Original Article

Traumatic Retinal Detachment Due To Tennis Ball Injury

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Purpose: To evaluate the visual outcome of surgical intervention in retinal detachment (RD) due to tennis ball injury.

Material and methods: Total 29 cases with retinal detachment having history of tennis ball trauma to the eye were included in this study. All patients were male of age ranging between 6 to 26 years. Of them 8 (27.58%) were children and 21 (72.42%) were of working age group. Types of retinal detachment encountered were inferior retinal detachment 17 (58.6%), sub total to total retinal detachment 11(34.5%), tractional retinal detachment 1 (3.45%) and total retinal detachment with severe PVR 1 (3.45%). Conventional RD surgery was done in 28 cases and 7 cases required vitrectomy, endolaser, and silicone oil injection.

Result: Out of twenty nine patients included in this study 27.58% were children below the age of 15 years and 72.42% were between the age of 16 to 30 years. All patients were male with only one female patient that was not included in the study. It showed substantial improvement of vision in 24 cases and vision remained unchanged in 5 cases after they underwent vitreoretinal surgical procedures. The mean follow up period was one year.

Conclusion: Although useful vision could be achieved in most of the tennis ball injury induced retinal detachment cases by surgical intervention but more emphasis should be given on the preventive aspect like use of protective eye wear.

Rhegmatogenous retinal detachment affects one in 10,000 of the population each year[1]. A variety of systemic and ocular disorders are responsible for causing retinal detachment. Important predisposing entities include high myopia, aphakia. pseudophakia, ocular trauma etc. Pathological myopia makes up 30-40% of all retinal detachments[2]. Severe blunt ocular trauma accounts 70-80% of retinal detachments that occurs in young males[3].

Common examples of blunt ocular trauma include cricket ball/tennis ball trauma, boxing ocular trauma, fist and stones etc. There are several studies regarding the ocular complications of boxing, squash ball trauma and paintball trauma[4,5]. Vision threatening complications of posterior segment trauma include commottio retinae, macular hole, retinal pigment epithelial edema, choroidal rupture, vitreous hemorrhage and most important of these is the formation of retinal break/breaks leading to retinal detachment[6].

In Indo-Pak subcontinent cricket is a popular game. Youngsters play cricket with rubber tennis ball instead of actual hard cricket ball. Trauma by tennis ball affects the eye particularly the posterior segment causing retinal tear/s, which lead to retinal detachment. There is no available data regarding

retinal detachment due to tennis ball trauma and the visual consequences after treatment. It is to be mentioned here that the youngster are most common victims of such type of trauma.

Our aim of this study is to provide the idea about the number and location of tears, the extent of retinal detachment and the visual consequences resulting after surgical intervention in these cases of tennis ball trauma attended in our hospital from July 2002 to December 2004.

MATERIAL AND METHODS

The study included all the patients presenting to the retina clinic of Al Shifa trust eye hospital with tennis ball trauma to the eye between July 2002 to Dec 2004. The total number of patients was thirty (30). Age of the patients was between 7 years to 26 years except one who was 52 years old. All of them were male except the 52 year aged female who was watching the game and was accidentally hit by the tennis ball. For the convenience of this study female patient was excluded from the study. All of them attended our hospital with the complaints of decreased vision following trauma with tennis ball. Each eye was taken as a single case.

Data regarding the case history of these patients were collected on a standardized form. Data included the age, sex, profession, address, presenting vision, and duration of decreased vision. Visual acuity was recorded by Snellen's chart. Examination of the anterior segment was performed by slit lamp and intraocular pressure was recorded by applanation tonometer. Posterior segment was examined on slit lamp with +78D lens, fundus contact lens and with indirect ophthalmoscope with indentation. A detailed retinal drawing was charted on standard retinal charts with conventional color codes. Data sheet also contained the type of first surgical intervention and subsequent surgical intervention if needed and materials used for external tamponade. Follow up date and final corrected visual acuity was also recorded at the end of one-year follow up.

In 28 cases we performed conventional retinal detachment surgery. Sub retinal fluid was drained externally in all cases. Trans-scleral cryo was applied at the margins of the breaks to create an inflammatory reaction. An appropriate scleral buckle was placed to close the retinal breaks and to support the vitreous base. In majority of the cases a 4mm grooved silicone strip with a 2mm silicone band was used. In few cases we used a segmental 7mm silicone tyre with a 2.5mm silicone band. In one case we did not perform surgery due to very advanced PVR and sever retinal contraction.

During the first three months of follow up, 7 out of 28 cases had recurrent retinal detachment after the first surgery. All these seven cases underwent pars plan vitrectomy, endolaser application and silicone oil injection as a secondary procedure. Two of these cases also required a buckle adjustment as well in order to ensure complete closure of the break.

RESULTS

All patients were male of age ranging between 6 to 27 years distribution of which is mentioned in table 1.

Table I: Age distribution of patients.

	Age	**No. of patients n(%)**	
Children	6-10	3	8 (27.58)
	11-15	5	
Working age group	16-20	10	21 (72.42)
	21-25	7	
	26-30	4	

In this study we found that 17 cases out of 29 had infero-temporal breaks with inferior retinal detachment. Ten cases had more than one retinal break with subtotal to total retinal detachment. One patient was found to have infero-nasal retinal tear and one case had a total retinal detachment with severe PVR and sub retinal fibrosis. Macula was detached in 16 cases and three cases had a full thickness macular hole.

Outcome and complication: In twenty one cases anatomical success with retinal reattachment was achieved after the primary surgical intervention. However after the second surgical intervention with three port pars plana vitrectomy and silicone oil injection the anatomical success was achieved in 26 cases.

Visual Acuity attained at the end of follow up period were 6/18 or better in 8 cases, 6/60 to 6/18 in 7 cases, 3/60 to 6/60 in 9 cases, and in 5 cases visual acuity was less than 3/60.

There was no significant intra-operative complication. Overall postoperative complications included mild vitreous hemorrhage, raised intra-ocular pressure, and corneal haziness. All of these were managed by conservative treatment. At the end of one year follow up of 29 cases, we noticed severe proliferative vitreoretinal reaction in 4 cases including one, upon which we did not perform any surgical procedure. PVR and epiretinal membranes usually develop within six to twelve weeks after trauma[6,8]. Three cases had pre-existing full thickness macular holes, which were diagnosed at the time of first presentation. Three cases developed epiretinal formation, one patient developed a nebular corneal opacity due to corneal edema and in one case there was development of secondary cataract.

Reasons of diminished final visual acuity

Severe PVR	4 Cases	13.8%
Macular hole	3 Cases	10.3%
Epiretinal membrane	3 cases	10.3%
Cataract	1 Case	3.4%
Corneal opacity	1 Case	3.4%

DISCUSSION

Retinal detachment is a known complication in patients with blunt trauma and is a common problem encountered by the vitreo-retinal surgeons. It comprises 10-15% of all rhegmatogenous retinal detachments[1]. Retinal tears and detachment related to blunt trauma are thought to result from anatomical and mechanical changes in the vitreous leading to acute PVD and retinal traction. But blunt trauma due to tennis ball can cause sever damage to the posterior segment including vitreous hemorrhage, choroidal rupture and rhegmatogenous retinal detachment with or without macular hole. Trauma causes macular hole in 10% cases[7].

Children under 15 years of age are the main victims of injuries related to sports and recreation, which comprises 1/3rd of the total sports injured personnal[8,9]. The cost in terms of medical care and personal disability is staggering. Most of the sports related injuries are preventable.

In our study we had 29 retinal detachment patients with marked decrease in vision following blunt ocular trauma received while playing cricket by rubber tennis ball during the period of July 2002 to December 2004. Majority of these cases had inferior retinal tears.

Table 2: Uniocular (Affected Eye) Preoperative and final (post operative) corrected Visual Acuity

Sr. No	Pre Operative VA	Final VA
1	6/60	6/9
2	1/60	3/60 <
3	1/60	6/60
4	C.F	4/60
5	C.F	2/60
6	6/60	6/24
7	1/60	6/60
8	6/60	6/9
9	6/36	6/6
10	HM	3/60
11	HM	2/60 >
12	2/60	6/60
13	CF	2/60>
14	6/60	6/36+
15	3/60	6/12
16	PL	4/60
17	1/60	5/60
18	4/60	6/12
19	3/60	6/60
20	6/9	6/6
21	6/12	6/9
22	6/36	6/24
23	6/60	6/24
24	2/60	3/60 <
25	3/60	3/60
26	6/60	6/9
27	CF	6/60
28	HM	3/60
29	6/36	6/24

Table 3: Prevalence of Blindness and SVI in the injured eye at the time of presentation and at final visit.

Category	Before Treatment n (%)	After Treatment n (%)
Blind	14 (48.27)	5 (17.24)
SVI	4 (13.79)	7 (24.13)
VI	9 (31.03)	9 (31.03)
Normal	2 (6.89)	8 (27.58)

WHO grading of visual acuity < 3/60 – Blind, >6/18 – Normal, 6/60 – 6/18 – Visual impaired (VI), 6/60 – 3/60 Severe Visual Impaired (SVI).

It was due to this fact that there were minimal PVR changes on the inner retinal surface in most cases. However sub retinal fibrous bands and demarcation lines were not uncommon. 28 patients underwent conventional RD surgery that included scleral buckling with silicone bands and tyres, cryo application at the margin of the tear/s along with drainage of sub retinal fluid. Among 28 operative cases 21 achieved anatomical retinal reattachment with comprising 75% success rate. And after performing vitrectomy and silicone oil injection in the redetached cases the anatomical success rate increased to 93%. The anatomical success rate after second time surgery is comparable to Ryan SJ et al[3].

A major determinant of post operative visual acuity is the status of the macula. Macular detachment of any duration, even one day results in reduced post operatively visual acuity[3]. All patients attended Al-Shifa, tertiary eye care hospital being referred by ophthalmologist having the duration of four days to four years after trauma.

In summary our study demonstrates that a useful visual outcome is possible in most eyes with traumatic rhegmatogenous retinal detachment due to tennis ball injury. The presence of macula-off retina detachment, however, significantly affects the visual outcome in an adverse manner.

CONCLUSION

Useful vision can be attained in most of the tennis ball related injury induced retinal detachments by surgical intervention. But a large number of such cases can be prevented by taking appropriate preventive measures. Our approach to prevention and management of ocular trauma must change if we hope to reduce the prevalence of blindness and severe visually impaired personal. In this regard Canadian ice hockey is the prototype for a successful injury prevention programme. Prevention programme in tennis ball injury will attain the same success. Ophthalmologist has the potential to prevent eye injury each year in various ways by educating the patients about the risk of eye injuries in various sports and explaining the benefit of the use of protective eyewear.

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