

## Background

- **Lack of literature** surrounding management of low grade renal trauma (Grade I/II, American Association for the Surgery of Trauma (AAST) grading)<sup>1</sup>
- Trend towards conservative management of low grade renal trauma<sup>2,3</sup> but **unclear whether Intensive Care Unit (ICU) admission or transfer** is necessary
- Negligible rates of complications arise from low grade renal trauma
- **Secondary overtriage** (unnecessary inter-hospital transfer to higher care) **common in low grade renal trauma**, indicating resource over-utilization<sup>4</sup>
- **Evidence-based management protocol could save tremendous medical costs** for both hospitals/patients- up to \$10,000 for ambulances, \$100,000 for medical airlifts, and an average of \$5000/day in the ICU<sup>4</sup>

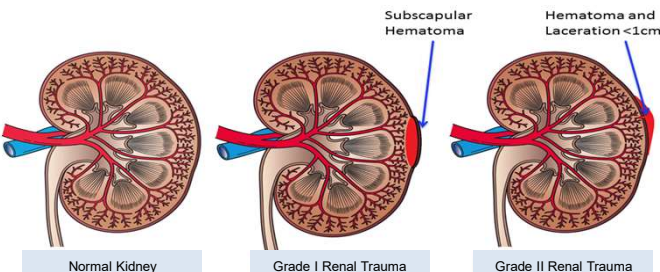


Figure 1: Renal Trauma according to AAST Organ Injury Scale. Middle is Grade I Renal Trauma, with a hematoma contained by the kidney capsule. Right shows a Grade II Trauma with superficial laceration <1 cm not involving the collecting system and a perirenal hematoma contained by the perirenal fascia. Image: [https://commons.wikimedia.org/wiki/File:Kidney\\_Cross\\_Section.png](https://commons.wikimedia.org/wiki/File:Kidney_Cross_Section.png)

## Aims

- To help determine whether transfer to level 1 trauma/ ICU management of isolated low grade renal trauma (iLGRt) is necessary for best outcomes
- Hypothesis: Floor management and early discharge is safe for iLGRt.

## Methods

**Study Design:** Retrospective Cohort Study

**Inclusion Criteria:**

iLGRt taken from Harborview (HMC) trauma registry: Jan. 2005-Apr. 2018 (n=586)

↳ Patients with non-abdominal Abbreviated Injury Score (AIS) <3 selected (n=133)

↳ AIS descriptions read in registry, excluded all with any evidence of other abdominal injury (solid organs, vasculature, etc.) (n=87)

↳ Classified pts. into **EXPOSURES** Floor (n=31) or ICU (n=46) based on admission. Chart review (ORCA & Epic) from date of renal trauma until present

↳ Look for **OUTCOMES:** post-discharge complications (e.g. hematuria, renal complications, urinary tract infection, urinoma, etc.), blood product/vasopressor administration and post-discharge status (alive/dead).

- Outcomes and certain variables (length of stay (LOS), Transfer Status) were stratified by age, due to potential impact of age on ICU admission or transfer.
- Renal trauma registry contained LOS, Age, Sex, Race, Transfer Status, ICU hrs., Alive/Dead, Injury Severity Score (ISS) and AAST Renal Trauma Grade.

## Results

Table 1- Demographics of Study

n(%), Mean[IQR]	Floor (n=31)	ICU (n=46)
<b>Age</b>		
Overall Mean	32.93 [20]	41.26 [46.25]
Count		
0-18	7 (22.5)	10 (21.7)
19-64	23 (74.2)	24 (52.2)
65+	1 (3.2)	12 (26.1)
<b>Sex (Male)</b>	22 (70.9)	36 (78.2)
<b>Race</b>		
White	20 (64.5)	37 (80.4)
Black	3 (9.7)	3 (6.5)
Other/N.A.	8 (25.8)	6 (13.1)
<b>Trauma Type</b>		
Blunt	29 (93.5)	46 (100)
Other	2 (6.5)	0
<b>Trauma Cause</b>		
Motor Vehicle	15 (48.8)	18 (39.1)
Fall	5 (16.1)	16 (34.8)
Other	11 (35.5)	12 (26.1)

Table 1. Other trauma causes include bike accident, assault, overexertion and snow-related falls. IQR=Interquartile Range.

Table 2- Floor and ICU Demographics

n(%), Mean [IQR]	Floor (n=31)	ICU (n=46)
Transferred to HMC	14 (45.1)	26 (56.52)
Transfer <72 hr. stay	14 (100)	19 (73.07)
Mean LOS in Hours	43.4 [20.75]	71.9 [45.94]
By Age Group		
0-18	25.1 [15]	42.6 [21.56]
19-64	49.6 [22.88]	63.9 [51.19]
65+	27.8♦	112.6 [81.88]
Mean ICU LOS (Hrs.)	NA	37 [23]
Mean ISS	7.7 [4]	8 [3.75]
Blood Product Admin	0	3 (6.52) ♦
Vasopressor Admin	0	0
Post-Discharge Complications⊖	2 (6.45)	3 (6.52)
Alive post-discharge	31 (100)	46 (100)
HMC discharge. to...		
Home	31 (100)	41 (89.13)
SNF♦	0 (0)	5 (10.87)

Table 2. ♦only one value for floor and 65+ age group.

♦ in the study, all patients who received blood products were 60+ yrs. Old (two transfer, one no transfer).

⊖ Of the five patients with post-discharge complications, four were 65+, and one was a 15 yr. old with a family history of ureteropelvic junction obstruction (pre-existing renal condition).

♦SNF= Skilled Nursing Facility

Figure 2- Transfer Status Count by Age Group

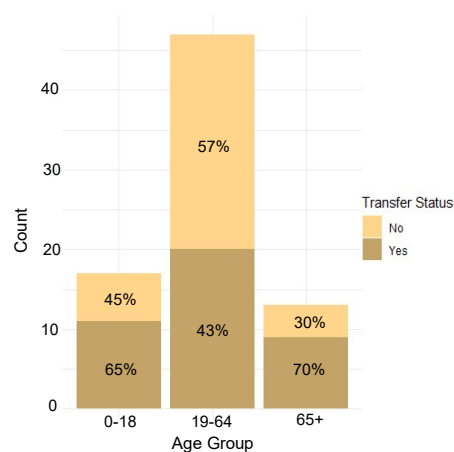
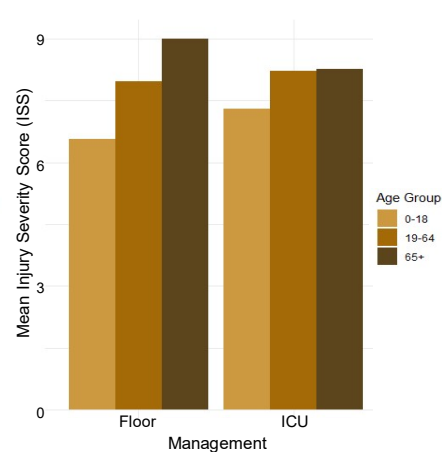


Figure 3- Mean Severity by Management / Age



## Conclusions

- **Majority of <65 yr. old patients (96.1%) did not receive blood products or vasopressors** and had relatively short "observation only" (no blood/vasopressors) ICU stay
- **All patients survived**, those <65 and without other renal conditions (family history of ureteropelvic junction obstruction) suffered no post-discharge complications
- **85% of transfer patients were discharged <72 hours** with only two receiving blood products- **potential unnecessary transfer and incurred costs**
- Rapid discharge/lack of intervention in majority of transfer patients suggests that transfer to higher level of care not impactful in iLGRt- **further evidence needed**
- Floor management of isolated renal trauma is like ICU management of iLGRt in this study, especially those <65 yrs. old. **Low Complication Rate+ Rapid Discharge from ICU= ICU admission likely unnecessary**

## Implications/Next Steps

- Floor management of iLGRt seems promising and a possible means of cost reduction for hospitals and patients
- Rapid discharge and low complication rates in <65 yr. old patients suggests that floor management of iLGRt is possible
- Further studies are needed to effectively correlate floor management/early discharge with safe outcomes for iLGRt

## Limitations

- Higher mean age (higher rates of comorbidities) may be a confounder for why patients were admitted to the ICU
- ORCA and EPIC with compatible out-of-system records only
- Single institution study provides limited size: Multi-institution study with follow-up data would provide further evidence on iLGRt management

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