

# Ophthalmology Consult Order: “Rule Out Open Globe Injury”

Matthew Williams MD, Ellen Ingram, Kevin Kirchner MD

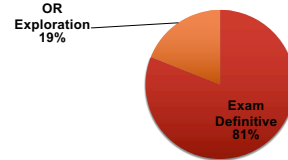
Our Lady of the Lake Regional Medical Center, Baton Rouge, LA  
Department of Ophthalmology, New Orleans, LA; <sup>2</sup>Louisiana State University Health Sciences Center, School of Medicine, New Orleans, LA

## INTRODUCTION

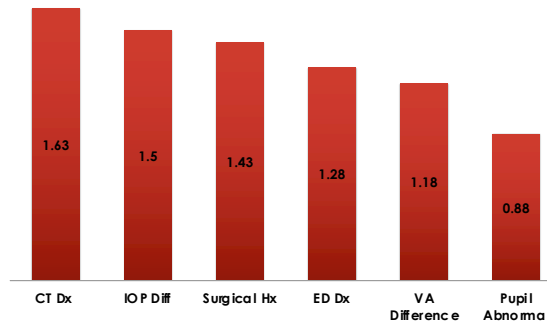
- Out of traumatic eye injuries, open globe injuries are associated with the highest patient morbidity [3,4]
- CT imaging of the orbits is routinely used by the ER physician during workup of traumatic eye injuries
- Positive CT findings reliably indicate penetration of the globe with a specificity up to 98% [1]
- Studies have consistently shown that CT imaging fails to diagnose ~30% of open globe injuries [1,2]
- Therefore, a negative CT can not definitively rule out an open globe
- There are no defined exam parameters that have been established as reliable indicators for open globe injuries in uncertain cases
- Identifying specific parameters in these cases could improve the overall diagnostic accuracy of open globes

## RESULTS

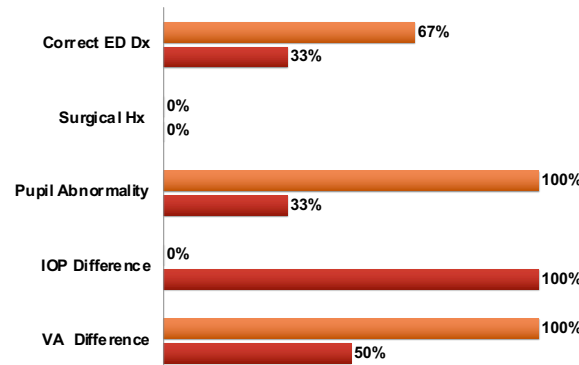
All Cases Concerning for Globe Injury n=131



Relative Risk of Open Globe in Uncertain Cases Requiring Exploration n=25



Variables in Uncertain Cases With Negative CT n=6



Number of Patients Analyzed n=131

	Open n=124	Not Open n=7
Blunt	60 (48%)	3 (43%)
Projectile	64 (52%)	4 (57%)
Y VA Difference	102 (82%)	3 (43%)
N VA Difference	6 (5%)	1 (14%)
N/A	16 (13%)	4 (43%)
Y IOP Difference	8 (6%)	1 (14%)
N IOP difference	6 (5%)	2 (29%)
N/A	110 (89%)	4 (57%)
Y Pupil	97 (78%)	4 (57%)
N Pupil	12 (10%)	1 (14%)
N/A	15 (12%)	2 (29%)
Y CT	91 (73%)	4 (43%)
N CT	19 (15%)	3 (43%)
N/A	14 (11%)	1 (14%)
Y Surgical Hx	28 (23%)	0 (0%)
N Surgical Hx	91 (73%)	7 (100%)
N/A	5 (4%)	0 (0%)
Y ED Dx	97 (78%)	2 (29%)
N ED Dx	27 (22%)	5 (71%)
OR Exploration	18 (15%)	7 (100%)

## OBJECTIVE

- To determine the correlation of specific exam variables towards an open globe in uncertain cases

## HYPOTHESIS

- In cases of uncertain globe rupture, which require surgical exploration, there are additional exam findings that can reliably predict the presence or absence of an open globe other than CT

## METHODS

- An IRB approved, retrospective chart review of patients at Our Lady of the Lake who underwent surgical exploration or repair for a suspected open globe injury between August 2015-2020.
- Exclusion criteria:
  - No CT imaging
  - Globe injury confirmed on exam
- For each patient, data including mechanism of injury (blunt vs projectile), VA difference (at least 2 snellen lines) between eyes, IOP difference (at least 6 mmHg), pupil abnormalities (no view, irregular, apd), CT results, history of ocular surgery, diagnosis by ER physician, diagnosis by Ophthalmologist (exam or OR) was collected.
- The data was then analyzed for the following questions:
  - What percentage of cases require exploration in the OR?
  - What is the relative risk for an open globe injury for each of the variables identified?
  - Was a specific mechanism of injury (Blunt vs Projectile) more common among open globe injuries?
  - Do any of the variables reliably predict the presence of an occult open globe at a similar rate to CT?

## DISCUSSION

### SUMMARY

- Our findings revealed that the majority of cases concerning for open globe injury can be definitively diagnosed by an Ophthalmologist upon exam (81%) while a minority of cases remain uncertain and must be surgically explored for definitive diagnosis (19%)
- Of the clinical factors associated with an occult globe injury, a positive CT has the highest relative risk (1.63), followed by an IOP difference of at least 6 mmHg between the eyes (1.50). Pupil abnormalities had the lowest association (RR=0.88) with the presence of an open globe
- For surgically confirmed open globe cases with negative CT, 100% had an IOP difference of 6 mmHg between the eyes
- Blunt (48%) and projectile (52%) injuries occurred at comparable rates

### CONCLUSIONS

- In conclusion, we were unable to identify exam parameters that could serve as reliable indicators of an occult globe in uncertain cases. Rather, one must look at all factors, realizing that certain exam findings have a higher association with an occult globe than others.

### LIMITATIONS

- Small sample size

### FUTURE STUDIES

- Repeating study with a larger sample size

## REFERENCES

- 1.) Hoffstetter P, Schreyer AG, Schreyer CI, et al. Multidetector CT (MD-CT) in the diagnosis of uncertain open globe injuries. *Rofo*. 2010;182(2):151-154.
- 2.) Arey ML, Mootha VV, Whittmore AR, Chason DP, Blomquist PH. Computed tomography in the diagnosis of occult open-globe injuries. *Ophthalmology*. 2007;114(8):1448-1452
- 3.) Owens PL. (AHRQ), Mutter R. (AHRQ). Emergency Department Visits Related to Eye Injuries, 2008. HCUP Statistical Brief #112. May 2011. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb112.pdf>.
- 4.) Wang D. Open Globe Injury: Assessment and Preoperative Management. *American Academy of Ophthalmology*. <https://www.aao.org/eyenet/article/open-globe-injury>. Published January 31, 2021. Accessed May 3, 2021.