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Institutional Outcomes Of Blunt Liver & Splenic Injury In The Atomac Era

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Background

- The Arizona-Texas-Oklahoma-Memphis-Arkansas Consortium (ATOMAC) practice management guideline (PMG) was created to standardize management of blunt liver or spleen injury (BLSI) across pediatric trauma centers.
- Management of BLSI tended to be based on grade of injury based on imaging studies for decades.
- Evaluations of institutional outcomes after guideline adoption remain scarce. We describe our outcomes since PMG adoption at our institution.

Methods

- Institutional Review Board (IRB) approved retrospective cohort study was conducted on patients <18 years presenting with blunt liver and/or splenic injuries from March 2016 to March 2021.
- We queried our institutional trauma database for all pediatric patients who were diagnosed with solid organ injury of the liver or spleen after blunt abdominal trauma.

Results

- **Table 1. Cohort characteristics**

	Total (N=199)
Sex	
Male	65.7% (130)
Female	34.3% (68)
Age (in years)	10.9 (6.3, 14.8)
Injury Severity Score	14 (IQR 9,19)
Body Mass Index	19.4 (16.2, 22.6)
Mechanism of injury	
Motor vehicle collision (MVC)	41% (82)
Fall	20.6% (41)
Bicycle/recreational vehicle collisions	17.6% (35)
Pedestrians struck by vehicle	8.5% (17)
Sports related	4.0% (8)
Crush	3.5% (3)
Assault	0.5% (1)
Other	1.5% (3)
Splenic Injury	46% (91)
Liver Injury	44.2% (88)
Combined liver & spleen injury	10% (20)
Traumatic brain injury	19% (37)
Intensive Care Unit Utilization	23.0% (46)
Blood transfusion	9.0% (18)
Mortality	1.5% (3)

- **Table 2. Comparison of clinical variables between low- and high-grade spleen injuries**

Variable	Low-grade (I-III) N=70	High-grade (IV-V) N=22	P-value
Median age in years	11.9 (7.5, 14.8)	12.3 (8.4, 14.8)	=0.8
Injury Severity Score	9.5 (5, 17)	21 (16, 26)	=0.00
Median LOS without TBI*	1.0 (0.4, 2.9)	1.6 (0.6, 3.7)	=0.3
Median LOS with TBI	0.8 (0.3, 3.1)	1.0 (0.4, 5.1)	=0.1
ICU admission	18% (13)	45% (10)	=0.1
Transfusion requirement	4% (3)	32% (7)	=0.00

*Traumatic brain injury (TBI)

- **Table 3. Comparison of clinical variables between low- and high-grade liver injuries**

Variable	Low-grade (I-III) N=70	High-grade (IV-V) N=34	P-value
Median age in years	9.5 (5.0, 15.3)	8.8 (4.5, 12.5)	=0.38
Injury Severity Score	10.5 (5, 17)	17 (16, 29)	=0.0002
Median LOS without TBI	1.0 (0.3, 2.8)	1.9 (1.0, 6.6)	=0.06
Median LOS with TBI	0.8 (0.7, 3.8)	1.2 (1.6, 7.1)	=0.1
ICU stay	11.4% (8)	47% (16)	=0.00
Transfusion requirement	17.1% (12)	64.7% (22)	=0.00

*Traumatic brain injury (TBI)

- **Table 4. Comparison of clinical variables between low- and high-grade combined liver and splenic injuries**

Variable	Low-grade (I-III) N=10	High-grade (IV-V) N=10	P-value
Median age in years	15.2 (14.9, 15.3)	13.0 (3.3, 16.3)	=0.23
Injury Severity Score	15.5 (13.0, 22.0)	27.5 (17.0, 34.0)	=0.14
Median LOS without TBI	3.0 (0.3, 28.2)	7.7 (2.7, 15.7)	=0.60
Median LOS with TBI	5.2 (1.8, 25.3)	9.8 (3.6, 27.4)	=0.56
ICU stay	50% (5)	100% (10)	=0.01
Transfusion requirement	40% (4)	100% (10)	<0.01

*Traumatic brain injury (TBI)

Conclusion

- **Management of BLSI based on hemodynamic status alone is safe and reproducible.**

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