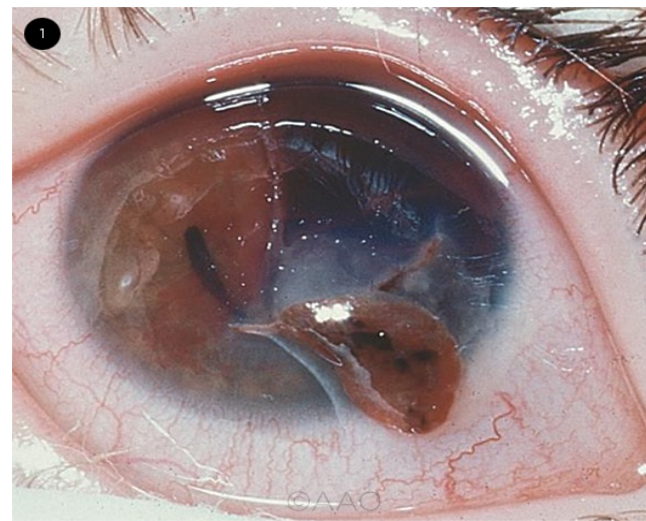


Background

- Ocular trauma is a significant cause of *preventable* blindness, affecting 19 million people worldwide
- Open globe injuries (OGIs) are full-thickness injuries to the wall of the eye
 - two mechanisms: severe blunt trauma or sharp objects (lacerating trauma)
 - symptoms include blurred vision, pain, swelling, extrusion of ocular tissue, and iris irregularities
- OGIs are emergencies requiring urgent surgical repair, ideally within 24 hours of injury
- Worldwide incidence of OGIs: 3.5 per 100,000 (200,000 cases/year)
- Still, studies on the etiology and epidemiology of OGIs in the U.S. are few



Objective

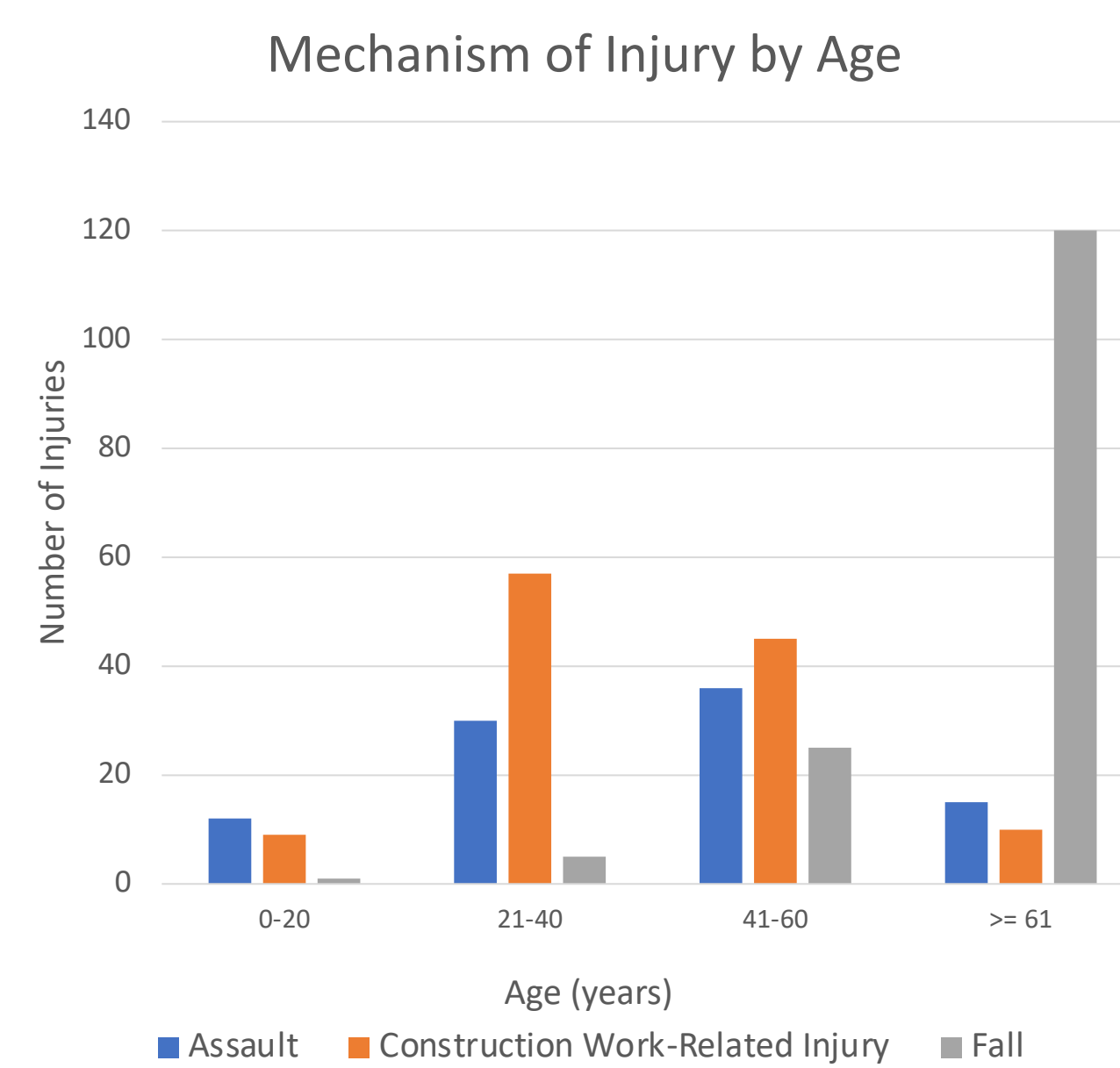
- To examine the incidence, clinical characteristics, and demographics of patients presenting with open globes to emergency departments at major tertiary care academic centers in the U.S.
- To stratify variables by common mechanisms of injury to better understand prognostic indicators for open globe injuries

Methods

- Study design:**
 - Retrospective cohort study of all patients presenting with open globes within a 3-year study period
 - Demographic and clinical factors associated with cause of injury including age, sex, race, ethnicity, and open globe type were assessed
- Population:**
 - 766 patients with mean patient age of 46.7 ± 23.3 years
 - Patients presenting to the Wilmer Eye Institute at Johns Hopkins (n=256 eyes) and the Bascom Palmer Eye Institute at the University of Miami (n=510 eyes) from January 1st, 2018 to December 31st, 2021
- Main Outcomes**
 - Mechanism of open globe injury
- Statistical Analysis**
 - Stata and R (univariate and multivariate logistic regression)

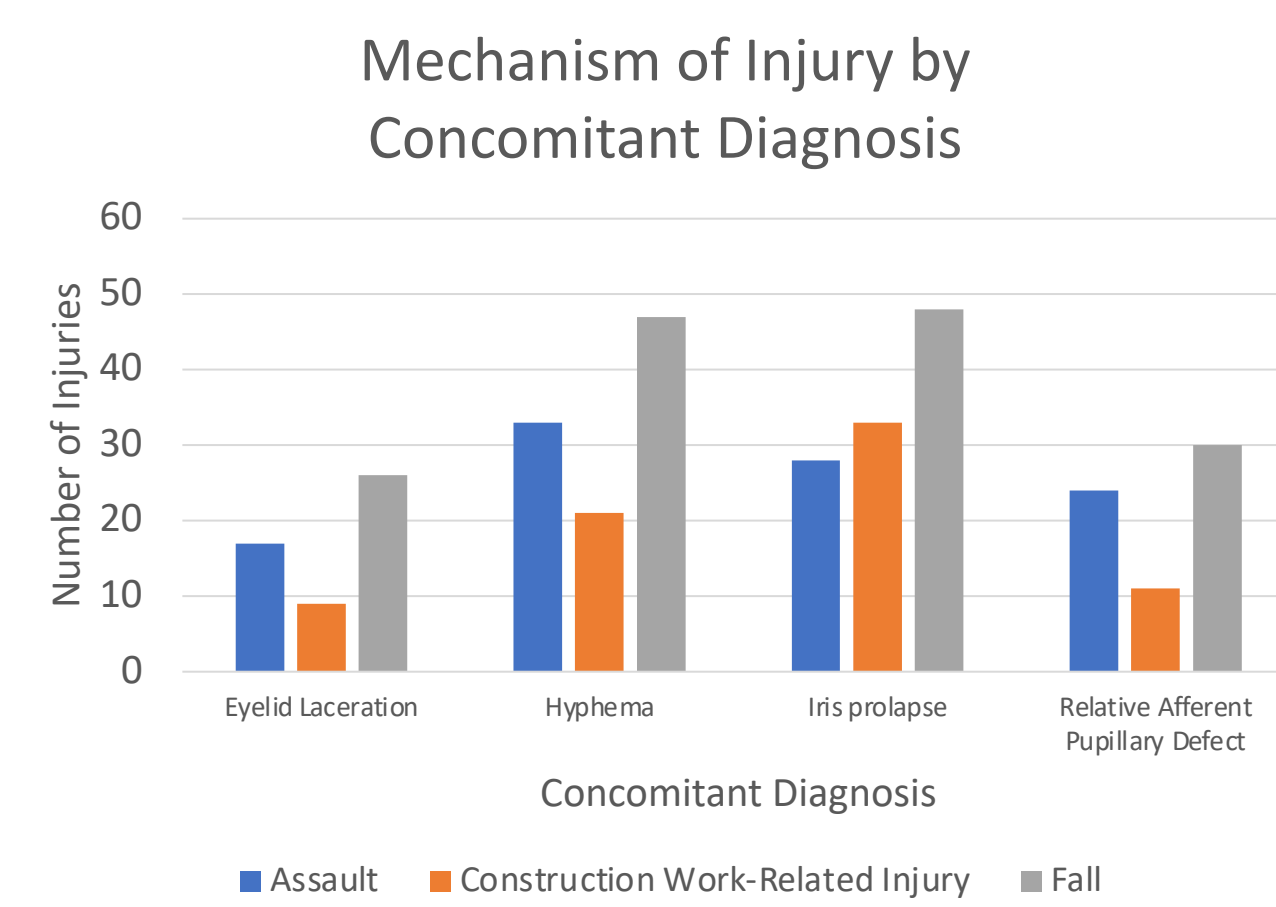
Results

Falls, construction-work injuries, and assaults were the most common mechanisms of injury.



Characteristic	Assault N (%)	Construction Work-Related Injury N (%)	Fall N (%)	Motor Vehicle Accident N (%)	Sports N (%)	Other Injury Mechanisms N (%)	Total
Number	94	123	151	32	28	338	766
Mean Age at Presentation							
0-20 years	12 (12.9)	9 (7.4)	1 (0.7)	8 (25)	7 (25)	71 (21.1)	108
21-40 years	30 (32.3)	57 (47.1)	5 (3.3)	15 (46.9)	8 (28.6)	93 (27.6)	208
41-60 years	36 (38.7)	45 (37.2)	25 (16.6)	5 (15.6)	6 (21.4)	111 (32.9)	228
>=61 years	15 (16.1)	10 (8.3)	120 (79.5)	4 (12.5)	7 (25)	62 (18.4)	218
Sex							
Male	76 (80.9)	121 (98.4)	78 (51.7)	21 (65.6)	23 (82.1)	267 (79)	586
Female	18 (19.1)	2 (1.6)	73 (48.3)	11 (34.4)	5 (17.9)	71 (21)	180
Race							
White	32 (34)	13 (10.6)	36 (23.8)	14 (43.8)	11 (39.3)	94 (27.8)	224
Black	56 (59.6)	7 (5.7)	5 (3.3)	2 (6.3)	2 (7.1)	25 (7.4)	47
Other	6 (6.4)	103 (83.7)	110 (72.8)	16 (50)	15 (53.6)	219 (64.8)	495
Ethnicity							
Hispanic or Latino	23 (25.3)	55 (45.1)	110 (72.8)	21 (65.6)	20 (71.4)	195 (58.7)	469
Not Hispanic or Latino	68 (74.7)	67 (54.9)	41 (27.2)	11 (34.4)	8 (28.6)	137 (41.3)	287

Zone I, lacerations were the most frequent type of injury. Hyphema, iris prolapse, and pupillary defect were common concomitant diagnoses. Most patients were not wearing eye protection.



Characteristic	Assault N (%)	Construction Work-Related Injury N (%)	Fall N (%)	Motor Vehicle Accident N (%)	Sports N (%)	Other Injury Mechanism N (%)	Total
Open Globe Injury Type							
Rupture	51 (55.4)	17 (14.5)	105 (71.9)	12 (38.7)	16 (59.3)	72 (22.2)	273
Laceration	37 (40.2)	71 (60.7)	41 (28.1)	17 (54.8)	8 (29.6)	198 (61.1)	372
IOFB	4 (4.3)	29 (24.8)	0 (0)	2 (6.5)	3 (11.1)	54 (16.7)	92
Zone of Injury							
I	26 (32.9)	73 (64.6)	56 (41.5)	12 (40)	17 (60.7)	207 (66.1)	391
II	32 (40.5)	24 (21.2)	55 (40.7)	11 (36.7)	6 (21.4)	69 (22)	197
III	21 (26.6)	16 (14.2)	24 (17.8)	7 (23.3)	5 (17.9)	3 (11.8)	110
Use of Eye Protection							
Yes	38 (97.4)	49 (80.3)	63 (90)	12 (100)	8 (80)	129 (94.9)	299
No	1 (2.6)	12 (19.7)	7 (10)	0 (0)	2 (20)	7 (5.1)	29

Patients 61+ were 6 times more likely to have fall injuries, Black patients were 4 times more likely to have assault injuries.

Covariate	Assault vs. Other Injury Mechanism		Construction Work-Related Injury vs. Other Injury Mechanism		Fall vs. Other Injury Mechanism	
	95% CI	P Value	95% CI	P Value	95% CI	P Value
Age						
0-20 years	0.18-3.45	0.023*	0.43-4.70	0.56	0.01-0.42	0.005**
21-40 years	0.50-1.67	0.78	0.48-4.36	0.51	0.09-0.68	0.007**
41-60 years	Reference		Reference		Reference	
>=61 years	0.36-1.60	0.470	0.65-6.80	0.21	3.86-11.84	<0.001***
Sex						
Male	Reference		Reference		Reference	
Female	0.46-1.67	0.700	0.26-2.09	0.57	1.29-3.49	0.003**
Race						
White	Reference		Reference		Reference	
Black	2.37-7.57	<0.001***	0.65-4.01	0.31	0.54-1.68	0.85
Other	0.082-5.72	0.73	0.17-13.32	0.71	0.11-3.99	0.66
Ethnicity						
Hispanic or Latino	0.42-1.53	0.51	0.32-2.25	0.75	0.46-1.37	0.41
Not Hispanic or Latino	Reference		Reference		Reference	

*p < 0.05, **p < 0.01, and ***p < 0.001

Summary and Conclusions

- Incidence of open globes was highest in males 41 to 60 years
- Most frequently due to Zone I, lacerating trauma
- Common causes of injury were falls, construction work-related, assaults, and motor vehicle accidents
- Open globe injury etiologies vary significantly by demographic factors including age, race, and sex
- Preventive strategies should be targeted at high-risk elderly and minority populations
 - for falls, assaults, and work-related injuries
- Use of protective eyewear during sports and occupational activities should be encouraged

Limitations

- Patients identified using ICD-9 codes for open globe injury as the primary or secondary diagnosis
- Conclusions are based on data from initial ED visit, which can be incompletely recorded
- Cohort limited to tertiary academic referral centers in the U.S.
 - excludes any patients managed in outpatient centers

Future Directions

- To increase population size, incorporate data from other tertiary academic eye trauma centers
- Stratify clinical and demographic factors based on improvement in visual acuity at presentation and after surgery
- Examine impact of factors such as income status, comorbidities, and prior ocular surgery on susceptibility to OGIs
- Identify risk for secondary complications based on mechanism of injury

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