Magnetic orbital implants

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SUMMARY Sixty-six consecutive cases undergoing enucleation with the insertion of the Roper-Hall magnetic implant at the Birmingham and Midland Eye Hospital (BMEH) were followed up to re-establish the rate of extrusion. It was possible to study the records of all 66 patients. An extrusion rate of 1.5% was found.

A number of implants have been designed with the intention of improving the cosmetic appearance after enucleation of the eye. Some were intended to improve the shape of the socket so that a prosthesis could be more satisfactorily fitted, others to give a more natural appearance by imparting movement to the prosthesis. These implants date from 1885, when Mules introduced a glass ball into the scleral cup and Frost a similar ball into Tenon's capsule. They did not provide the expected results. Inflammatory responses were common and the amount of movement imparted was disappointing.¹ Integrated, partly exposed implants were received with enthusiasm in the mid-1940s.^{2,3} They gave excellent movement, but their long-term results were unsatisfactory.⁴ We know of none which were retained. Experience with buried implants suggested that they were better retained but that mobility of the prosthesis was not so good.

In many reported series the follow-up period has been limited and there is a repeatedly stated opinion that no implant, buried or unburied, has given satisfactory results in the long term. Tyers and Collin⁵ state that buried implants give extrusion rates of less than 5%. They then go on to describe a 'baseball' implant, a sphere covered with donor sclera. They do not mention their extrusion rate but do advise suturing patches of donor sclera in cases of partial extrusion of their implant. Our experience has been more favourable with a buried hemispherical implant incorporating a magnet^{6,7} (Fig. 1).

After encouraging early results⁵ a late follow-up of a random group of 57 patients who had received these implants⁸ showed only one extrusion after a period of 7 years. Some of the patients had been followed up for 10 years. It was decided to continue to use the

same hemispherical implant, modified only by the incorporation of a magnet,⁷ for a prolonged period. This period has now reached 30 years.

The Roper-Hall magnetic implant is derived from the Allen implant and consists of a plastic hemisphere of 21 mm diameter with a flat anterior face into which a magnet is embedded. A ring of the same material stands forward of the face and has tunnels through which the 4 rectus muscles may be passed. Since its introduction in 1951 this design has afforded a satisfactory replacement of part of the lost volume of the globe. Because of its flat anterior surface and the attached muscles, movement is imparted to an overlying prosthesis with considerable cosmetic advantage. More horizontal than vertical movement is usually seen, and this can be increased in all directions if a corresponding magnet is placed in the

Fig. 1 The Roper-Hall magnetic orbital implant (courtesy of Rayner Intraocular Lenses Ltd.).

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prosthesis.⁸ Unlike some of the partly exposed implants popularised earlier^{2,3} this implant does not have an extreme amplitude of movement, for it is limited to a 'conversational' range. In our experience a minimum of postoperative problems are seen if the implant is inserted properly, and extrusion is extremely rare.

Patients and methods

PATIENT SELECTION

The implant has been used as a routine at the time of implantation by most of the surgeons at BMEH during the past 30 years. Exceptions are made in certain cases. These include eyes with malignant melanoma or other intraocular neoplasm when extra-ocular extension is suspected on preoperative evaluation or at the time of surgery; the presence of frank infection of the globe or orbit; and aged and infirm patients, when the extra operative and anaesthetic time cannot be justified. The size of the implant allows its use in most children even though the orbit is small. In very small orbits an implant with a diameter of 19 mm is sometimes used.

SURGICAL METHOD

A standard enucleation is performed isolating the anterior 15 mm of the 4 recti and preplacing 5/0 plain collagen sutures at their ends. After enucleation these muscles are joined together, having been passed through the tunnels in the implant, forming a cross. The muscles are secured to each other by mattress sutures, and then the right-angled arms of the cross are joined by further sutures, so that the whole of the anterior face is covered. Tenon's capsule and conjunctiva are closed over the centre of this, so that the wound heals quickly over vascular tissue, and no part of the implant is exposed. Separate closure of Tenon's capsule helps to ensure complete tissue closure in front of the prosthesis. The conjunctiva may be closed separately with a purse-string suture. This may, with advantage, be nonabsorbable, to be removed when there is no risk of tissue separation. A prosthetic conformer is usually inserted at the first postoperative visit.

PRESENT STUDY

Sixty-six postenucleation implants were inserted between February 1977 and December 1980 by surgeons of all levels of experience. They were followed up at the BMEH until the postoperative healing was complete enough for prosthetic fittings and were then transferred to the Department of

Health and Social Security (DHSS) Prosthetic Centre in Birmingham, where their subsequent follow-up was arranged.

Results

In the 66 records of cases followed up only one case of extrusion was discovered. This indicates an extrusion rate of 1.5%, corresponding to the impression gained at the time of the previous reports⁶⁻⁸ and during the subsequent years.

Discussion

During 1981 the DHSS prosthetic centre saw 233 old and new patients from the BMEH. They included enucleations without as well as with an implant. Only 9 cases of implant extrusion have been recorded at the centre since its establishment in 1961.

The facts that almost all of our patients requiring prostheses are fitted by the DHSS prosthetic centre, and that the agreed policy has been for them to refer any problems back to the hospital, lend validity to our claim of trouble-free retention.

CONCLUSION

The Roper-Hall magnetic implant has proved to be a safe and effective device to reconstitute orbital volume after enucleation and allow a cosmetic improvement by imparting movement to the prosthesis. If inserted correctly it has an acceptably low extrusion rate. Residual problems of lower lid droop and a deep upper lid sulcus remain common to this as well as other more recent orbital implants.

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