

Risk Stratification for Serious Ocular Injury in Orbital Fractures: A Single Institutional Retrospective Study

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Background

Orbital fractures result from breaks in one or more bones surrounding the eye, which can potentially impair vision, facial structure, or eye movement. They make up for 10-25% of all facial fractures and are most commonly caused by trauma. The type and severity of the fracture can influence the likelihood of associated ocular injuries. Thus, increasing the frequency of co-occurrence. While orbital fracture repair can be delayed, serious ocular injury requires urgent attention and ophthalmic evaluation. Therefore, a bedside risk stratification tool that can direct well-timed and appropriate triage is lacking. Quick recognition of these injuries is necessary to preserve vision and prevent any long-term consequences from occurring.

Objectives

The purpose of this study was to identify clinical and radiographic predictors of serious ocular injury in patients with orbital fractures and create a risk stratification tool that can be used at the bedside to guide triage by non-ophthalmologists.

References

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- Zhong E, Chou TY, Chaleff AJ, Scofield-Kaplan SM, Perzia BM, Naqvi J, Hou W. Orbital fractures and risk factors for ocular injury. *Clin Ophthalmol.* 2022;16:4153-4161. doi:10.2147/OPHTH.S391175

Figure 1. Correlation of Factors with Ocular Injury

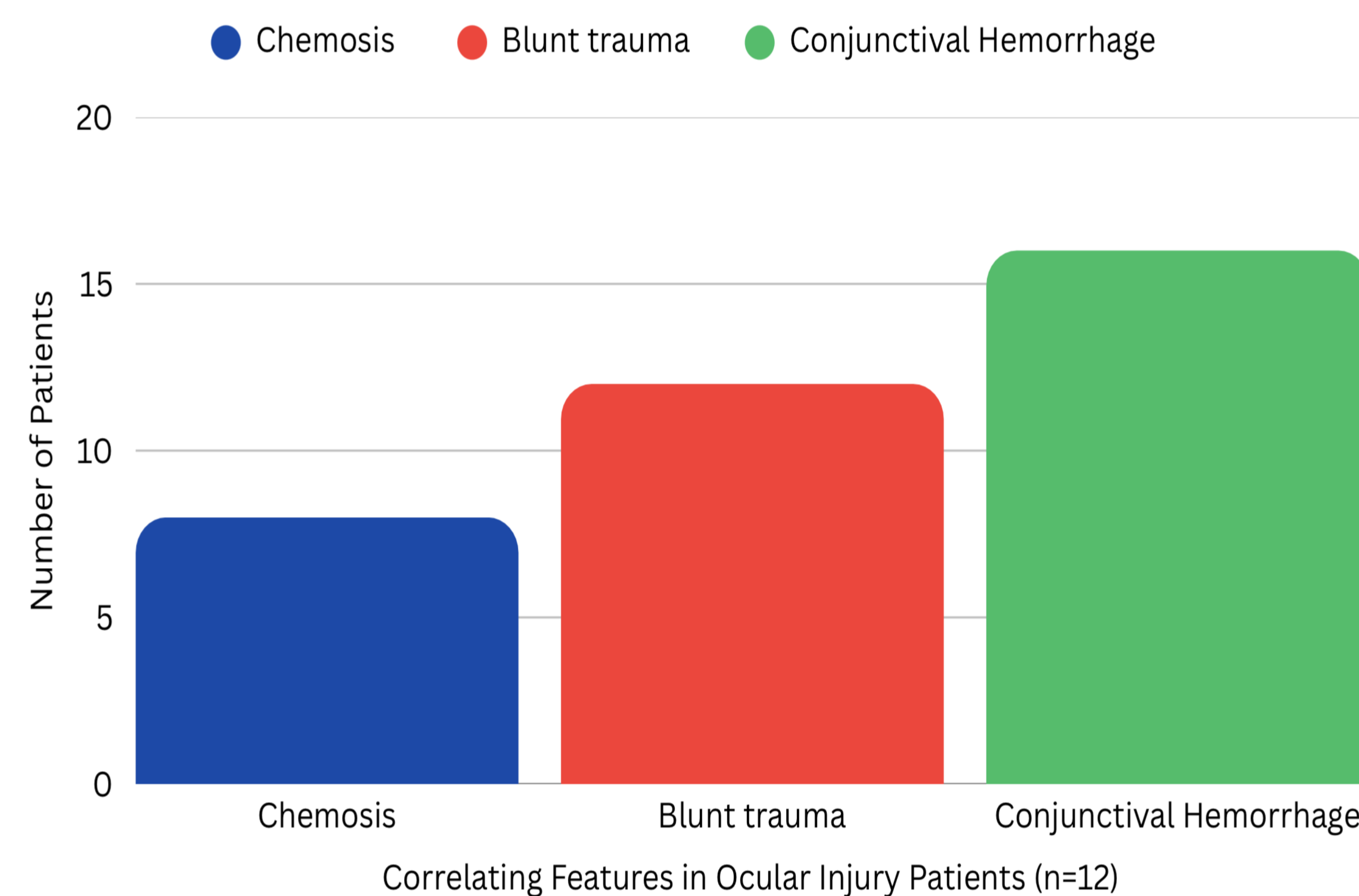
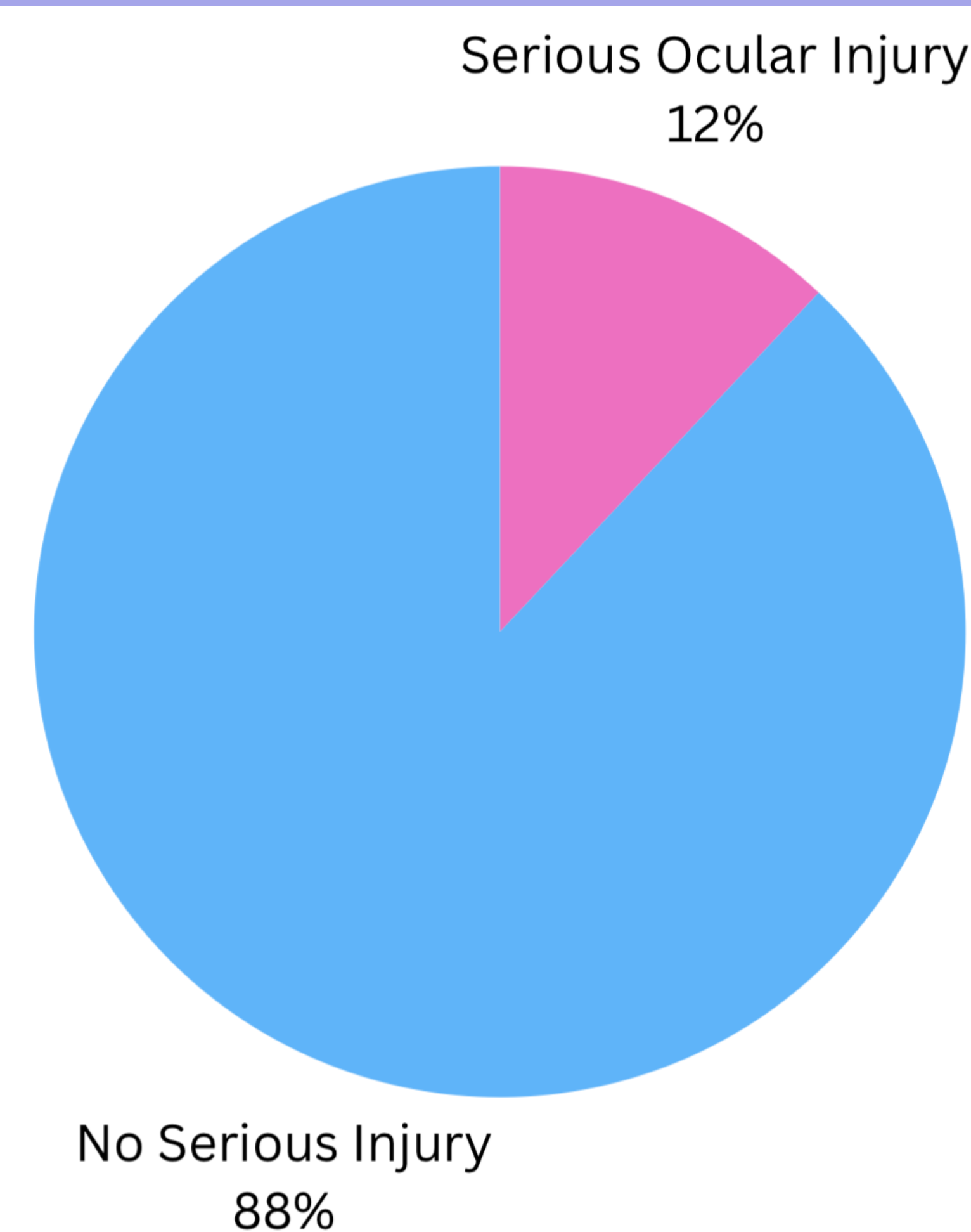


Figure 2. Prevalence of Serious Ocular Injury in Patient Population



Conclusion

The primary limitation of this study was its retrospective design, which relies on the accuracy and completeness of EMRs. Incomplete or missing data introduced the potential for systematic error and bias, while also reducing sample size and decreasing the statistical power of the analysis. Additionally, the single-center nature of the study may limit the generalizability of the findings. Despite these limitations, this study provides valuable insights into risk factors for serious ocular injuries associated with orbital fractures. Most of our cohort did not exhibit a correlation between serious ocular injury and orbital fractures; however, the rate of co-occurrence was consistent with findings from previous reports. Three factors were found to have a strong association with serious ocular injury: chemosis, blunt trauma, and conjunctival hemorrhage. Thus, early identification of these may help in triage, and patients presenting with these features should receive immediate ophthalmologic evaluation to ensure timely and appropriate management.

Methods

An initial search for subjects with an orbital fracture and consultation by ophthalmology within 24 hours of arrival was conducted using Slicer Dicer. The patient population was identified to be individuals 18 years or older who presented to the LOL Emergency Department or inpatient services between January 2016 and December 2024. A list of 100 patients was determined; data was abstracted from their electronic medical records (EMR) on Epic. Data variables extracted included demographics, clinical presentation, imaging findings, and outcome. Both descriptive and correlational analyses were used to evaluate for associations with serious ocular injury.

Results

Out of 100 patients with orbital fractures who met the inclusion criteria, the median age was 44.6 years (range, 3 –91). The cohort was predominantly male (75%), with 25% female, and racially composed of 54% African American, 45% Caucasian, and 1% of other racial backgrounds. No significant associations were identified between age, sex, or race and the occurrence of orbital fractures. A total of 64 patients sustained soft tissue injuries, with assault (n=31) and falls (n=22) being the most common mechanisms. Serious ocular injury was identified in 12 patients and was defined as retrobulbar hematoma, intravitreal hemorrhage, open globe, corneal abrasion, dislocated lens, or traumatic optic neuropathy (TON). Among these, ocular injury was significantly correlated with the presence of chemosis (6/12), blunt trauma from a body part or object (9/12), and conjunctival hemorrhage (7/12). The most prevalent fracture pattern was orbital floor fracture, observed in 56 patients.