

# Retinal Detachment in Paediatric Patients

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## ABSTRACT

**Objective:** To assess the causes of retinal detachment in children and the various operative procedures requiring vitreo-retinal surgical intervention for the same.

**Study Design:** Case series.

**Place and Duration of Study:** Department of Ophthalmology, Al-Shifa Trust Eye Hospital, Rawalpindi, from January 2006 to May 2009.

**Methodology:** A total of 281 eyes of 258 patients, (aged 0 – 18 years) who underwent vitreo-retinal surgical intervention for retinal detachment were included. Surgical log was searched for the type of retinal detachment and its causes. Frequencies of various interventions done in these patients viz. vitrectomy, scleral buckle, use of tamponading agents, laser photocoagulation and cryotherapy were noted. Results were described as descriptive statistics.

**Results:** Myopia was the cause in 62 (22.1%) and trauma in 51 (18.1%) of the eyes. Total retinal detachment (RD) was treated in 94 (33.5%) eyes, sub total RD in 36 (12.8%), recurrent RD in 32 (11.4%), giant retinal tear in 28 (10%), tractional RD in 15 (5.3%) and exudative RD in 2 (0.7%). Prophylactic laser or cryotherapy was applied in 74 (26.3%) of the eyes. Pars plana vitrectomy (PPV) was carried out in 159 (56.6%) eyes while scleral buckle procedure was done in 129 (45.9%) eyes. Silicon oil was used in 149 (53%), perfluorocarbon liquid in 32 (11.4%) and gas tamponade in 20 (7.1%) eyes.

**Conclusion:** The most common cause of retinal detachment in paediatric patients was myopia, followed by trauma. Total RD was more common as compared to the other types. The most common procedure adopted was pars plana vitrectomy followed by scleral buckle procedure.

**Key words:** Retinal detachment. Silicon oil. Vitrectomy. Scleral buckle. Paediatric age group. Myopia. Trauma.

## INTRODUCTION

Retinal detachment (RD) is a relatively rare entity in the paediatric age group with an approximate annual incidence of 2.9 per 10,000.<sup>1</sup> The main causes of paediatric RD described in various studies include myopia, trauma, vitreoretinal degeneration, previous ocular surgery and congenital-developmental anomalies. Vitreoretinal surgical intervention differs according to the type of RD being treated. Various procedures adopted for RD surgery include scleral buckle, subretinal fluid (SRF) drainage, pars plana vitrectomy (PPV), membrane peeling, laser photocoagulation, cryotherapy and use of different tamponading agents. The local and international data about the causes and surgical management of RD in the paediatric population was reviewed.

## METHODOLOGY

Surgical charts of patients were evaluated for the etiology and management of all vitreo-retinal surgical procedures carried out from January 2006 to May 2009,

at Al-Shifa Trust Eye Hospital, Rawalpindi. The age of these patients ranged from birth to 18 years.

The studied variables included demographics regarding age and gender; clinical features such as laterality and underlying etiology and the type of surgical intervention, prophylactic and adjunctive treatment. The type of vitreo-retinal interventions carried out including vitrectomy, tamponade (silicon oil, pneumatic or perfluorocarbon liquid), membrane peeling, scleral buckle, air fluid exchange, intraocular foreign body removal, lensectomy, endo-drainage, and sub-retinal fluid drainage were noted. Laser photocoagulation, cryotherapy, intra-vitreous injection of steroids/anti-vascular endothelial growth factor were grouped under prophylactic treatment. Approval for the study was taken from the ethics review board of our institution.

Statistical Package for Social Sciences (SPSS) for windows was used for statistical analysis. The data was described in terms of mean  $\pm$  SD (standard deviation) for age. Frequencies and percentages were given for the qualitative variables viz laterality, etiological factors of retinal detachment and the type of treatment modality used.

## RESULTS

A total of 281 eyes of 258 patients were treated which included 128 (45.6%) right eyes and 153 (54.4%) left eyes. Fifty-three (20.5%) were females and 205 (79.5%)

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## DISCUSSION

**Table I:** Etiology of paediatric retinal detachment.

Etiology	Number of eyes (%)
Trauma	51 (18.1)
Myopia	62 (22.1)
Retinal degeneration	17 (6)
Previous intraocular surgery	45 (16)
Idiopathic	54 (19.2)
Less common miscellaneous factors	52 (18.5)
Total	281 (100)

**Table II:** Type of paediatric retinal detachment.

Type of RD	Number of eyes (%)
GRT	28 (10)
Recurrent RD	32 (11.4)
Total RD	94 (33.5)
TRD	15 (5.3)
RD risk factors	74 (26.3)
Sub total RD	36 (12.8)
Exudative RD	2 (0.7)
Total	281 (100)

GRT = Giant retinal tear, RD = Retinal detachment, TRD = Tractional retinal detachment, RD risk factors = Requiring prophylactic measures to prevent RD.

were males. Age ranged from 3 months to 17 years (mean  $9.097 \pm 3.88$  years, median age being 10 years).

Among etiological factors, the leading causes were myopia in 62 (22.1%) and trauma in 51 (18.1%) while no predisposing cause was seen in 54 (19.2%) of the eyes (Table I). Other miscellaneous causes included uveal coloboma (n = 10), uveitis (n = 10), retinoblastoma (n = 9), Marfan's syndrome (n = 5), familial exudative vitreoretinopathy (n = 5), persistent fetal vasculature syndrome (n = 3), retinopathy of prematurity (n = 3), Coats disease (n = 2), morning glory syndrome (n = 2), proliferative diabetic retinopathy (n = 1), Harada's disease (n = 1) and full thickness macular hole (n = 1).

Total RD was treated in 94 (33.5%) of eyes, 8 out of which had proliferative vitreoretinopathy grade-C (PVR-C) or worse. Risk factors for RD and vitreous haemorrhage requiring prophylactic procedures were present in 74 (26.3%) eyes (Table II).

Pars plana vitrectomy (PPV) was carried out in 159 (56.6%) eyes while scleral buckle procedure was done in 129 (45.9%) eyes. Among these, 102 eyes had vitrectomy and scleral buckle both, while 57 eyes had vitrectomy without scleral buckle and 27 eyes had scleral buckle without vitrectomy.

Silicon oil was used in 149 (53%), perfluorocarbon liquid in 32 (11.4%) and gas tamponade in 20 (7.1%) eyes. Indirect or endolaser was done in 161 (57.3%) eyes. Adjunctive treatments included lensectomy in 29 (10.3%), membrane peeling in 30 (10.7%), intraocular foreign body removal in 3 (1.1%), air fluid exchange in 84 (29.9%), endodrainage in 62 (22.1%) and sub-retinal fluid (SRF) drainage in 20 (7.1%) eyes.

The anatomic variability of RD is very diverse and comparisons of variable treatment options are fraught with difficulties.<sup>2</sup> The published literature describes different inclusion and exclusion criteria, making the comparison difficult.

Myopia was the commonest cause of RD in the present study. A study excluding trauma, also describes myopia as the commonest cause.<sup>3</sup> Fivgas and co-workers, also highlighted the importance of preventive measures as 89% patients had vision threatening abnormalities in their fellow eyes.<sup>3</sup> The present study has a much larger sample compared with the above (27 subjects), where indication for prophylactic procedures in the fellow eye was present in lesser number (26.3%) of eyes.

In a study in East Asians, myopia was the leading cause of RD followed by trauma.<sup>4</sup> This study also states that myopia as a single risk factor seems to be an important factor in Asians.<sup>4</sup> The present study also supports this fact. Similar order of the most common etiological factors was seen in another study in Taiwan.<sup>5</sup> Trauma and myopia/vitreoretinal degeneration were the leading risk factors in a couple of studies in Saudi Arabia and Japan.<sup>6,7</sup> Prior surgery in the affected eye was the commonest cause in a study by Gonzales *et al.*, where myopia was the least common cause.<sup>8</sup> Trauma and congenital-developmental anomalies were the leading etiologies in paediatric rhegmatogenous retinal detachment in a review in the Iranian population.<sup>9</sup> The same study reports presence of retinal pathologies, mostly lattice degeneration, in 82.2% of fellow eyes.<sup>9</sup> Congenital and developmental structural abnormalities were the commonest predisposing factors in paediatric retinal detachments while previous ocular surgery was the second most common cause in a study including 39 eyes carried out in two affiliated tertiary care hospitals in the US.<sup>10</sup>

Boys are affected more by trauma related RDs. In the present study also, 43 (84.31%) out of 51 patients with ocular trauma were male. All children below 15 years of age (n = 8) were male in another study including 29 patients of tennis ball injury requiring RD surgery at the study centre.<sup>11</sup> Good anatomical and functional success of PPV has been reported for intraocular foreign body removal in the paediatric population.<sup>12</sup> In a study of traumatic paediatric retinal detachment, 6 (18%) children had intraocular foreign bodies.<sup>13</sup> Intraocular foreign bodies were removed in 3 (5.88%) out of 51 trauma cases associated with RD.

Total RD was the most common type of RD present in 94 eyes, whereas the least common was exudative RD seen in 2 eyes, in this study. Most children present late, with macular detachment. PVR grade-C or worse, seen in 8 patients, among those with total RD, indicates late presentation in the paediatric age group.

In a study, initial scleral buckle procedure was shown to have lesser requirement of secondary operation as compared to initial PPV alone or PPV and scleral buckle procedure combined.<sup>14</sup> Scleral buckling, when compared with pneumatic retinopexy showed lesser missed or new retinal breaks in a study.<sup>15</sup> The results of vitrectomy in rhegmatogenous retinal detachment compared favourably in this study by Saw and colleagues.<sup>15</sup> Many authors have found essentially no difference between success rates when using PPV alone vs. PPV and scleral buckle, specially when there is no PVR or no risk of PVR. Supplemental scleral buckle may, however, be advantageous in specific situations.<sup>2,16</sup> The present study shows an increasing trend of vitrectomy compared to sclera buckle procedures.

Giant retinal tears were mostly idiopathic in this study (25 out of 28 patients) as is also reported by Ang and co-authors, in a study regarding epidemiology of giant retinal tears in which 54.8% were idiopathic GRTs.<sup>17</sup> A previous study at the study centre shows high success rate of management of GRTs with pars plana vitrectomy, internal tamponade and 360° photocoagulation of the retina without scleral buckle.<sup>18</sup> In the present study, however, scleral buckle was applied in 12 of the 28 GRT cases. PPV was done in a total of 25 cases of GRT. Common tamponading agents used in these patients were perfluorocarbon liquid and silicon oil. Laser photocoagulation was done in 22 and cryopexy was applied in 3 patients of GRT.

Paediatric RD is characterized by a delay in diagnosis. This delay may affect the treatment outcome in patients of this age group, especially in cases with macular detachment or proliferative vitreoretinopathy at the time of presentation. The fellow eye should be thoroughly examined for presence of bilateral ocular pathology. Regular screening programs in schools by ophthalmologists may help in early diagnosis of vision threatening ocular abnormalities.<sup>19</sup> Patients tended to report early when there was a family history of retinal detachment. Better health education of parents in this regard may thus save useful vision in the younger age group. Similarly, genetic counselling provided in primary RRD, may also benefit the at-risk sibs of the proband, by preventing permanent visual disability through timely intervention.

The present study has limitations because of its retrospective nature of review. Similar studies in this age group have all been retrospective analyses, thus far.<sup>20</sup> A uniform and complete data format in ophthalmic institutions can result in better analysis of the burden of the disease and its management. Missing etiological factors in retrospectively collected data have contributed to the limitations of this study as well as the fact that most etiological factors are missed by the parents or the

children due to late presentation. Likewise children at times are unable to tell or are unaware of the symptoms in the early phase.

In developing countries, vitreoretinal facilities are usually present at selected tertiary care eye centres only.<sup>20</sup> The data on paediatric vitreoretinal surgery can help in planning the requirement of modern surgical equipment and training.

## CONCLUSION

The most common cause of retinal detachment in paediatric patients was myopia, followed by trauma. The most frequent type of retinal detachment observed was total RD. The most common procedure adopted was pars plana vitrectomy followed by scleral buckle procedure.

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