

Pediatric Low Speed Vehicle Roll-over Injuries

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Abstract

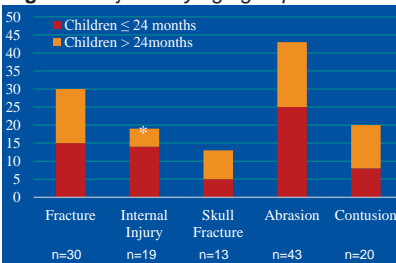
Injuries from low speed vehicle roll-overs have not been adequately investigated. This is a retrospective chart review carried out at Phoenix Children's Hospital in affiliation with the University of Arizona College of Medicine-Phoenix that categorizes and examines the injuries sustained by patients involved in low-speed vehicle roll overs that occurred between December 2007 and August 2013. The cohort included fifty-five pediatric patients with a median age of 24 months of which 6 were fatally injured. Internal injuries were more common in children ≤ 24 months. Over half of the cohort sustained fractures, with 24% receiving skull fractures. All fatalities were the result of traumatic brain injury. 20% of victims required operative intervention.

RESULTS

Table 1: Cohort characteristics

| | Survived n = 49 (%) | Fatality n=6 (%) | P value |
|------------------------------|------------------------|---------------------|---------|
| Gender | | | |
| male | 25 (58) | 2 (33) | 0.67 |
| Age (months) | | | |
| Median [IQR] | 27 [19 - 39] | 21.5 [16 - 26] | 0.12 |
| Direction | | | |
| Backover | 38 (77) | 4 (67) | 0.35 |
| Front over | 8 (16) | 2 (33) | |
| Injury severity score | | | |
| Median [IQR] | 5 [1 - 13] | 50.5 [10 - 75] | 0.02 |

Figure 1: Injuries by age group



*statistically significant

RESULTS

Table 3: Operative intervention (n=11)*

| | Frequency n (%) |
|-----------------------------------|--------------------|
| Intubation | 4 (7) |
| Chest Tube | 3 (5) |
| Closed Reduction of fracture | 3 (5) |
| Subdural/Epidural drain placement | 2 (4) |
| Ventricular shunt | 1 (2) |
| Wound Debridement | 1 (2) |
| Tendon repair | 1 (2) |
| Skin Graft | 1 (2) |
| Open Reduction and fixation | 1 (2) |
| Craniotomy | 1 (2) |
| Splenic Embolization | 1 (2) |
| Pericardiocentesis | 1 (2) |

*frequencies not mutually exclusive

Discussion

- Non-survivors were generally younger, difference was not statistically significant (Table 1)
- Internal injury was significantly higher for children ≤ 24 months (Figure 1)
- 20% (n=11) of patients required operative intervention
- Fracture reduction was the most common intervention (Figure 2, Table 3)
- Patients transferred from another hospital had a longer hospital stay than those that were not (Table 2)
- Transferred patient's median ISS were not statistically different than those that were not transferred (Table 2)
- Survivors of TBI had a greater abdominal AIS compared to non-survivors (Figure 3)

INTRODUCTION

- Low speed vehicle roll-over (LSVRO): child < 18 years old injured from impact with a vehicle moving at low speed, primarily in a non-traffic setting¹
- Non-traffic settings include driveways, sidewalks, roadways
- In the United States, 5,000 children are injured and 220 children are killed annually by LSVRO²
- There is incomplete understanding of the spectrum of injuries associated with LSVRO
- Better understanding of common injury characteristics may prepare healthcare providers for proper, and efficient, administration of care

Figure 2: Patients requiring operative intervention (n=55)

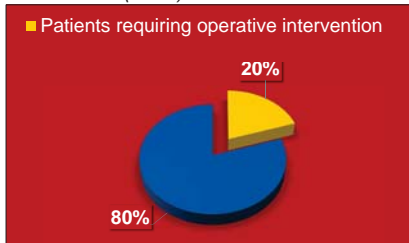
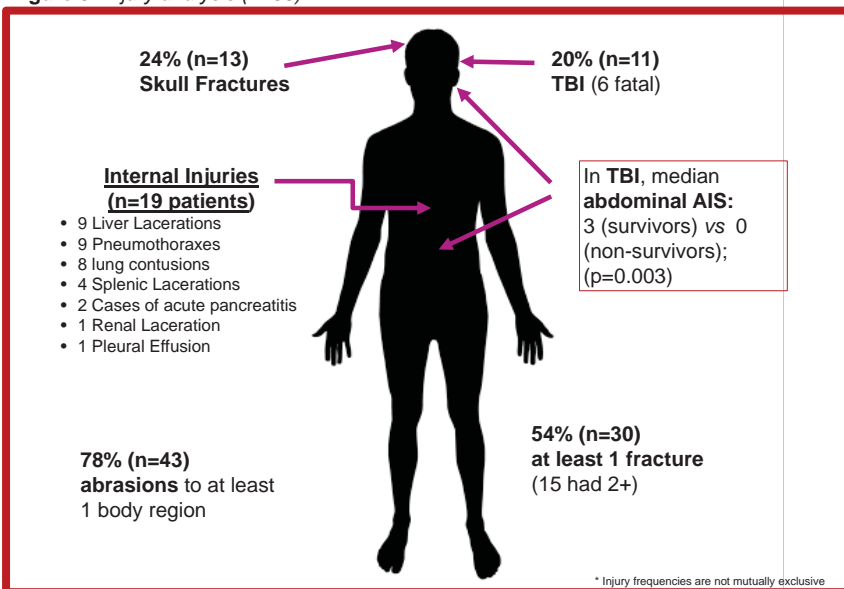


Table 2: Length of stay and ISS for patients transferred vs. not transferred

| | Transferred from outside hospital (n=30) | NOT transferred from outside hospital (n=25) | P value |
|--------------------------------------|--|--|---------|
| Length of stay at PCH (hours) | | | |
| Median [IQR] | 34.5 [16-88] | 6 [3-40] | 0.04 |
| ISS | | | |
| Median [IQR] | 6.5 [1-11] | 5 [1-17] | 0.95 |

Figure 3: Injury analysis (n=55)*



METHODS

- Study Design**
- Design: Retrospective Chart Review
 - Setting: Phoenix Children's Hospital
 - Time: December 2007 – August 2013
 - Inclusion Criteria:
 - < 18 years
 - LSVRO injury identified from ICD-9 descriptors E814.7, E818.7, E821.7, E822.7, E823.7, E825.7
- Data Source**
- Medical records
 - Trauma registry
 - Medical examiner records
- Data Collection**
- Patient demographics
 - Injury characteristics
 - Operative intervention
 - Patient outcome
- Data Analysis**
- Descriptive statistics
 - Categorical and continuous data compared with Fisher's exact and Mann-Whitney, respectively

CONCLUSIONS

- Abrasions, fractures, and internal injuries were common in victims of LSVRO injuries.
- Children ≤ 2 years old were more prone to internal injury.
- Operative intervention was common and diverse.
- Injury distribution in TBI may relate to survival.

REFERENCES

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