea and its "barrier effect" prevents vascular invasion (Paton, 1955). In our series, three penetrating keratoplasties in trachomatous eyes were performed following a lamellar graft and all had a poor outcome. Biswell (1959) remarked that all the corneal buttons removed from trachomatous eyes revealed vascularity of all the layers when examined histopathologically, and he therefore saw no

advantage in preparatory lamellar grafts, a conclusion which our experience supports.

Summary

Thirty eyes had penetrating keratoplasty for various corneal conditions. Sixteen of them had healed trachoma without other complicating sequelae. It was shown that trachoma *per se* did not have any deleterious effect on the clarity of the graft or on the visual outcome; nor did it increase the incidence of complications.

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