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

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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.