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TREATMENT OF PERFORATED CORNEAL ULCER, BY AUTOPLASTIC SCLERAL TRANSPLANTATION*†

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THE method generally used in trying to close a persistent corneal defect is either that of covering it with conjunctiva which has been detached in some way, or that of corneal grafting. In cases where the defect lies outside the optic zone, and optical considerations do not arise, a conjunctivoplasty would seem to be the current method, and is in fact successful in most cases. If, however, transparency is aimed at, transplantation of cornea has lately been used with ever increasing frequency.

In the literature at my disposal I have found no account of attempts to close a persistent corneal defect or fistula by transplantation of sclera taken from the patient's own eye. Such an attempt will be described here.

The patient, a seven year old girl, M.E. 977/45, had previously been healthy. In July, 1945, a left-sided exophthalmus occurred, and as the X-ray examination showed a decalcification of the left wing of the sphenoid the doctor in charge of the case suspected a tumour with intracranial extension. The patient was, therefore, sent to the neuro-surgical clinic of the Serafimer Hospital in Stockholm. A copy of the patient's case history has been placed at our disposal.

The following data were recorded on admittance on September 14, 1945:

Vision R.E. 5/5, L.E. 5/10.

The right eye showed no symptoms of abnormality.

The left eye protruded considerably. Hertel's exophthalmometer showed 13 mm. for the right eye and 19 mm. for the left eye, *i.e.*, an exophthalmos of 6 mm.

* Received for publication, July 23, 1947.

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Papilloedema with about 4D. protrusion in the left fundus.

The X-ray showed a decalcification in the rear and lateral wall of the left orbit, which was probably due to atrophy caused by pressure. For this reason an orbital tumour was assumed.

The patient was operated on September 21 (Prof. Olivecrona), and a cavernous angioma was removed after unroofing the orbit. The histopathological examination revealed a cavernous haemangioma. On the following day the patient became unconscious and had Jacksonian fits. As a haematoma was suspected, the bone flap was lifted and a medium-sized extradural haematoma was removed.

Ptosis, protrusion of the left eye, and failure of the eyelid to cover the lower part of the cornea were recorded during the post-operative course. An ulcer appeared in the lower part of the cornea. In other respects progress was favourable, and the patient was discharged on October 5, 1945, to be treated further by an eye-specialist in her home region.

The patient's lagophthalmic keratitis did not, however, heal. A descemetocele appeared, which was cauterized and covered by a conjunctival flap. The operation, repeated no less than three times, was unsuccessful. The wound grew larger, nutritive impairment was suspected, and on December 28, 1945, the patient was sent to the ophthalmological clinic at Lund.

We recorded the following data :

Vision R.E.=1 (\pm 0). L.E.=0.2; no improvement with glasses. Right eye normal.

Left eye: A slight ptosis. The eye turned slightly downwards and outwards indicating par sis of the IIIrd nerve. The eye did not protrude. Intense injection (as a result of all the earlier operative measures). In the lower part of the cornea a few mm. from the limbus, a descemetocele somewhat larger than the head of a pin, was discovered and close to this the cornea was a muddy grey. The eye was otherwise free from irritation, and there were no signs of iritis. Ophthalmoscopically the eye was normal. Reduced sensibility of the cornea could not definitely be established.

The patient was operated on on January 12, 1946. A conjunctival flap was dissected downwards, during which process the bulbus became rather soft owing to leakage from the corneal defect. This, however, only slightly impeded the operation. The sclera near to the insertion of the external rectus was exposed and a scleral disc was punched out near the lower border of the rectus tendon by means of a 2.5 mm. trephine. This was lifted up without damaging the choroid. The corneal

hole was manipulated in order to obtain a circular defect, a good 2 mm. in diameter and as clean cut as possible. The scleral disc was then easily fitted into the hole, whereupon the conjunctival flap was drawn over the graft and sutured. A double bandage was applied.

The post-operative course was without complications: no irritation at all; the anterior chamber was soon regenerated.

January 26, 1946; no irritation. The conjunctival flap still remained and covered a large part of the cornea. Through the flap the white scleral disc could be seen in position. No fistula. The patient was discharged.

March 7, 1946; no irritation. Through the translucent conjunctival flap, which now covered only the lower part of the cornea, the transplanted white scleral disc was still seen to fill up the former defect. The corneal surface was completely smooth. The pupil was round, but nasally and downwardly the iris had probably healed a little to the inner side of the cornea. No fistula. Tension, 22 mm. Hg. Vision=0.5 (+1.0 D.Sph.+2.0 D.Cyl. 180°). A slight ptosis still persisted, together with a slight deviation, downwards and outwards, of the bulbus.

Discussion

The corneal affection communicated here was undoubtedly a lagophthalmic keratitis, since it arose in connection with a post-operative inability to close the eye. It is, of course, impossible to decide whether impaired circulatory and nutritive conditions—caused by the operative measures—contributed towards the genesis of the corneal injury. There were, however, no grounds for assuming neuroparalytic keratitis.

The ulcerative corneal process advanced, and as no less than four attempts had been made by others to cover the wound and cause it to heal by means of common cauterization and conjunctivoplasty, I thought a plastic operation of a different kind was indicated. Because of the comparatively peripheral site of the ulcer, the graft did not need to be transparent and therefore optical considerations could be disregarded. As a result of the wide experience of scleral trephining I had gained from my earlier operations for detachment of the retina, I was attracted by the idea of trying to close the corneal defect by means of a scleral disc punched out of the same eye. The operation here described in detail did not present any difficulties, and its course was entirely favourable. The method might well be remembered in cases of corneal ulcer or fistula where other more simple methods do not lead to the desired result.

Summary

In connection with an operation for retrobulbar haemangioma, a seven year old girl got a lagophthalmic corneal ulcer which developed into a descemetocoele. Four attempts elsewhere to close the ulcer with a conjunctival flap did not lead to the desired result. The wound got larger, and there was danger of perforation. A scleral disc was punched out of the same eye and transplanted into the wound, after the edges of the latter had been excised. The graft was covered with conjunctiva. The result was good: the transplant fitted in comfortably, the ulcer closed, and vision was comparatively good.

ANNOTATION

Sir Charles Sherrington, O.M., F.R.S.

Sir Charles Sherrington celebrated his ninetieth birthday on November 27 last. When we remember that some of his experiments on ocular movements and visual phenomena provided the most crucial evidence for great discoveries, it is a fitting and altogether congenial duty that ophthalmologists should add their quota to the paean of praise. His investigations of muscle spindles and the afferent nerve fibres from extrinsic eye muscles initiated his study of proprioceptive nerves; and this in turn led to the discovery of the physiological substrata of posture as fully elaborated by him and by his pupil Magnus. It was, too, from conjugate movements of the eye, induced by stimulation of the frontal ocular motor area, that he obtained some of the strongest evidence of the inhibition of antagonistic muscles, thus again opening up a vast new conception of active processes other than mere excitation occurring in motor phenomena.

Pure mathematicians are always anxious to obtain the neatest and most "beautiful" solution of a problem. Sherrington's experiments on binocular vision belong to this category. They prove the absence of simple summation of the responses from the two eyes; but the philosophical meaning goes far beyond so simple a fact. They show that "for each eye the sensorium carries elaboration of sub-perceptual and perceptual vision to a considerable pitch of mental completeness without marked collaboration between the visual processes of the two eyes."

Of even more far-reaching importance were his experiments on cortical motor areas, which broke down the jejune idea of mere anatomical representation of muscular action in the cortex cerebri, and so "first within the brain discerned the meaning of its ordered