Original Research Article

Analysis of 74 Open Globe Injuries Requiring Vitreo-Retinal Intervention and Its Correlation with Ocular Trauma Score

Abstract:

Objective: This study was done to predict functional outcome with reasonable certainty by Ocular Trauma Score (OTS). We have also correlated our cases of open globe injuries (requiring vitreo-retinal intervention) with Ocular Trauma Score (OTS). *Material & Methods:* A Retrospective study was done at Krishna Institute of Medical Sciences, Karad involving 74 eyes with open globe injuries which required vitreo-retinal intervention. Patients with no posterior segment intervention were excluded. Detailed history of trauma and Primary intervention was done. General ophthalmic examination with USG (B scan) / CT scan / X-ray done in appropriate cases. Standard 3-port pars plana vitrectomy with wide angle EIBOS viewing system with 20 G cutter was used. Cataract extraction was done by pars plana lensectomy or SICS. Appropriate Intravitreal antibiotics in cases >24 hrs post trauma with suspected endophthalmitis was given. Endolaser & appropriate tamponade was given as required. Post-op follow-up of minimum 6 months was done. Secondary interventions like – resurgery for RD, secondary IOL, repeat I/V done as per need. No case had optical keratoplasty done. *Results:* Commonest cause of injury: Hammer-chisel/stone in 32.43% (24) and Thorn/wooden stick 27% (20). Average interval between trauma & intervention was -10.04 days (4hrs – 52days). *Interpretation and Conclusion:* Our patients had better prognosis and visual outcome even though they were all open globe injuries with posterior segment involvement which makes situation more complex. This points towards the inequitable distribution & approachability of health facilities as well as the lack of awareness in people & referring practitioner about importance of early intervention.

Keywords: Ocular trauma score (OTS), Retinal Detachment (RD), open globe injury

Introduction:

Ocular trauma is the major cause of preventable monocular blindness and visua l impairment
in the world and leads to psychological, economical and professional crippling

of the patient. Fifty yrs ago, there was very little to offer patients with severe injury involving posterior segment. In open globe injuries,enucleation was often recommended due to perceived risk of sympathetic ophthalmia. Since last decade scenario has changed with better vitreoretinal surgical techniques. Now in almost all cases, we can salvaged the eye and in many we can even give ambulatory vision

Aim & Objectives:

1. Critically important for patient as well as ophthalmologist to have reliable information regarding outcome and prognosis of injured eye.
2. Ferenc Kuhn et al. [8] developed a method by which we can predict functional outcome with reasonable certainty by Ocular trauma score (OTS).
3. We correlated our cases of open globe injuries (requiring vitreo-retinal intervention) with Ocular Trauma Score (OTS).

Materials & Methods:

Retrospective samples of 74 eyes with open globe injuries which required vitreo-retinal intervention, from May 2017 to September 2018 was taken for study. Patients with no posterior segment intervention were excluded. The detailed history of trauma and primary intervention was considered for study. After that general ophthalmic examination was done, USG B-scan/CT scan/ X-ray done in appropriate cases. Standard 3 port pars plana vitrectomy with wide angle EIBOS system with 20 G cutter was used. Cataract extraction done by pars plana lensectomy or SICS. An appropriate intravitreal antibiotics was given in cases >24 hrs post trauma - suspected with endophthalmitis. Endolaser & appropriate tamponade given as required. Post operative follow-up was minimum 6 months. Secondary interventions like – re-surgery for RD, secondary IOL, repeat Intraviteal as per need. No case had optical keratoplasty done.Each case was given raw points as per OTS criteria that was divided based on Birmingham Eye Trauma Terminology (BETT) into 4 groups and compared with OTS criteria for calculating likelihood of final visual acuity.

Results:

The average age among the cases under study was 30.5 years. The Male to Female ratio was 58:16. Also, average time of intervention after trauma was **10.4 days** (4hrs to 52days).

Table 1: Distribution of Raw Points.

Variables	***Raw points***
Initial vision	
NLP	60
PL/HM	70
1/200-19/200	80
20/200-20/50	90
>/=20/40	100
Rupture	-23
Endophthalmitis	-17
Perforating injury	-14
RD	-11
Aff. pupillary defect	-10

Table 2: Presentations

Endophthalmitis	26 (35.13%)
Retinal detachment	27 (37.83%)
Traumatic aniridia	5 (6.7%)
Traumatic cataract	46(62.16%)

Table 3: Commonest causes of injury among the different cases under study.

Hammer-chisel/stone in	24(32.43%)
Thorn/wooden stick	20 (27%)

Table 4: Different study parameters under study.

Parameters	PT (n=40) 54%	IOFB (n=22) 29.7%	PF (n=7) 9.5%	RPT (n=5) 6.75%
Age (yrs)	22.7	32.7	31.6	38.2
M:F ratio	28:12	21:1	7:0	3:2
Commonest Injury type	Thorn/wooden stick 42.5%	Hammer-chisel/stone 68.2%	Iron wire/needle 71.4%	Sugarcane stick 60%

Penetrating trauma (PT), Retained IOFB (IOFB), Perforating injury (PF), Globe rupture (RPT)

Table 5: Different study variables under study.

Study Variables	PT	IOFB	PF	RPT
Avg OTS	54.92	55.09	41.97	38.42
Endophthal	12 (30%)	11 (50%)	2 (28.5%)	1 (20%)
RD	14 (35%)	9 (40%)	4 (57%)	1 (20%)
Preop Va </=HM	34 (85%)	19 (86.3%)	7 (100%)	5 (100%)
Preop Va>6/60	0	2	0	0
Final Va </=HM	5 (12.5%)	4 (18.1%)	1 (14%)	1 (20%)
Final Va>6/60	13 (32.5%)	8 (36.3%)	3 (42.8%)	2 (40%)

Figure 1 : overall visual outcome

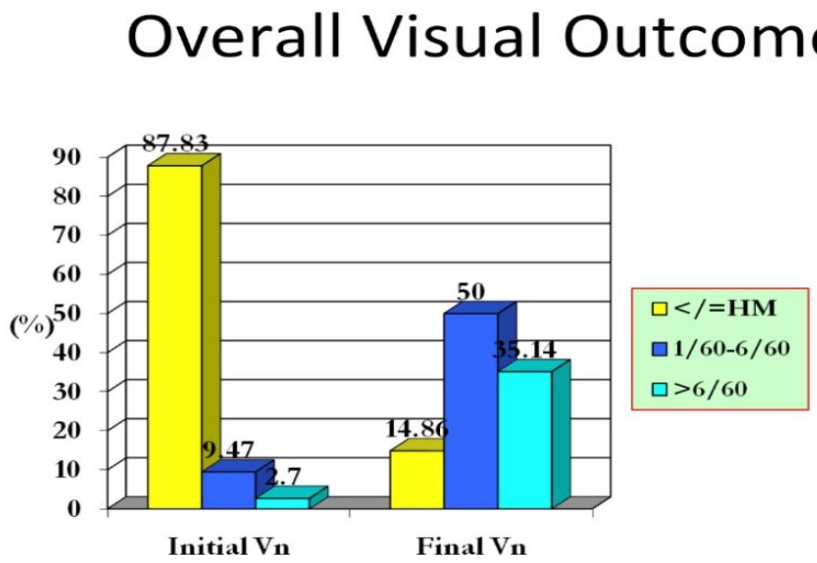

Table 6: Comparison between outcome of our results & F. Kuhn et al as per OTS criteria.

Raw points	*OTS.*	*No PL*		*PL/HM*		*1/200-19/200*		*20/200-20/5*		*>/=20/40*	
		Kuhn et al (%)	*Our result (%)*	*Kuhn et al (%)*	*Our result (%)*	*Kuhn et al (%)*	*Our result (%)*	*Kuhn et al (%)*	*Our result (%)*	*Kuhn et al (%)*	*Our result (%)*
0-44	1	74	10.5	15	21.5	7	52.6	3	10.5	1	5.2
45-65	2	27	0	26	27.3	18	38.6	15	30	15	4.5
66-80	3	2	0	11	0	15	27.3	31	36.4	41	36.4
81-91	4	1	-	2	-	3	-	22	-	73	-
92-100	5	-	-	1	-	1	-	5	-	94	-

- *Statistically significant p<0.05 by test of difference between two proportions*
- *F.Kuhn el al included all trauma cases including closed globe injuries*

Discussion:

Ocular injuries can occur in almost any setting; commonly occurring in rural agricultural farms, occupational work places, homes, road accidents and recreational centers. Ocular Trauma score (OTS) aims to estimate a patient's visual acuity 6 months after injury. The score ranges from 1 (most severe injury and worst prognosis at 6 months follow-up) to 5 (least severe injury and best prognosis at 6 months). F Kuhn et al[8] reported that patients with an OTS score of 1 have 74% probability of No PL visual acuity. In our study, only 10.5% patients had No PL visual acuity and 52.6% patients had better vision between 1/200-19/200 range. Similar discrepancies were also found in two other groups. F Kuhn et al[8] observed that with an OTS score of 2; 27% cases would have No PL vision whereas our study found no case with No PL vision instead 38.6% cases with vision between 1/200-19/200 and 30% cases with vision between 20/200-20/50. According to Kuhn OTS 3 category 13% cases had poor visual outcome (</= PL/HM) and only 46% patients had visual outcome of 1/200-20/50 whereas our study documented no patient with </= PL/HM vision and 63.7% patients with vision between 1/200-20/50. These differences are statistically significant (Table 6). Our patients had better visual outcome and prognosis. So the predictive accuracy of the conventional OTS system is poor. Hammer-chisel injury was the most common (68.2%) cause of IOFB, comparable to other studies by Kuhn F et al., Witherspoon C and Jackson Coleman et al. [8-10]This study revealed that, the majority of the cases were young males with the average age being 30 years. So the potential earning group was more commonly affected leading to economic burden to the family. The male preponderance is explained on the basis that men are more commonly involved in agricultural and industrial work.

This study found that the average interval between trauma & intervention was 10 days. Delay in seeking medical attention increases the severity of the ocular injury and affects the visual outcome. The causes of delay are illiteracy, ignorance, rural status and poverty. Taking into consideration the ocular morbidity because of trauma in the young wage earner age group, the need for its prevention cannot be over emphasized. In rural area ocular trauma mainly affects agricultural workers and labourers in small scale industries. Mass education regarding measures of prevention of trauma, importance of obtaining immediate treatment and consequences of ocular injuries is necessary.

Conclusion:

The conventional OTS scoring system is a useful classification designed to predict visual outcomes in open globe injuries. Our study compared the visual outcome post injury with the OTS predictive value. Our patients had better follow-up visual acuity. Even though, the cases included in our study were open globe injuries with posterior segment involvement which makes the situation more complex. There are drawbacks in using such a simplified system. It does not include significant facial and ocular adnexal injuries or the delay of presentation that can have a bearing on the outcome of open globe injuries. It does not factor in results from ancillary tests including X-rays, CT scans, ultrasound B scans that are important especially when there is no view of the posterior segment. We need to modify the raw points recommended in OTS criteria for the Indian scenario on the following basis. The initial visual acuity is underestimated in traumatic cataract (62.16%) which affected the predictive outcome. The existing classification also does not include the delay in seeking medical help or the extension of would beyond the pars plana and aniridia which has lot of significance in open globe injuries. These need to be added as negative raw points in the scoring system. RAPD cannot be calculated in most cases of open globe injuries, so faulty projection of rays probably would be a better criteria. There is also an inequitable distribution & approachability of health facilities and a lack of awareness in people & referring practitioner about the importance of early intervention. Effective mass education is needed for prevention of ocular injuries and seeking early medical help. Eye care programmes need to consider ocular trauma as a priority in the rural population.There is a need to have a prospective study to avoid short comings and limitations inherent to retrospective studies.The proposed changes can be adopted for a further multicenter study as it represents the current scenario of visual prognosis in the Indian population.

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