

# Rhegmatogenous retinal detachments in pediatric population

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## Abstract

**Aim:** It is to review the clinical features, and surgical, and visual outcomes of rhegmatogenous retinal detachment in a pediatric population.

**Material and Methods:** Medical records of 31 children aged 16 years old or younger with rhegmatogenous retinal detachment were retrospectively analyzed. Cases of acute retinopathy of prematurity were excluded. The data for etiologies, risk factors, prior intraocular surgery, therapeutic approach options, anatomic and functional results were evaluated.

**Results:** Thirty-three eyes of 31 patients with RRD were evaluated. The mean patient age was 11.42±3.82 years (range 3-16). There were 26 (83.9%) males and 5 (16.1%) females. The most common etiology was trauma. At presentation 57.5% of affected eyes (19/33) had a visual acuity worse than 20/400. Preoperative retinal tear was found in 60.6% (20/33) of patients. At initial examination, proliferative vitreoretinopathy was detected in 36.3% (12/33) of patients. The most common primary operation was scleral buckle with subretinal fluid drainage (69.6%, 23/33). Anatomical reattachment was accomplished in 84.8% of cases (28/33). At the final visit, 78.78% of affected eyes (26/33) had a better visual acuity when compared to preoperative examination. In nine of affected eyes (27.27%), visual acuity was 20/200 or better. Mean follow-up time was 37.5 months (range 3-72).

**Conclusion:** In our series, pediatric RRD occurred most commonly in association with trauma. Most eyes were anatomically reattached, and most eyes retained vision of 20/800 or better. Preserving vision in children with RRD is of great importance because of high risk of vision threatening events to the fellow eye.

**Keywords:** Pediatric; rhegmatogenous; retinal detachment; surgery

## INTRODUCTION

Rhegmatogenous retinal detachment (RRD), being a major cause of blindness in adult population, presents as a rare condition in pediatric and adolescent population with an estimated incidence of 0.38-0.69 per 100,000 cases per year (1). Pediatric RRD, accounting for 0.5 to 12.6% of all RRD cases, also has different clinical features than adult RRD such as longer duration of detachment, slower progression, macula involvement and proliferative vitreoretinopathy (2, 3).

Despite the low incidence of pediatric RRD, management is crucially important because of the high risk of vision threatening events in the fellow eye and profound impact of saving vision in young patients' lives. As treatment and routine ophthalmologic examination skills improve, more young children will be examined due to other causes and

treated earlier. The aim of this study was to evaluate the clinical features, with surgical and visual outcomes of RRD in a pediatric population

## MATERIAL and METHODS

The study was a retrospective and consecutive case series. The clinical and operative medical records of 33 eyes of RRD who had undergone for retinal detachment surgery were retrospectively reviewed. Acute retinopathy of prematurity cases was excluded. Data collected included age at initial presentation, sex, affected eye, presenting symptoms, visual acuity at initial examination, type and size of retinal breaks and their localizations, presence of proliferative vitreoretinopathy, type of surgeries performed, early and late postoperative retinal attachment, postoperative visual acuity and follow-up time.

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We defined anatomical success as complete retinal reattachment and reabsorption of subretinal fluid at the last postoperative follow up which was at least 3 months postoperatively.

## RESULTS

Total of 33 eyes of 31 pediatric patients aged 16 years old or younger who had undergone surgery for RRD were evaluated. The mean age, distribution of sex and laterality was shown in Table 1. Rhegmatogenous retinal detachment was bilateral only in 1 case (3.2%). Medical history was remarkable for mental retardation in 5 patients (16.1%), child abuse in 4 patients (12.9%). Family history was positive for retinal detachment in 2 children (6.4%).

**Table 1. Demographic data of 31 patients/ 33 eyes**

	Patients / Eyes	
Age (meanSD) (31 patients)	11.42	3.82 years (range 3-16)
Sex (31 patients)		
Female	5	(16.1%)
Male	26	(83.9%)
Laterality (33 eyes)		
OD	16	(48.5%)
OS	17	(51.5%)

SD; Standard deviation, OD; Oculus dexter, OS; Oculus sinister

### Etiological factors of rhegmatogenous retinal detachment

The etiologies of RRD of 33 eyes are shown in Table 2. Trauma, degenerative myopia and retinoschisis were the three most commonly encountered etiological factors. Previous surgery procedures performed before development of RRD are shown in Table 3. Of the 7 eyes who had previous intraocular surgery, 3 were aphakic.

**Table 2. Etiologies of rhegmatogenous retinal detachments of the 33 eyes**

Ocular Condition	Number Of Eyes (%)
Trauma	21 (63.63%)
Degenerative myopia	4 (12.12%)
Retinoschisis	4 (12.12%)
Choroid coloboma	1 (3.03%)
Pars planitis	1 (3.03%)
Familial exudative vitreoretinopathy (FEVR)	1 (3.03%)
Congenital glaucoma	1 (3.03%)

### Presenting symptoms and examination findings of RDD

Visual loss was the most common presenting symptom. Twenty-seven patients (81.81%) presented with poor vision in any eye. Four patients (12.12%) was detected on routine examination and 2 patients (6%) were presented with leukocoria. The duration of retinal detachment ranged from 1 week to 6 months (mean: 4±2.8 weeks).

**Table 3. Etiologies of rhegmatogenous retinal detachments and operative procedures performed**

Case no	Etiology	S/P	SB	PVR	PPV	S-Oil
1	Degenerative myopia, Trauma		+	+	-	-
2	Retinoschisis, Aphakia	L	+	-	-	-
3	Choroidal coloboma		+	-	-	-
4	Trauma		+	-	-	-
5	Trauma		+	-	-	-
6	Trauma		+	-	-	-
7	Trauma, Subluxated lens		-	+	+	+
8	Trauma		-	+	+	+
9	Pars planitis		+	-	-	-
10	Trauma		+	-	-	-
11	Trauma, Aphakia	L	+	-	-	-
12	Retinoschisis		+	-	-	-
13	FEVR		-	+	+	+
14	Trauma		+	-	-	-
15	Retinoschisis		+	-	-	-
16	Trauma		+	-	-	-
17	Trauma		-	+	+	+
18	Trauma		-	+	+	+
19	Trauma		+	-	-	-
20	Degenerative myopia		-	+	+	+
21	Retinoschisis		+	-	-	-
22	Trauma		+	-	-	-
23	Trauma	R	-	+	+	+
24	Trauma, Redetachment	SB	+	-	-	+
25	Trauma		+	-	-	-
26	Degenerative myopia		-	+	+	+
27	Congenital glaucoma, Aphakia	L	+	-	-	-
28	Trauma	R	-	+	+	+
29	Degenerative myopia		-	+	+	+
30	Trauma	R	+	+	-	-
31	Trauma		+	-	-	-
32	Trauma		+	-	-	-
33	Trauma		+	-	-	-

S/P: Previous surgery; SB: Scleral buckle; PVR: Proliferative vitreoretinopathy; PPV: Pars plana vitrectomy; S-Oil: Silicone oil; L: Lensectomy; FEVR: Familial exudative vitreoretinopathy; R: Repair; (+): present; (-): absent

A horseshoe retinal tear was detected at initial examination in 18 eyes (54.5%). The most common localization of the retinal tears was upper temporal quadrant followed by lower temporal quadrant. Three eyes (9.1%) had dialyses in the inferior quadrants, 2 eyes (6.1%) had giant tears and in the remaining 10 eyes (30.3%) retinal breaks could not be able to be detected preoperatively. Proliferative vitreoretinopathy (PVR) was present at first visit in 12 of 33 eyes (36.4%) (Table 3).

### **Surgical procedures, complications and anatomical success**

The initial surgical procedure performed was a conventional external approach, with subretinal fluid drainage, if possible and scleral buckle in 23 of 33 eyes (69.6%). Pars plana vitrectomy (PPV) was done in 10 of 33 eyes (30.3%) initially. Silicone oil was used in all the PPV operations (Table 3). Overall, 4 eyes (12.1%) required more than one surgery (range 1-3) for reattachment.

There were no recorded intraoperative complications. Cataract developed in 2 eyes (6.06%), vitreous hemorrhage occurred in 1 eye (3.03%), and macular scarring occurred in 1 eye (3.03%) that also had pars planitis. Consequently, the total postoperative complication rate was 12.12%.

At first presentation 57.5% of affected eyes (19/33) had a visual acuity worse than 20/400. Anatomical success, defined as complete retinal reattachment, was achieved in 28 eyes (84.8%). Visual acuity was 20/200 or better in 9 of 33 eyes (27.27%). Even though visual improvement occurred in 26 eyes (78.78%), visual acuity remained unchanged in 4 eyes (12.12%) and worsened in 3 eyes (9.09%). Of the 3 eyes that had worsening of vision, one had vitreous hemorrhage, one had macular scarring and one had PVR. Mean follow-up time was 37.5 months (range 3-72).

## **DISCUSSION**

The present retrospective study evaluated clinical features, and surgical and visual outcomes of pediatric RRD in 33 eyes. Our results showed trauma, degenerative myopia and retinoschisis were the three most commonly encountered etiological factors in accordance with previous studies. Male predominance was observed with the rate of 81.8%, similarly to previous studies (2, 4-6). The most common operation was primary vitrectomy and scleral buckle with/ without subretinal fluid drainage (7) and anatomical reattachment was accomplished in 28 cases (84.8%) and a better visual acuity was achieved in 26 cases (78.78%) in the final visit in accordance with literature (8).

The most common presenting symptom was vision loss with 81.81% of the cases presenting with decrease in vision in at least one eye. The higher rate can be accounted for the high rate of trauma in our series. Trauma, degenerative myopia and congenital anomalies are three major causes reported in previous pediatric RRD studies. The rates of trauma, myopia and congenital anomalies range from 11.5 to 44.5%, 17 to 45% and 17 to 56% respectively in previous studies (2, 4, 5, 9-12). In a series of 187 eyes

of 179 patients, trauma was the most common cause of retinal detachment accounting for 44% (13). Fivgas and Capone found that in 37 eyes of 34 patients 8% had a history of prematurity, 23% had a history of trauma, 12% had undergone previous ophthalmic surgery for congenital cataract or glaucoma and 4% had a history of uveitis (1). Weinberg et al reported that the structural abnormalities were the most common etiology followed by trauma and uveitis in a series of 39 eyes of 34 children (14). Okinami et al. reported that trauma was the most common cause with the rate of 26.4% in 908 eyes who were treated for retinal detachment. Of the eyes without trauma, pre-existing anatomic abnormalities were found in 17 to 56% of eyes (5, 15). More recent studies were also in accordance with previous studies with trauma rates of 23 to 44.3%, degenerative myopia rates of 9.4 to 60% and congenital anomaly rates of 9.9 to 49% (4-6, 16). In our series, with the rate of 63.63%, was the most common etiological factor and was higher than reported in previous series of pediatric retinal detachments. Also, the rate of eyes with congenital or developmental anatomic abnormality that have predisposed retinal detachment was 36.36%. Recruitment of the cases from a tertiary referral center with high referral rate for trauma and higher rate of child abuse in our series may account for this result.

In our study, anatomic success rate was 84.8% but functional results were less impressive. Previously reported anatomic success rate ranges between 74.9 to 84.5% (2, 5, 6, 12, 14). In our series, the causes of poor outcome were the complexity, chronicity and the presence of PVR. We have used silicone oil in 11 of 33 eyes. Silicone oil was removed from 4 eyes. Mean follow-up time available for these patients was 13.2±4.6 SD months. Among the 4 eyes of which silicone oil was removed, no retinal re-detachment occurred. The Silicone Oil Study reported that among eyes with complex retinal detachment associated with PVR, anatomic success rates were superior with silicone oil compared with intraocular gas as a retinal tamponade (17).

Visual outcome of pediatric RRD depends on various factors including amblyopia, congenital anomalies, previous intraocular surgeries, pre-operative and post-operative complications. Late diagnosis in RRD is related to poor prognostic factors such as PVR and macular involvement (7). Most of the detachment in our series involved the macula at the time of the diagnosis and unfortunately PVR and macular involvement rates were high in our series (36.3% and 57.5% respectively).

This study has some limitations. First, because of all cases were recruited at a tertiary referral center, the cases included were more complex and did not represent the general pediatric RRD population. Preverbal children population and the socio-economic status of the parents may play a role in delayed diagnosis. Although multiple surgical procedures were required in these eyes, the prognosis was poorer. Second, its retrospective nature

and limited sample size do not allow significant statistical analysis.

During the early years of life, the rarity of patients with retinal detachments is largely responsible for our lack of examination and treatment skills. However, as examination and treatment skills improve, more young children are being evaluated and treated for retinal detachment. Pediatric RRD differs from adults in terms of etiology and prognosis. Trauma and congenital developmental anomalies are the leading causes and result in worse visual outcomes. The repair of retinal detachment in pediatric population carries difficulties for the vitreoretinal surgeon. Preserving vision in children with RRD is of great importance because of high risk of vision threatening abnormality such as trauma to the fellow eye and profound impact of improved vision on children's lives.

## CONCLUSION

Therefore, children with risk factors should be identified, screened and diagnosed timely and those who are diagnosed with RRD should be routinely examined lifelong for recurrences and accompanying conditions such as glaucoma and cataract.

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