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Evisceration Versus Enucleation Following Ocular Trauma, a Retrospective Analysis at a Level One Trauma Center

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Purpose

Penetrating and perforating ocular trauma is often devastating and may lead to complete visual loss in the traumatized eye and subsequent compromise of the fellow eye. Enucleation remains the gold standard in the management of a non-salvageable eye following penetrating and perforating ocular injuries. As a technically easier alternative, evisceration offers several advantages to the ocular trauma surgeon. Debate persists whether evisceration is a viable option in the surgical management of a non-salvageable eye following trauma, given the theoretical increased risk of sympathetic ophthalmia and technical difficulty in construction with extensive and complex corneoscleral lacerations.

Methods

A retrospective analysis at a level 1 trauma center was performed to evaluate the practicality of evisceration in ocular trauma. Eyes that underwent evisceration or enucleation following ocular trauma at San Antonio Military Medical Center, a level 1 trauma center, between 01 January 2014 and 30 Dec 2016 were examined. Specific factors evaluated include mechanism of injury, defect size and complexity, associated orbital trauma, ocular trauma score, zone of injury, and time from injury to surgical intervention. Surgical outcomes were assessed. Post-operative complication rates to include implant exposure or extrusion, forniceal shortening, sympathetic ophthalmia, hematoma, infection, and pain were also analyzed.

Results

In total, 29 eyes were examined, 15 having undergone evisceration and 14 enucleation. The average size of the scleral defect prior to evisceration was 20 mm in length, and 23mm prior to enucleation. Associated orbital injuries were present in 57% of patients having undergone evisceration and 71% in the enucleation group.

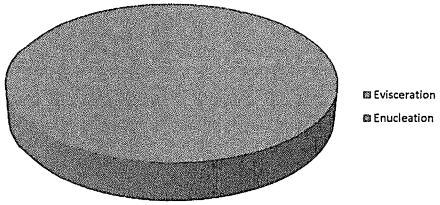

Figure 1: Pie graph representing evisceration vs. enucleation rates

Subject	Mechanism	Injury	Defect Size (mm)	Duration (d) to Repair	Associated Injury
1	GSW	Perforating	6	8	Orbit fx
2	GSW	Perforating	*	1	Orbit fx
3	Firecracker	Penetrating	1.5	7	None
4	GSW	Perforating	30	5	Orbit fx
5	MVP	Penetrating	8	5	None
6	Rock	Penetrating	15	7	Orbit/ZMC fx
7	FFS	Penetrating	8	16	None
8	GSW face	Perforating	18	4	Orbit fx
9	Assault	Penetrating	50	20	Orbit fx
10	FFS	Penetrating	14	8	Orbit fx
11	Firecracker	Perforating	28	19	None
12	FFS	Penetrating	15	12	None
13	Metal grind	Perforating	28	8	None
14	Blast	Perforating	30	39	Orbit fx
15	GSW	Perforating	**	39	ZMC fx

Table 1: Injury Pattern, Evisceration
*Unquantified scleral lacerations w/ complete extrusion
**Disorganized

Subject	Hematoma	Infection	Pain	Dehiscence	SO	Extrusion	Exposure	Fornix shortening
1	N	N	N	N	N	N	N	N
2	N	Y	N	N	N	N	N	N
3	N	N	N	Y	N	N	N	N
4	N	N	N	N	N	N	N	N
5	N	N	N	N	N	N	N	N
6	N	N	N	N	N	N	N	N
7	N	N	N	N	N	N	N	N
8	N	N	N	N	N	N	N	N
9	N	N	N	N	N	N	N	N
10	N	N	N	N	N	N	N	N
11	N	N	N	N	N	N	N	N
12	N	N	N	N	N	N	N	N
13	N	N	N	N	N	N	N	N
14	N	N	N	N	N	N	N	N
15	N	N	N	N	N	N	N	Y

Table 2: Complication Rates, Evisceration

Subject	Mechanism	Injury	Defect Size (mm)	Duration (d) to Repair	Associated Injury
1	FFS	Penetrating	10	14	Orbit fx
2	Firework	Penetrating	30	9	Orbit fx
3	GSW	Perforating	20	11	NOE/ZMC fx
4	MVC	Penetrating	36	12	Orbit fx
5	Knife	Penetrating	20	19	None
6	Metal	Penetrating	2	3	Endophthalmitis
7	Metal	Perforating	58	11	Orbit fx
8	Assault	Penetrating	5	3	None
9	Assault	Perforating	*	8	None
10	Assault	Penetrating	20	5	ZMC/Orbit fx
11	GSW	Perforating	*	3	ZMC fx
12	Fall	Penetrating	32	10	Orbit fx
13	GSW	Perforating	*	1	Orbit fx
14	Saw	Perforating	*	1	NOE fx

Table 3: Injury Pattern, Enucleation
*Disorganized

Subject	Hematoma	Infection	Pain	Wound dehiscence	Sympathetic ophthalmia	Implant extrusion	Exposure	Forniceal shortening
1	N	N	0	N	N	N	N	N
2	N	N	0	N	N	N	N	N
3	N	N	0	N	N	N	N	N
4	N	N	0	N	N	N	N	N
5	N	N	0	N	N	N	N	N
6	N	N	0	N	N	Y	N	N
7	N	N	0	N	N	N	N	Y
8	N	N	0	N	N	N	N	N
9	N	N	0	N	N	N	N	N
10	N	N	0	N	N	N	N	N
11	N	N	0	N	N	N	N	N
12	N	N	0	N	N	N	N	N
13	N	N	0	N	N	N	N	N
14	N	N	0	N	N	N	N	N

Table 4: Complication Rates, Enucleation

Conclusion

Though enucleation remains the gold standard in the management of a blind eye following ocular trauma to decrease the risk of sympathetic ophthalmia, this analysis demonstrates evisceration is a viable surgical alternative. Defect size, zone of injury, ocular trauma score, and presence of associated orbital trauma did not affect surgical construction of the scleral shell during evisceration. The post-operative outcomes and complication rates demonstrated are comparable to enucleation and consistent with the recent literature. Additional factors to include patient characteristics and surgeon preference should be considered when determining the appropriate operative technique for management of a non-salvageable eye following ocular trauma.

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