

Changes in Injury Patterns Associated with Elevated Blood Alcohol Level

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Background

- Falls account for a significant portion of traumatic injuries, with unintentional falls being the grand majority (~90%)¹
- Different injury patterns based on person's state (sober vs intoxicated). Sober patients experience more lower extremity injuries while intoxicated patients experience more head and spinal cord injuries²
- Intoxication involves being under the influence of alcohol as well as prescription medications and illegal drugs

Objective

The objective of this study is to define common injury patterns due to alcohol-induced falls in different patient populations with the aim to improve public health outreach, education and prevention in high-risk fall population.

Methods

- Retrospective study of EtOH positive patients
- N = 1141

Study period:
January 1, 2016
to March 30, 2021

Study population
divided into
EtOH ≥80mg/dL
and EtOH
<80mg/dL

Continuous
variables
compared using
Wilcoxon test

Categorical
variables
compared using
Pearson's chi-
squared test

Results

Table 1: ETOH+ Fall Trauma Patients; Demographics vs Under/Over Legal Drinking Limit (N=1141)

	ETOH Level ≥80 (N=714, 62%)	ETOH Level ≤79 (N=427, 37%)	P-Value
ETOH (X,M[SD]IQR)	231,229[89,3]125	18,6,7[21,2]22	<0.01
Age (X,M[SD]IQR)	60,1,63[15,7]19	69,8,72[16,1]21	<0.01
Gender			
Male (N=699, 61%)	472, 66%	227, 53%	<0.01
Female (N=442, 38%)	242, 33%	200, 46%	
Race			
Caucasian (N=1026, 89%)	631, 88%	395, 92%	0.03
Other/Unknown (N=115, 10%)	83, 11%	32, 7%	0.03
Mode of Arrival			
Ground Ambulance (N=1013, 88%)	655, 91%	358, 83%	<0.01
Private Vehicle or Walk-In (N=113, 9%)	49, 6%	64, 14%	<0.01
HEMS (N=15, 1%)	10, 2%	5, 1%	0.95
Transfer In			
Yes (N=138, 12%)	78, 10%	60, 14%	0.14
Season			
Spring (N=283, 24%)	187, 26%	96, 22%	0.39
Summer (N=299, 26%)	183, 25%	116, 27%	
Fall (N=280, 24%)	178, 24%	102, 23%	
Winter (N=279, 24%)	166, 23%	113, 26%	
Year			
2017 (N=228, 19%)	137, 19%	91, 21%	0.42
2018 (N=313, 27%)	179, 25%	134, 31%	0.02
2019 (N=314, 27%)	167, 23%	147, 34%	<0.01
2020 (N=234, 20%)	185, 25%	49, 11%	<0.01
2021 (N=52, 4%)	46, 6%	6, 1%	<0.01

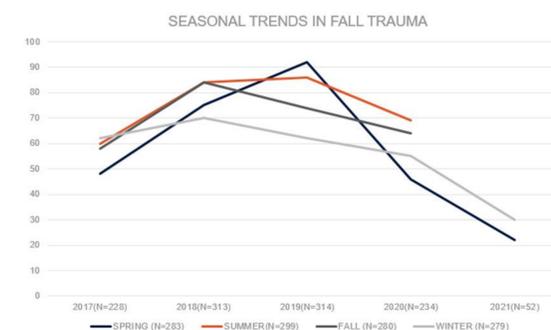
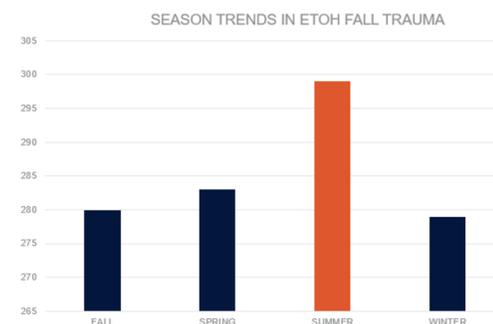


Table 2: ETOH+ Fall Trauma Patients; Injury Patterns vs Under/Over Legal Drinking Limit (N=1141)

	ETOH Level ≥80 (N=714, 62%)	ETOH Level ≤79 (N=427, 37%)	P-Value
Trauma Activation			
Fall (N=248, 21%)	174, 24%	74, 17%	<0.01
Partial (N=811, 71%)	475, 66%	336, 78%	<0.01
Consult (N=51, 4%)	41, 5%	10, 2%	0.01
None (N=31, 2%)	24, 3%	7, 1%	0.12
ISS (X,M[SD]IQR)	5,51,4[6,10]8	6,25,4[7,85]8	0.74
GCS (X,M[SD]IQR)	14,0,15[2,58]1	14,1,15[2,73]0	<0.01
Mode of Injury			
Fall From Stairs (N=120, 10%)	86, 12%	34, 7%	0.03
Ground Level Fall (N=633, 55%)	383, 53%	250, 58%	0.12
Fall From Object (chair/bed/etc.) (N=87, 7%)	48, 6%	39, 9%	0.17
Fall From Tree/Building Structure (roof/balcony, etc.) (N=44, 3%)	29, 4%	15, 3%	0.75
Fall From Ladder/Scaffolding (N=31, 2%)	11, 1%	20, 4%	<0.01
Fall Other/Unknown (N=226, 19%)	157, 21%	69, 11%	0.02
Mechanism of Injury			
Blunt (N=1138, 99%)	714, 100%	424, 99%	0.09
Penetrating (N=3, 0.2%)	0, 0%	3, 0.7%	0.09
ISS Region			
Head/Neck (X,M[SD]IQR)	2,28,2[1,13]2	2,63,2[1,34]2	0.01
Face (X,M[SD]IQR)	1,61,2[0,49]1	1,43,1[0,55]1	0.05
Chest (X,M[SD]IQR)	2,21,2[0,8]1	2,45,1[0,87]1	0.32
Abdominal/Pelvic (X,M[SD]IQR)	2,07,2[0,47]0	2,41,2[0,79]1	0.20
Lower Extremity or Pelvis (X,M[SD]IQR)	2,23,2[0,55]1	2,16,2[0,51]0	0.34

Gross Diagnosis	ETOH Level ≥80 (N=714, 62%)	ETOH Level ≤79 (N=427, 37%)	P-Value
Amputation/Burns (N=2, 0.01%)	2, 0.0%	0, 0%	0.71
Neuro			
Concussion (N=225, 19%)	166, 22%	60, 14%	<0.01
Intracranial Injury (N=213, 18%)	129, 18%	84, 19%	0.55
Nerve or Spinal Cord (N=23, 2%)	11, 1%	12, 2%	0.21
Skull Fracture (N=37, 3%)	27, 3%	10, 2%	0.24
Head NFS (N=3, 0.02%)	1, 0.1%	2, 0.4%	0.65
Spinal Fracture (N=75, 6%)	42, 5%	33, 7%	0.27
Facial Fractures (N=133, 9%)	80, 11%	53, 12%	0.07
Abdominal/Retroperitoneal (N=13, 1%)	7, 0.9%	6, 1%	0.71
Orthopedic			
Shoulder Girdle Fracture (N=39, 3%)	21, 2%	18, 4%	0.32
Upper Extremity Fracture (N=73, 6%)	42, 5%	31, 7%	0.42
Lower Extremity Fracture/Hip (N=81, 7%)	45, 6%	36, 8%	0.21
Dislocation/Sprain/Subluxation (N=22, 1%)	13, 1%	9, 2%	0.91
Pelvic Fracture (N=21, 1%)	9, 1%	12, 2%	0.09
Soft Tissue (N=962, 84%)	609, 85%	353, 82%	0.27
Thoracic Trauma			
Rib Fractures (N=68, 5%)	45, 6%	23, 5%	0.61
Sternum Fracture (N=44, 3%)	25, 3%	19, 4%	0.51
Hemo/Pneumo/Mediastinal (N=33, 2%)	18, 2%	15, 3%	0.43
Vascular (N=5, 0.04%)	5, 0.7%	0, 0%	0.20

Discussion and Conclusions

- Consuming alcohol in preceding 6 hours has 8x increased risk of injury
- Dose-response effect: higher risk with ≥4 drinks compared to ≤3 drinks³
- Intoxicated patients have higher tendency to fall from stairs or ladders and suffer blunt injuries to head, neck or face, and pelvic fractures
- This study shows an 18% association between falls with alcohol over legal limit and intracranial injuries. Very high morbidity and mortality for the patient
- Greater incidence of alcohol-related falls seen in the summertime, which is expected in Myrtle Beach
- Knowing these injury patterns is important to increase awareness and improve prevention in high-risk populations

References

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