Silicone rubber in defects of the conjunctiva

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The material commonly used today for filling up conjunctival defects is obtained from the buccal mucosa or the skin. The taking of these grafts has some drawbacks, such as scarring and tenderness of the areas from which the flaps have to be excised. Skin grafts into the conjunctival sac have also many well-known cosmetic disadvantages. The use of silicone rubber has many advantages, such as good tolerance by living tissue, adaptability and smoothness. Silicone rubber does not interfere with the exchange of gases, and it allows a normal metabolism in the underlying tissues. Bowen and Dyer (1962) used silicone rubber grafts in muscle lengthening procedures in cases of squint. They observed in experimental investigations that the implanted graft was quickly covered by a thin sheet of connective tissue, with cells similar to endothelial cells on the surface adjacent to the silicone. Morales, Polack, and Arata (1966), in similar experiments, found good tolerance of this material in man, and showed by microscopical examinations that the surface of the silicone implant was covered by a thin sheet of connective tissue. Agnew, Todd, Richmond, and Chronister (1962) pointed out that silicone rubber implanted into the peritoneum, subcutaneous tissue, and brain of experimental animals provoked only a slight tissue reaction and was encapsulated by connective tissue, which did not adhere to the implant. The formation of a connective tissue capsule around the implant is also confirmed by the observations of Leininger, Mirkovitch, Peters, and Hawke (1964). In comparison with the capsule formed after the implantation of Teflon, nylon, malar, and polyethylene, the capsule in cases of silicone implant is thinner and the tissue reaction the least.

The case described below shows how a silicone rubber graft may be used in large post-operative defects of the conjunctiva.

Case report

A 29-year-old male was referred to the Ophthalmic Department in 1966 for enucleation of the left eye. For the previous 3 years this eye had been blind, but the patient had been unwilling to have it removed. In 1964 he had observed a small, dark nodule situated in the upper temporal quadrant of the left eyeball; it was enlarging quickly so that 2 years later it appeared in the palpebral fissure. The patient was not severely ill, and the family history did not reveal any relevant details.

Examination His general health was good. The right eye was normal with visual acuity 6/6.

The left lids were normal, but in the palpebral fissure there was a greyish-brown tumour the size of a cherry, of uneven, cauliflower-like, surface covered by a fibrous capsule. It was heavily vascularized. A thick, short peduncle connected it with the sclera in the region of the ciliary body at 2 o'clock. Small clumps of pigment were scattered in the hyperaemic conjunctiva close to the

tumour (Fig. 1); the upper and temporal part of the cornea was covered by the tumour, and through the remaining transparent part of the cornea a greyish-brown, partly atrophic iris and a cataractous lens could be seen (Fig. 2). The eye was very hard and blind.

FIG. 1 Front view of the patient's eyes when looking down

FIG. 2 Protruding mass of tumour seen from the side

Laboratory findings did not reveal any abnormalities. A scintigram of the liver showed normal tissue. The eye had to be removed either by enucleation or by orbital evisceration, but the patient would not consent to the latter.

Surgery The chief surgical problem was to replace a vast area of the bulbar conjunctiva, since the whole upper and temporal sectors extending up into the fornix had to be excised.

An oval flap of silicone rubber, 20 by 15 mm. approx. was fixed by four plain catgut mattress sutures near the fornix at the beginning of the procedure. After the enucleation had been completed six more mattress sutures were added, fixing the lower and medial conjunctival wound lips so that the border of the silicone flap was kept underneath the conjunctiva. A plastic ball was inserted into the conjunctival sac and a pressure dressing maintained for 3 days.

Result Postoperative oedema of the lids persisted for nearly a week. One week after surgery the borders of the silicone flap were in full apposition with the neighbouring conjunctiva, and in following days a well-vascularized conjunctiva began to encroach on the flap. Four weeks after surgery the implant was already covered by a smooth, well-vascularized conjunctival sheath, except for a small area below. Three months after surgery the protruding corner of the silicone flap was grasped by forceps and slipped out. After 18 months follow-up there was nothing abnormal in the appearance and behaviour of the conjunctiva in comparison with a normal one as seen after enucleation in other patients (Fig. 3).

FIG. 3 Conjunctival sac 3 months after surgery

Discussion

Experimental and clinical investigations point to a steadily increasing role of silicone materials in ophthalmology. In the case presented a silicone rubber graft was used as substitute material and as a framework for the mucosa to grow over. It was then easily removed after the new tissue had filled up the defect. The silicone rubber is so smooth that the connective tissue fibres cannot grow into it, but form a capsule over it covering the defect with new tissue. The cosmetic results are nearly perfect, and much better than those obtained with a graft from the buccal mucosa.

Summary

The use of silicone rubber as a substitute material in an extensive conjunctival defect is described. New tissue grew over the silicone implant which was later removed leaving normal conjunctiva.

References

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