RETRANSPLANTATION OF THE CORNEA

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A corneal retransplantation is a transplant of the cornea following a previous unsuccessful transplant. It has been found that when a corneal transplantation has failed it was possible to obtain a subsequent clear transplantation—even if it requires several attempts. The following is the first report of a successful retransplantation of the cornea in Singapore.

CASE REPORT

A.R., 28/M, was first seen at the General Hospital in 1964 with a history of gradual loss of vision for 15 years. At the time of examination he was blind and could only count fingers at 1 metre. He had no other ocular complaints. In the last 5 years the vision was so poor that he had difficulty finding his way around and was unemployed as he could not perform his usual duties.

Examination showed that he was suffering from heredo-familial macular corneal dystrophy of both eyes. The dystrophy affected the full thickness of both cornea with a diffuse haze between irregular white dots of varying sizes especially marked at the centre where they were confluent. These white dots had indistinct margins which merged into the general haziness of the cornea.

The corneal opacity extended almost to the limbal region although at the extreme periphery especially above and below, the cornea was relatively clear. There was no vascularization or signs of inflammation. The corneal sensation was diminished. There was no family history of similar illness.

Right Eye

It was decided that a full thickness graft should be done.

Accordingly, in April 1965, arrangements were made with the East Grinstead Eye Bank of England to send a pair of eyes with which a penetrating 5 mm. graft was done to his right eye on 11.4.65. Unfortunately, by the time the graft was used it was already 9 days old but the patient was prepared to accept the donor material as no other donor material was available.

The operation was successful anatomically and the immediate post-operative period was uneventful. However, from about the tenth day after the operation there was considerable uveal inflammation which subsided with intensive local and systemic steroid therapy. Unfortunately, the cornea did not clear and his vision did not improve (Fig. 1). Although he could see a little better in the temporal field he still could not carry out his usual work as a newsagent and remained legally blind. The eye remained essentially the same over the next 5 years.

Left Eye

In 1966, the Ceylon International Eye Bank sent a pair of eyes and his left eye was successfully transplanted, restoring normal vision to the eye (Lim and Tan, 1967).

Right Eye

In August 1969, an eye was removed for an intraocular tumour and the patient agreed to have a regraft to his right eye.

PROCEDURE

The operation was done under local anaesthesia with sedation. He was given phenergan 25 mgms. and largactil 25 mgms. an hour before surgery. Just before surgery he was given 50 mgms. of pethidine intravenously. One hour before surgery, he was given tetracaine 0·5% every 5 minutes and at operation he was given facial akinesia and retrobulbar anaesthesia with 2·0% lignocaine and adrenalin.

The procedure of surgery was as follows:—

1. The lids were retracted with 5/0 black silk.
2. The eye was fixed with 5/0 black silk sutures to the insertions of the superior and inferior recti.
3. The 7 mms. full thickness trephine was made and the disc was removed by completing the cut with corneal scissors over the inferior portion of the wound.
4. The posterior synechia and the fibrous tissue over the pupil found at surgery, were excised with Vanna's scissors under the microscope.

5. The donor cornea was inserted.
6. Virgin silk sutures were placed at 12, 6, 3 and 9 o'clock under magnification 10 with the operating microscope.
7. 12 other sutures were placed.
8. Air was injected into the anterior chamber.
9. Sub-conjunctival injection of framygen was given.
10. The eye was bandaged under slight pressure.

His post-operative management presented 2 problems. Firstly, there was considerable post-operative inflammation but this was rapidly controlled with oral steroids. Secondly, he developed post-operative vascularization in the second post-operative week.

By the third week it was noticed that the vascularization had invaded the deeper layers of the donor cornea at the inferior and nasal quadrants. This was observed to be growing rapidly especially inferiorly where it infiltrated inwards for 2 mms. Associated with these changes was the development of oedema of the cornea over the corresponding quadrants.

At this stage it was decided to arrange for beta-ray irradiation with Strontium 90. This was provided by the Radiotherapy Department of the Singapore Outram Road General Hospital. An ophthalmic applicator of Strontium 90 was applied and 2000 rads were given as a single dose.

In the ensuing days dramatic improvement took place. By the second post-irradiation day the vessels were found to appear much less "angry" and the eye considerably less congested. By the seventh post-irradiation day the vessels were shrunken. Gradually, over the next ten days the congestion entirely subsided and all the vessels in the cornea regressed.

On the 28th post-operative day his visual acuity with glasses was 6/9 and 3 months later (Fig. 2) his vision was 6/6 (normal).

COMMENT

Re-transplantation of the cornea has been done in different countries for many years. In general it may be said that the criteria for deciding to perform a retransplantation of the cornea is the same as if a previous corneal transplant had not been done. Thus, in the words of R. Castroviejo (1955) "When a keratoplasty has failed, it is still possible to obtain a clear graft with considerable restoration of vision after two, three, or even four attempts, provided that the patients have been adequately prepared, a suitable technique is used, and the eye has not developed complications incompatible with the preservation of transparency of the graft.

The field of retransplantation is wide and includes cases where a previous graft has failed unexpectedly and those cases in which repeated transplantation was expected and the earlier grafts may be considered to be preparatory in function.

There are a number of reasons which cause a graft to fail unexpectedly and these include:—

1. A poor choice of case.
2. Unsuitable donor material.
3. Inadequate surgical technique.
4. Unpredictable complications applicable to all transplants despite the above 3 being satisfactory.

The factors to consider in determining the size of the retransplantation is not different from that used in the first transplant. In cases where the opaque cornea is within a relatively clear and non-vascular cornea the decision is easy—for obviously the opaque graft should be removed with a trephine of similar or a larger size. Less commonly, the size used in retransplantation may be made within the confines of the original graft—this is usually in cases where the recipient cornea has remained vascular and the graft itself relatively avascular. In such cases the cicatrical junction between the graft and host of the original graft may act as a barrier against the ingrowth of vessels.

In cases of retrocorneal membranes where the membrane is observed to be continuous with the posterior surface of the cornea, the size of the retransplant should be larger to avoid the possibility of not removing the membrane completely.

Successful retransplantation after a cloudy penetrating graft has been done 5½ weeks after original operation but such early retransplants are unusual (Sanders, 1964). In general, it would be best to perform a retransplantation when the vascularization has been reduced and the eye quiet. It is for this reason that it would be best to delay a retransplantation until after a year.

In this case the opacity of the graft was very dense and the recipient cornea relatively healthy, thus it was decided that a larger (7 mm.) transplant be used.

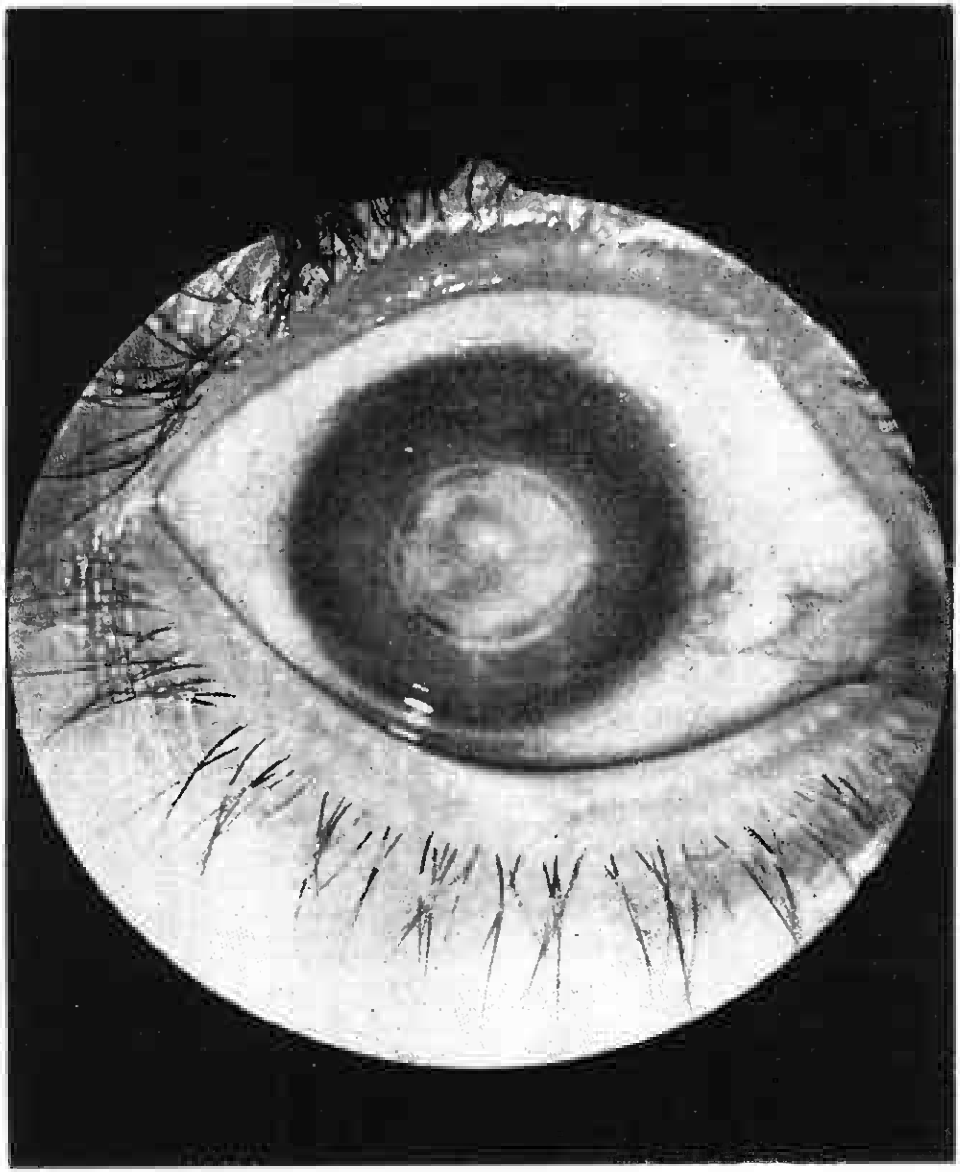

Fig. 1. Photograph showing an unsuccessful opaque 5 mm. graft in corneal macular dystrophy. Note the avascular and relatively clear recipient cornea.

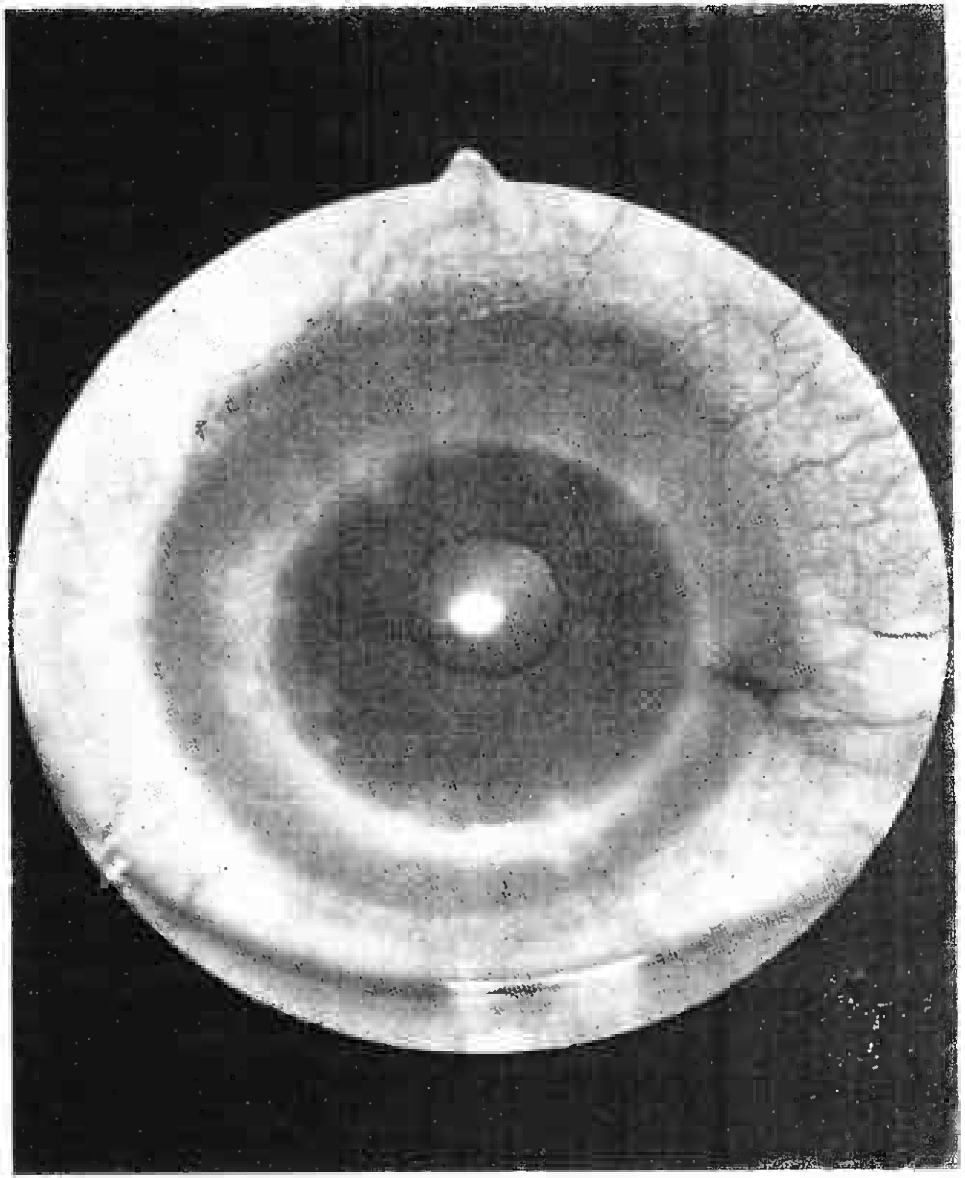

Fig. 2. Photograph of the same eye illustrates a clear 7 mm. penetrating corneal retransplantation resulting in 6/6 vision (normal) 3 months after surgery.

As it is with all transplantations, it was often necessary to diminish the immunogical reaction by intensive administration of steroids. It was significant that within a week of irradiation, the vessels "melted" away and the cornea cleared rapidly.

SUMMARY

1. The first successful case of retransplantation of the cornea done in Singapore is reported. Normal vision was restored.
2. Some problems of corneal retransplantation were discussed.

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