

THE VITREOUS IMPLANT

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INTRODUCTORY

That degenerative changes in the vitreous body play an important part in the etiology of simple detachment of the retina has been increasingly recognized during the past decade—thought, in reality, this is no new thought as it was first suggested by Leber as long ago as 1882 and later stressed by Gonin, Lindner and Von Sallman. Indeed, the development of the various forms of globe shortening operation has been due to a tacit understanding of the importance of vitreous detachment and contraction in the causation of retinal detachment, but it is to Dr. Donald Shafer of New York that we are indebted to this latest development in retinal detachment surgery—the planting of human vitreous in eyes affected with complicated retinal detachments.

TECHNIQUE

The doner eye is an enucleated human eye preferably removed within six hours of death. Immediately after removal the eye is placed in a penicillin streptomycin suspension in sterile liquid paraffin (500,000 units penicillin, 500,000 units streptomycin, 5,000 gm. sterile liquid paraffin), where it remains for two hours. Then, with all aseptic precautions, the eye is removed from its container, rinsed in Ringer's solution, and a culture taken from the limbus and bulbar conjunctiva, after which it is placed in a glass bottle containing sterile liquid paraffin and stored in a refrigerator at 4° C.

The recipient eye is prepared for the vitreous injection before any surface diathermy or other operative procedure has been undertaken by making a small vertical opening in the conjunctiva and Tenon's capsule 7 mm. behind the limbus in the infero-temporal quadrant just below the insertion of the external rectus. The exposed sclera is cleaned and a small incision some 3 mm. long, centred at 7 mm. behind the limbus and parallel to the meridian at that point, made with a

Graefe knife just down to the pars plana of the ciliary body. A mattress suture of 00 silk or plastic thread, doubly armed with Grieshaber 81/7 needles, is inserted across the small incision and the two threads in the base of the incision withdrawn with a scleral hook — the two loops so formed enable the assistant to separate the lips of the little wound at the time of the vitreous injection. The detachment operation, whether diathermy or scleral resection or a combination of both, is now proceeded with up to the stage of evacuation of the sub-retinal fluid.

The surgeon now changes over to a second trolley which contains the donor eye and a separate set of instruments. The cadaver eye is well rinsed in sterile normal saline so as to remove all paraffin globules and then held firmly in a large gauze swab in the left hand. The sclera is cleaned at a point some 14 mm. behind the limbus and between any two recti. A cautery at dull red heat now makes an opening at this site, circular in shape, about 3 mm. in diameter and shelving more deeply towards its centre, the cautery being applied intermittently until the choroid and retina are just perforated (Fig. 1). The opening should be just sufficient

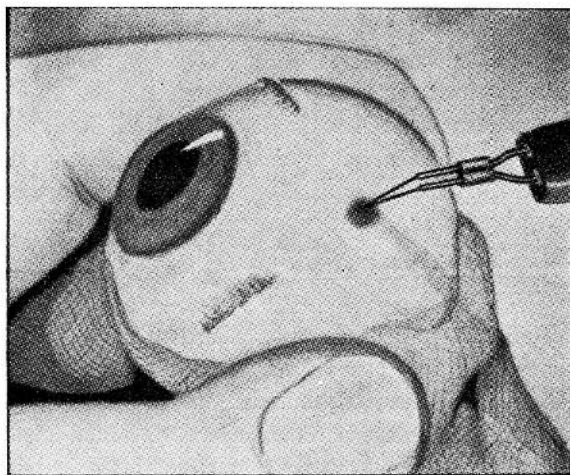


Fig. 1. Cautery opening into donor eye.

size to accommodate the nozzle of a 2 c.c. record syringe which is now applied to the opening and with firm pressure on the globe with the left hand and suction on the plunger of the syringe with the right as much as 2 cc. of vitreous can be aspirated (Fig. 2). A special needle of 18 British Standard Gauge has been made to my design by C. Davis Keeler which has the advantage of not only a sharp point but of a cutting edge on each side of this, so that it slips easily through the small incision in the recipient's eye, and also a stop 12 mm. there from so that the needle cannot be inserted too far (Fig. 3). This is now placed on the nozzle of the syringe and the surgeon returns to the recipient eye to make provision for

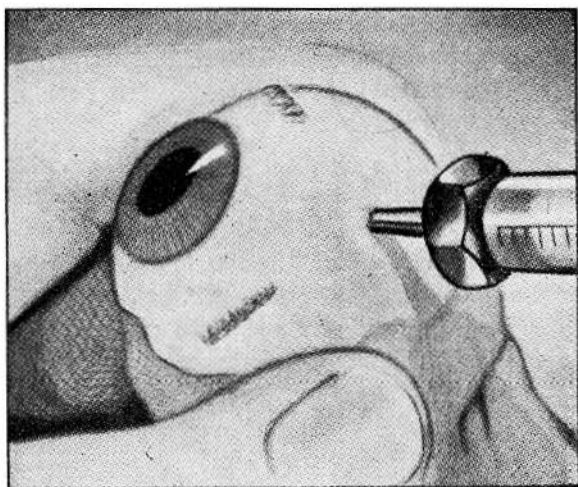


Fig. 2. Aspiration of vitreous from donor eye.

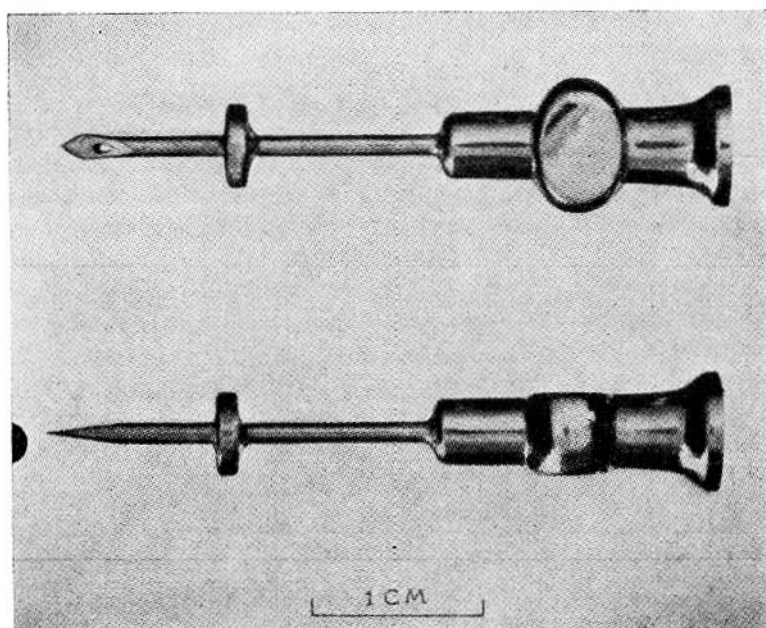


Fig. 3. Vitreous implant needle (Shapland).

the evacuation of the sub-retinal fluid — this I do with a catholysis current of 2 ma., and a 0.5 mm. diameter needle over the site where the main bulk of the sub-retinal fluid is lying. It is very important that there should be an obvious free of sub-retinal fluid before the vitreous is injected.

The vitreous aspirate is now planted into the recipient eye by inserting the 18 gauge needle through the little opening previously made in the sclera and directing it towards the centre of the globe. The eye being soft at this stage the lower lip of the incision is supported by the assistant making traction on the lower loop of the mattress suture whilst the surgeon supports the upper lip with a pair of Jayles forceps (Fig. 4). The vitreous is slowly injected until the eye becomes quite firm and a gush of sub-retinal fluid can usually be seen escaping from the site of the catholysis puncture. The needle is held in situ while the assistant releases the loop of the mattress suture and makes one half of a surgeon's knot — this he then ties off tightly as the surgeon withdraws the needle.

It is of interest to note that if the donor eye be now opened a much more compact vitreous remains in the anterior portion of the globe and if the nozzle of the 2 cc. record syringe is applied to this it will not become aspirated into the syringe on making suction but will adhere to the nozzle and it, together with the retina and sometimes the lens as well, can all be withdrawn from the eye on the nozzle of the syringe.

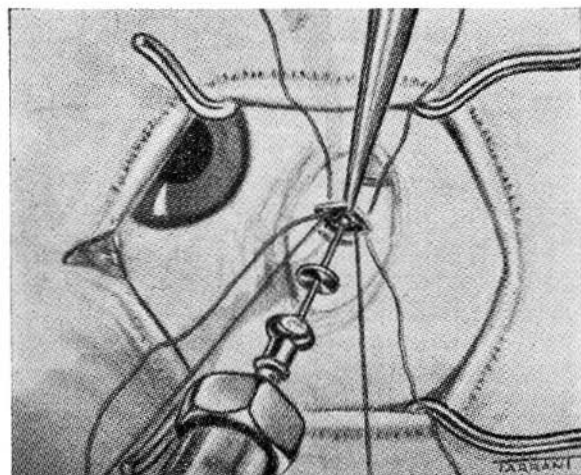


Fig. 4. Injection of vitreous into recipient eye.

RESULTS

Between August 13th, 1956 and June 11th, 1959 I have performed a vitreous implant on 34 cases, 27 males and 7 females. Half of these (17) were myopic

detachments, 9 aphakic detachments whilst the remaining 8 occurred in emmetropic of hypermetropic eyes, these latter mainly traumatic of inflammatory detachments. Twenty of these cases were blind in the fellow eye from previous retinal detachments and were therefore to be regarded as desperate cases, and, indeed, I usually only employ the vitreous implant as a last resort after more orthodox detachment surgery — diathermy or lamellar scleral resection has failed. I have, however, often combined the vitreous implant with other surgical procedures at the same session — 8 times with diathermy, 6 with a lamellar sclerectomy, on 3 occasions with light coagulation, twice with catholysis punctures over the hole and once with an embedded polyethylene tube. I have now employed multiple vitreous implants in 5 cases — 5 in one, 3 in a second and 2 in the remaining three, making a total of 43 implants to date.

It is important that the donor eye should be quite fresh — excised not longer than 24 hours. In two cases in which I used vitreous from eyes which had been kept for four days — both of them were early cases my first and fourth and each after receiving second injections reacted violently — a panophthalmitis occurring in the first and a low grade endophthalmitis in the second. At that time it was not clear whether this was an infective or allergic process but both responded to intensive local and systemic antibiotic therapy, so presumably were infective. In Barcelona last September Shafer assured me that he had seen no allergic reactions with subsequent vitreous implants and I have since employed multiple implants on 3 further cases — one receiving 5, one 3 and the third 2 with no untoward reactions, but in all these the donor material was under 24 hours old.

In taking the vitreous aspirate from the donor eye I now employ the vitreous implant needle instead of applying the nozzle of the record syringe to the globe as originally described — the needle is inserted towards the centre of the globe through an elliptical area at the equator sterilised by a cautery at dull red heat — it is unusual to obtain more than 2 cc. of vitreous aspirate and I use the same needle for the injection into to the recipient eye so as to avoid losing any of the aspirate.

Complications of this procedure have been few — and, apart from the two cases of endophthalmitis, not serious. There were three cases of secondary glaucoma and all occurred in aphakics, one lasted from the time of the implant for 3 weeks but eventually responded to diamox and pilocarpine, in the remaining two the raised tension appeared on the fourth day in one and on the sixth day in the other and both responded to diamox 250 mmg. four hourly within 3 days. Curiously enough two of these three cases were cured so a fleeting secondary glaucoma is certainly not of bad import.

With regard to results 6 of the 34 cases were cured — 3 of the 9 aphakic detachments, 2 of the 13 myopic detachments and one of the inflammatory detachments in a hypermetrope. Although a temporary improvement in a retinal detachment is frequently seen following a vitreous implant it is rarely maintained for long unless the retina is completely replaced and although a further six cases do appear to have derived some permanent benefit from this procedure — one aphakic, 2 myopic and 3 detachments in emmetropic eyes, the rest must be classed as failures.

In my experience the type of case which does best with vitreous implant is a sub-total detachment in which no definite unsealed retinal hole can be found, indeed, one in which a collection of sub-retinal fluid appears to be trapped and has failed to become absorbed. At the time of the vitreous implant it is most important to puncture over the approximate centre of this loculus and to be sure of a free flow of sub-retinal fluid before injecting the vitreous aspirate.

In conclusion the vitreous implant would appear to have a small but definite place in the treatment of the more serious cases of retinal detachment — myopic and aphakic detachments which have not responded to orthodox surgery, and also it is worth trying in those with vitreous traction bands. In my experience to date it is, rather, surprisingly, the aphakic detachments which have responded the best.

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