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# Internal retinal biopsy: Surgical technique and results

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**Abstract**

I have performed an internal retinal biopsy on fourteen patients. The technique involves the use of vitrectomy instrumentation endodiathermy, endolaser and vitreous scissors to remove a 1–2 $mm^2$ area of the diseased retina. Endolaser photocoagulation and air-fluid exchange with and without the use of silicone oil conclude the surgery. No significant postoperative complication has been noted in patients undergoing this procedure.

## Introduction

Diagnosis and management of numerous degenerative and inflammatory disorders of the cornea and retina have been hampered by the lack of availability of tissue to diagnoses these disorders. The technique of external biopsy as described previously by Peyman [3, 4, 5] has been useful but is seldom used by other investigators [1, 2]. Encouraged by our experimental and clinical result of retinochoriodectomy ab interno [6–9], we developed a modification to remove retinal biopsy during vitrectomy in a variety of cases requiring intravitreous surgery.

## Surgical technique

Three pars plana sclerotomies are prepared and an infusion cannula is placed. A complete pars plana vitrectomy is performed as the case requires. An encircling endodiathermy is applied around the area to be biopsied from the retina (Fig. 1A). A square portion of the retina to be biopsied is incised with the use of vitreous scissors (Fig. 1B & C) and removed with vitreous biopsy forceps. Endolaser diathermy is applied around and inside the area which has been biopsied (Fig. 1D). If the retina was previously detached, air-fluid exchange, epiretinal membrane dissection, and other procedures as indicated are performed to re-attach the retina. Silicone oil implantation and scleral buckling procedure was done if indicated by the primary condition but was not necessary if biopsy alone has been performed.

## Results

Retinal biopsy was performed on fourteen patients who underwent pars plana vitrectomy for various causes, the majority of them having proliferative vitreoretinopathy or diabetes or retinitis (Table 1). Retinal tissue of sufficient quality and quantity for histopathology and immunochemical analysis was obtained in all cases. A typical specimen is shown in Fig. 2. Intra-operative complications were limited to minimal hemorrhage from the biopsy site. This was easily controlled with the use of intracellu-

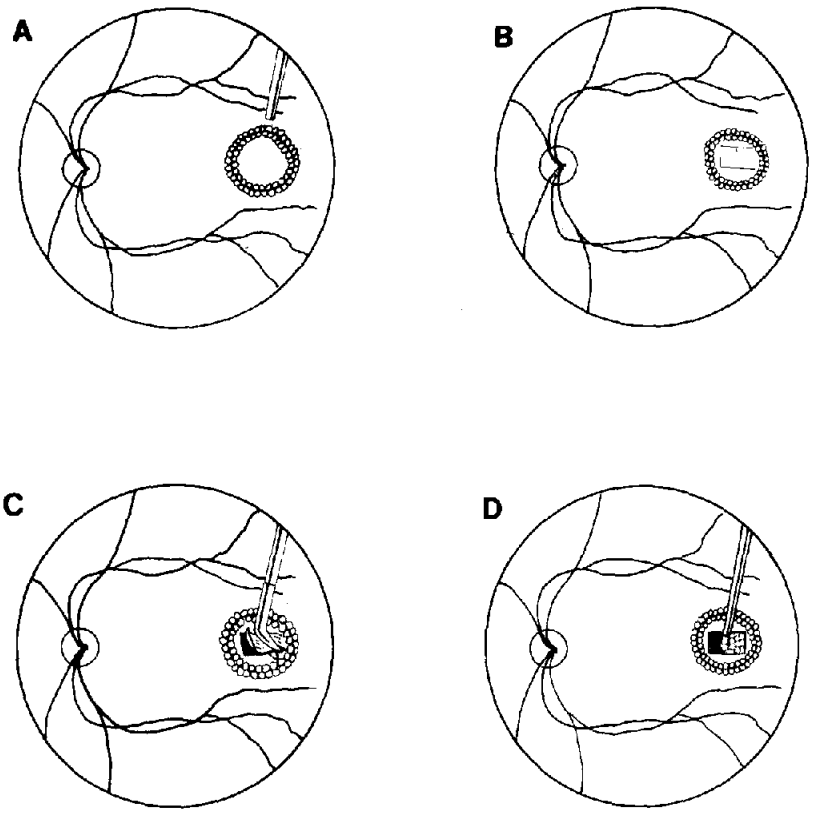


*Fig. 1.* Technique of retinal biopsy; the retina is attached or surgically reattached prior to biopsy. (A) After a complete vitrectomy, two rows of diathermy or laser coagulation are applied around a $1^1/_2$ DD area of the retina. (B) A retinal flap is dissected using vitreous scissors. (C) The specimen is cut and separated completely from its attachment and removed with forceps. (D) Endolaser coagulation is applied to the bed and border of the biopsy site.

lar diathermy. In all cases, retinal re-attachment was achieved and there was no significant postoperative complications. The final visual acuity of these patients was unrelated to the biopsy procedure (Table 1).

## Discussion

Internal retinal biopsy was developed as a continuation of our previously described internal approach to chorioretinal lesions located close to the optic nerve [6–9]. The majority of the patients who underwent this procedure needed pars plana vitrectomy, membrane dissection and the re-attachment of the retina for the previous underlying retinal disorders. These included diabetic traction detachment, proliferative vitreoretinopathy and retinitis. The internal retinal biopsy procedure was approved by the Committee of Research Associates and patient consent was obtained in all cases prior to surgery. In our series of fourteen patients, no significant complications involving the biopsy site could be identified. Minimal intra-operative hemorrhage was observed during dissection of the retina which was controllable with the use of internal diathermy. Postoperatively there was no significant epiretinal membrane formation from the biopsy site to complicate the procedure. Biopsy specimen obtained were all sufficient for histopathological evaluation of the specimen. Although the series is small, the primary results are encouraging and warrant further evaluation. Internal retinal biopsy may provide an excellent opportunity to evaluate retinal changes in degenerative, metabolic and inflammatory with diseases of the retina.

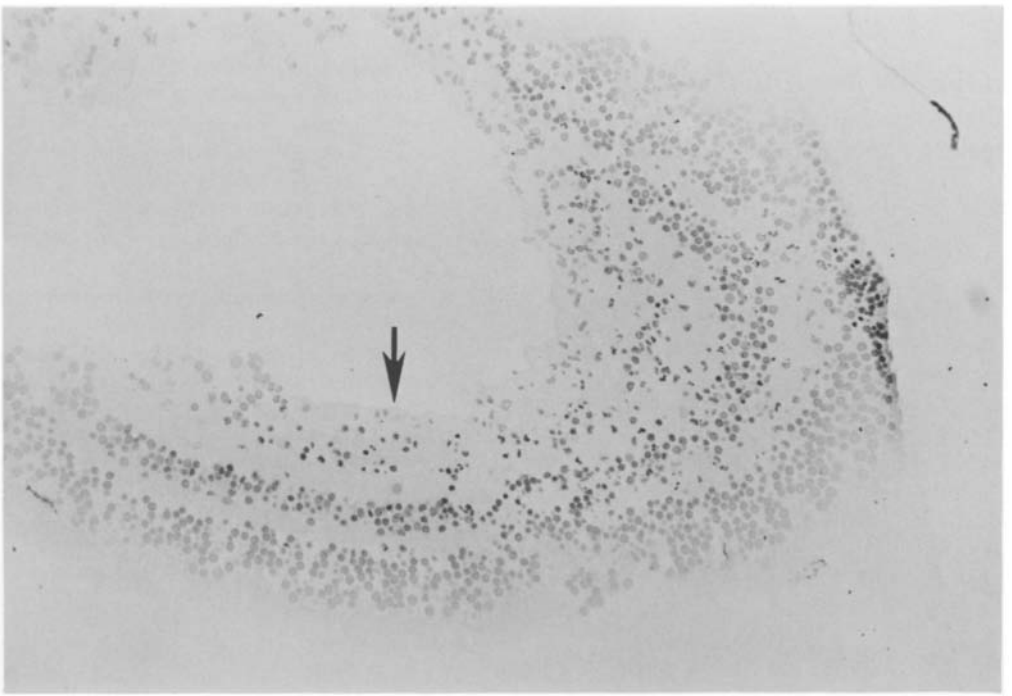

*Fig. 2.* Light microscopy of retinal biopsy specimen taken from a patient with retinitis. Note that retinal anatomy, in spite of a lymphocytic infiltration, is recognizable. Arrow indicate inner retina. (Toluidine blue, × 10).

*Table 1.* Retinal biopsies.

| Case | Age/Sex | Diagnosis | Pre-op VA | Surgery | Post-op VA | Follow-up (mos.) |
|---|---|---|---|---|---|---|
| 1 | 31 M | PDR | 20/200 | PPV,Mx,SB | 20/300 | 9 |
| 2 | 21 F | PDR | HM | PPV,Mx | 20/50 | 8 |
| 3 | 85 F | PDR | HM 2′ | PPV,Mx,SB | LP-HM | 7 |
| 4 | 31 M | PDR | CF 2′ | PPV,Mx,SB | CF 4′ | 7 |
| 5 | 73 M | RD-D3 | LP | PPV,Mx,SB | LP | 6 |
| 6 | 24 M | RD-D3 | LP | PPV,Mx,SB silicone | LP | 5 |
| 7 | 57 M | RD-C3 | HM 2′ | PPV,Mx silicone | HM 4′ | 4 |
| 8 | 10 F | Giant tear | HM | PPV silicone | CF 5′ | 6 |
| 9 | 41 F | RD | HM 4′ | PPV,Mx silicone | CF 2′ | 7 |
| 10 | 39 M | Giant tear | HM 1′ | PPV,Mx silicone | 20/200 | 6 |
| 11 | 70 M | RD-D2 | LP | PPV,Mx silicone | HM 2′ | 7 |
| 12 | 53 F | Retinitis | LP | Retinal biopsy | LP | 7 |
| 13 | 51 F | PDR | CF | PPV,Mx | 20/200 | 8 |
| 14 | 50 M | RD-D2 cataract | LP | Cat Ext, PPV silicone | LP | 8 |

RD = retinal detachment.
PDR = proliferative diabetic retinopathy.
PPV = pars plana vitrectomy.
Mx = membranectomy.
SB = scleral buckle.

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