

9 MM. PENETRATING KERATOPLASTY FOR TOTAL ANTERIOR STAPHYLOMATA

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The total 10 mm. penetrating homogenous corneal grafts is the surgery of choice for cases of total anterior staphylomata with visual acuity hand movement, good projection and normal ocular tension. The results of this operation are usually bad (Arruga 1952, Sourdille 1955, Stallard 1965 and others) and the graft usually becomes opaque because:

- 1) The graft is large and may necrose or become ectatic (Friede 1950).
- 2) The incision is at the limbus with the possibility of obliteration of limbal vessels and scarring in the angle of anterior chamber resulting in secondary glaucoma.
- 3) Superficial and deep vessels may invade the graft from the normally vascular limbus.
- 4) As in anterior staphyloma, the lens is usually cataractous and nearly all the iris is adherent to the pseudocornea, removal of the lens almost always gives rise to vitreous loss. This occurs especially in younger patients with an intact hyalocapsular ligament. Presence of vitreous in contact with the graft corneal endothelium usually leads to opacification of the graft.

Aiming at a large penetrating keratoplasty not reaching the limbus, the following 10 cases of total anterior staphylomata were operated upon using the 9 mm. homogenous grafts. Follow up for 3 years showed the percentage of graft clarity and visual results for such an operation.

Case reports.

In the following 10 cases of total anterior staphylomata the patients had perfect general health. There were no septic foci in their bodies. Blood pressure was 120/90. Urine was free of albumin and sugar. Faeces was negative for parasites. Blood Wassermann reaction was negative. Total and differential blood count did not reveal any abnormal changes.

Most of the cases had one shrunken globe and the other eye had a total anterior staphyloma of more than one year duration. These staphylomata occurred after perforation of corneal ulcers due to acute ophthalmias. Lids and conjunctivae were normal. Conjunctival cultures were negative for organisms.

The eye affected with the anterior staphyloma had visual acuity of hand movement with good projection and perception of colours. Digital examination showed normal intra ocular pressure. Eyes were free of any extra or intra-ocular inflammation.

The donor eyes were specially selected for such a major operation. The donor corneae were fresh, viable, non-oedematous, and transparent. Flourescein stain showed an intact epithelium. The donor corneae were taken from eyes removed within 10 hours of death. Donors were adults free of syphilis, tuberculosis, diabetes, fever, cancer, disease of long terminal phase and any infective disease. After their removal the donor eyes were placed for one hour dipped in a 10 cc. solution of sterile normal saline containing 200,000 units of penicillin sodium and 0.5 gm. of dihydro-streptomycin at a temperature of $+4^{\circ}$ c.

Operative technique.

Half an hour before the operation the patients received sedatives and antihistaminic drugs. The operations were done under local anaesthesia, pantocaine 2% drops, O'Brien's akinesia, and retrobulbar novocaine with hyaluronidase. Traction sutures of Number one white silk were inserted into the tendons of the four recti and clamped to the head towel. 9 mm. corneal trephine was applied to cut the scarred ectatic cornea leaving one millimeter of cornea all around. When perforation of scarred cornea occurred, the rest of incompletely cut corneal incision was cut by corneal scissors. Not only the iris but also cataractous lens was found attached to the back of the 9 mm. scarred corneal disc. The iris attached to the scarred corneal disc was cut by iris scissors near its ciliary attachment all around. The scarred corneal disc was removed with its attached iris and cataractous lens. Slight fluid vitreous was seen seeping out of the wound.

PENETRATING KERATOPLASTY

The donor 9 mm. penetrating graft was cut and applied to its new bed. 16 interrupted border to border virgin silk sutures were used, each passing in superficial half thickness of edges of the graft and its bed. Normal saline was injected in the space between the cornea and vitreous.

Dressing was performed every other day. Sutures were removed on 15th day after the operation. The eyes were kept covered by glass goggles with side shelters for 6 months, not exposed to sun rays, air draughts or dust. Daily dressing with vitamin A and cortisone eye ointments were used.

TABLE SHOWING

Analysis of 10 cases of 9 mm. penetrating keratoplasties done for total anterior staphylococci with normal ocular tension and visual acuity had movement good projection.

Case n ^o	Age in (yrs) & sex	Side affected	Graft clarity after one month	Cause of graft opacity	Graft clarity after 3 yrs.	Corrected visual acuity
1	30 M.	R.	Clear (Fig. 1)		Clear (Fig. 2)	6/18
2	25 M.	L.	Clear		Clear (Fig. 3)	6/60
3	26 F.	R.	Clear		Clear	3/60
4	21 F.	R.	Clear		Clear	6/36
5	25 M.	R.	Clear		Clear	3/60
6	22 M.	L.	Opaque	Tension +	Opaque	H.M.
7	28 M.	L.	Opaque	Tension +	Opaque	H.M.
8	32 M.	R.	Opaque	Blood vessels invading graft.	Opaque	H.M.
9	30 M.	L.	Opaque	Blood vessels invading graft.	Opaque	H.M.
10	25 F.	L.	Opaque	Vitreous contact with endothelium.	Opaque	H.M.



Fig. 1 (case 1). 9 mm. penetrating keratoplasty done for right total anterior staphyloma in a male aged 30 years, showing the clear graft one month after the operation.



Fig. 2 (case 1). Right 9 mm. penetrating keratoplasty, showing the clear graft 3 years after the operation.



Fig. 3 (case 2). 9 mm. penetrating keratoplasty done for left total anterior staphyloma in a male aged 25 years, showing the clear graft 3 years after the operation.

Post operative glaucoma in cases 6 and 7 did not respond to cycloanaemization operation and the grafts remained opaque. Corneal graft vascularization in cases 8 and 9 were treated by B. rays 400 r once every week giving a total dose of 1200 r but the grafts remained opaque probably duo to vitreous contact with the graft endothelium. The latter cause was most probably also the cause of graft opacity in case 10 in which the ocular tension was normal and the graft was not invaded by vessels from the limbus.

DISCUSSION

Eyes with anterior staphylomata usually show post-inflammatory signs with a cataractous lens adherent to the vitreous. As the cataract is removed part of the fluid vitreous seeps out of the wound. To prevent or minimize vitreous loss in such cases, it is well to use retrobulbar hyaluronidase, general akinesia by curare, passing traction sutures N^o one white silk inserted into the tendons of the four recti and clamped to the head towel and Flieringa's ring sutured to the conjunctiva and episcleral tissues at eight sites.

It is advisable after removing the scarred staphylomatous cornea to sweep gently the iris repositor between the iris base and the peripheral corneal remnants. The tip of the repositor is inserted between the scleral spur and the ciliary body to achieve a circumferential cyclodialysis cutting the peripheral anterior synechiae and connecting the angle of anterior chamber with the supra-ciliary and supra-choroidal spaces, thus aiming at preventing post-operative glaucoma.

The diameter of the cornea average 11.7 mm. horizontally and 10.6 mm. vertically for males ,being slightly less 0.1 mm. in females. A diameter under 11.0 mm. or over 12.5 mm. is usually considered abnormal (microcornea or megalocornea) (Duke-Elder and Wybar 1961). In the 9 mm. penetrating corneal graft the cornea is cut one millimeter inside the limbus, thus avoiding injury of limbal vessels and angle of anterior chamber. This minimizes the incidence of post-operative glaucoma and graft vascularization giving graft opacity that usually occurs with the 10 mm. penetrating grafts.

The first five cases show that in some cases contact of fluid vitreous with the graft endothelium does not give rise to graft opacity.

SUMMARY

1) 10 cases of total anterior staphylomata with visual acuity hand movement good projection and normal ocular tension were operated upon using the 9 mm. homogenous penetrating keratoplasty. 3 years follow up showed that in 50% of the cases the graft remained clear with great improvement in visual acuity.

2) For such cases the 9 mm. corneal graft gives better results than those reported in literature after use of the 10 mm. graft. In 9 mm. graft the incision does not reach the limbus with less incidence of post-operative glaucoma and vascularization of the graft.

3) Contact of fluid vitreous with corneal graft endothelium does not always give rise to graft opacity.

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