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# Surgical Outcomes in Juvenile Retinal Detachment

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**Purpose:** To evaluate retrospectively clinical features and surgical outcomes of rhegmatogenous retinal detachment in juvenile patients.

**Methods:** Between 1991 and 1996, 28 patients younger than 15 years of age with rhegmatogenous retinal detachment (32 eyes) underwent the first surgical procedure, scleral buckling and/or pars plana vitrectomy, at our hospital.

**Results:** The major types of juvenile detachment, in order of frequency, were idiopathic, familial exudative vitreoretinopathy, trauma, and high myopia. Proliferative vitreoretinopathy (PVR) of grade C or D was involved in 12 cases (37.5%). Among the 12 eyes with PVR, 7 attained retinal reattachment after the first surgery with scleral buckling. The overall reattachment rate was 28/32 (87.5%) after the first operation and 30/32 (93.8%) after the second operation.

**Conclusion:** These findings indicate that the reattachment rate and visual prognosis can be as good in juvenile retinal detachment as in adult cases, when appropriate surgical procedures are used. **Jpn J Ophthalmol 2001;45:409–411**

**Key Words:** Juvenile retinal detachment, proliferative vitreoretinopathy, surgical outcomes.

## Introduction

The clinical features of retinal detachment in children are quite different from those in adults because of the variety of underlying diseases, difficulty of early diagnosis due to poor subjective complaints, and rarity of patients.[1–3] We studied retrospectively the medical records of patients younger than 15 years old who had undergone surgical treatment for rhegmatogenous retinal detachment in our hospital.

## Materials and Methods

We conducted a retrospective study of 28 patients (32 eyes) younger than 15 years of age who had undergone the first operation for rhegmatogenous retinal detachment at Toho University Sakura Hospital between 1991 and 1996. Patients with retinopathy of prematurity and those with non-rhegmatogenous retinal detachment were excluded from this study. During this period, a total of 543 eyes with retinal detachment were operated on; juvenile retinal detachments accounted for approximately 5.9% of the retinal detachment surgeries. Among these 28 pediatric patients, who ranged in age from 6–15 years (mean = 12.8 years), 20 were boys (21 eyes) and 8 were girls (11 eyes). Follow-up period after surgery ranged from 6 months to 3 years (mean = 16.4 months). The grade of proliferative vitreoretinopathy (PVR) was evaluated based on the classification that was first published in 1983.[4]

## Results

Table 1 summarizes the cause of retinal detachment in the 28 pediatric patients. No specific etiology could be identified in 4 eyes with rhegmatogenous retinal detachment. The major groups, in order of frequency, were myopia greater than −4 D (12 eyes), ocular trauma (7 eyes), and familial exudative vitreoretinopathy (FEVR) (5 eyes). Among the 32 eyes, 12 had already developed PVR of grade C or D preoperatively. Subretinal fibrosis was observed in 9 of these 12 PVR eyes. Among the 5 eyes with FEVR, 3 had PVR of grade C.

Various types of retinal breaks were identified preoperatively and are summarized in Table 2. Round

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**Table 1.** Etiology of Retinal Detachment

| | Eyes* | PVR† | |
|---|---|---|---|
| | | − | + |
| Myopia | 12 (37.5) | 10 | 2 |
| Trauma | 7 (21.9) | 5 | 2 |
| FEVR‡ | 5 (15.6) | 2 | 3 |
| Idiopathic | 4 (12.5) | 1 | 3 |
| Aphakia | 3 (9.4) | 2 | 1 |
| Atopic dermatitis | 1 (3.1) | 0 | 1 |
| Total | 32 (100) | 20 | 12 |

*Values in parentheses are percentages.
PVR: proliferative vitreoretinopathy.
FEVR: familial exudative vitreoretinopathy.

**Table 3.** Surgical Results

| | PVR* | |
|---|---|---|
| | − | + |
| First operation | | |
| Scleral buckling | 17/18 | 7/7 |
| Pars plana vitrectomy | 2/2 | 2/5 |
| Second operation | | |
| Scleral buckling | 1/1 | 0/0 |
| Pars plana vitrectomy | 0/0 | 1/3 |
| Total | 20/20 | 10/12 |
| | (100) | (84.6) |

PVR: proliferative vitreoretinopathy. Values in parentheses are percentages.

holes in lattice degeneration were most frequently identified (13 eyes); however, 6 eyes had no visible retinal breaks preoperatively.

In the 20 eyes without PVR, 18 eyes had undergone scleral buckling surgery at the first operation. Of these, 17 attained anatomic reattachment and 1 required replacement of the scleral buckle. The 2 eyes without PVR had pars plana vitrectomy because of extensive posterior capsular opacity after previous cataract surgery, and reattachment was obtained. Among the eyes associated with PVR, in 2 eyes in which the detached retina formed a narrow funnel shape in the center of the vitreous cavity, successful anatomic reattachment could not be attained even by repeated pars plana vitrectomies. Seven eyes associated with PVR obtained successful retinal reattachment after a buckling procedure at the first surgery. These eyes all had relatively mild PVR (C1 or C2) and apparent, but small, breaks in the peripheral retina. Finally, anatomic reattachment of the retina was accomplished in 30 of the 32 eyes (93.8%). Figure 1 compares preoperative and postoperative visual acuity of the 32 eyes, which had an average follow-up of 16.4 months. Sixteen eyes had no change in postoperative visual acuity, and 16 eyes had an improved visual acuity of more than 2 Snellen lines. In 3/32 eyes (9.4%) postoperative visual acuity was less than 20/200; these patients all were younger than 12 years of age.

**Table 2.** Types of Retinal Breaks

| | Eyes* | PVR† | |
|---|---|---|---|
| | | − | + |
| Round holes in lattice degeneration | 13 (40.6) | 9 | 4 |
| Round holes | 4 (12.5) | 2 | 2 |
| Tears with lattice degeneration | 3 (9.4) | 3 | 0 |
| Giant tear | 2 (6.3) | 1 | 1 |
| Oral dialysis | 2 (6.3) | 2 | 0 |
| Tears of pars plana | 1 (3.1) | 1 | 0 |
| Tears of pars plicata | 1 (3.1) | 0 | 1 |
| Undetected | 6 (18.8) | 2 | 4 |

* Values in parentheses are percentages.
† PVR: proliferative vitreoretinopathy.

## Discussion

Trauma is reportedly one of the common causes of juvenile retinal detachment. The frequency of trauma was reported as 60% by Hudson,[5] 44% by Winslow and Tasman,[3] 42% by Hilton and Norton,[2] and 34.6% by Delage and Bonnet.[6] In our study, its

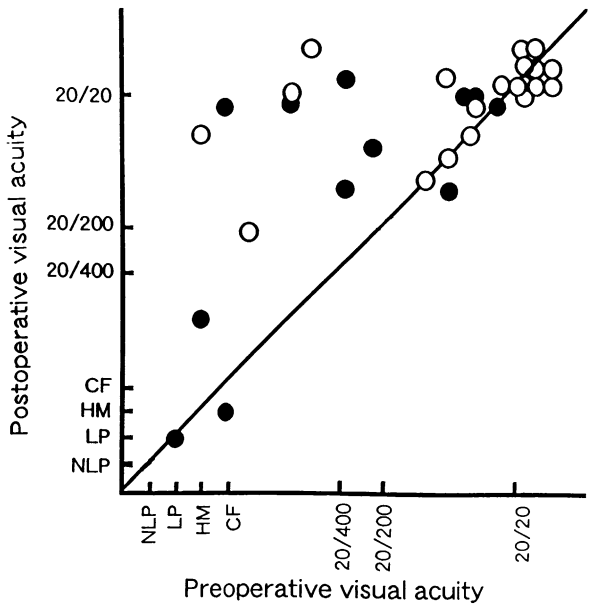


**Figure 1.** Comparison of preoperative and postoperative visual acuity of 32 eyes with average follow-up of 16.4 months. Open circles indicate cases without advanced proliferative vitreoretinopathy (PVR); closed circles indicate cases with advanced PVR. NLP: no light perception, LP: light perception, HM: hand motions, CF: counting fingers.

frequency was 21.9%, which was similar to that in Japanese children reported by Okinami et al.[7]

In contrast with previous reports,[1–3,5,6,8] FEVR comprised the third largest group in our study, and 3 of the 5 eyes with FEVR developed PVR of grade C. Familial exudative vitreoretinopathy is thought to be primarily an autosomal dominant disorder of peripheral retinal vascular development; however, its diagnostic criteria have been revised[9] and sporadic cases without family history have been described.[10] Thus, in this study, the diagnosis of FEVR was based on abnormal straightening of the retinal vessels, no history of prematurity, peripheral areas of retinal nonperfusion, and either present or absent family history. There was also a report that FEVR composed 12% of cases of juvenile rhegmatogenous retinal detachment.[11] Our study revealed a much higher frequency of FEVR, indicating a need for careful attention to its detection.

Retinal detachment without visible breaks is thought to be one of the specific clinical features in juvenile cases, because of the difficulty in obtaining an accurate preoperative examination.[7] Furthermore, poor visibility of the ocular fundus due to preoperative complications, such as vitreous hemorrhage, posterior capsular opacity, poor mydriasis, and extensive PVR, made it difficult to identify breaks in our cases. Those cases usually required pars plana vitrectomy for the first operation. However, in patients with visible retinal breaks, scleral buckling surgery can be the first choice for the initial operation, because vitreous gel is usually less liquefied and posterior vitreous detachment is less frequent in children. In our study, retinal reattachment was obtained in 24/25 eyes (96.0%) that had undergone scleral buckling for the initial operation, whether or not associated with PVR.

Retinal detachment with advanced PVR is more frequent in children than in adults. Proliferative vitreoretinopathy more advanced than grade C generally occurs in 5–10% of rhegmatogenous retinal detachment cases. The frequency of advanced PVR in children was 37.5% in our study and 29.8% in the Delage and Bonnet study.[6] The reasons for more frequent association of advanced PVR in juvenile retinal detachment may be not only delayed diagnosis and prolonged retinal detachment but also higher intraocular cellular activity.

The final reattachment rate in our cases was 93.8%, which was much higher than those previously reported, which ranged from 74%[6] to 89%.[2] Visual prognosis in our study was also better than in previous reports. Patients with final visual acuity less than 20/200 ranged from 33.6%[7] to 61%[2] in other juvenile cases younger than 15 years of age but was only 9.4% in our cases. The frequency of postoperative visual acuity worse than 20/200 was 3 in the 10 patients younger than 12 years of age and none in the 18 patients 13–15 years of age in our study. Recent improvements in vitreoretinal surgery might have contributed in part to these improved results for retinal reattachment and visual prognosis. The management of juvenile retinal detachment is still challenging for ophthalmic surgeons. However, irreversible life-long retinal damage can be minimized by early diagnosis and proper surgical procedures for treating juvenile retinal detachment.

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