



Neurological Injury in Snowmobiling

Anthony L. Petraglia MD; Vasisht Srinivasan MD; Clifford Pierre; Benjamin Plog; Jason H. Huang MD
Department of Neurosurgery, University of Rochester Medical Center, Rochester, NY



Introduction

Snowmobiles are increasingly popular recreational, all-terrain utility vehicles that require skill and physical strength to operate, given their inherent maneuverability, acceleration and top speed-capabilities. These same characteristics increase the risk of injury with operation of these vehicles, particularly neurological injury. We characterize our series of 107 patients involved in snowmobiling accidents.

Methods

From January 2004 to January 2012, all snowmobiling-related injuries referred to our regional trauma center were reviewed. Information had been recorded in the hospital's trauma registry, and medical records were retrospectively reviewed for data pertaining to the injuries, with particular emphasis on neurological injuries and any associated details.



Results

A total of 107 patients were identified. Ninety percent of injured riders were male. The mean age was 34.4 years (range 10-70), with 7% younger than age 16. The mean Injury Severity Score was 12.0 +/- 0.69 (range 1-34). Although not documented in all patients, alcohol use was found in 7.5% of the patients and drug use found in 1 patient.

Table 1		
Demographics and Disposition of Patients with Snowmobile Trauma		
Characteristic		
Age (year)		
Average		34.4
Range		10-70
Male gender (%)		90%
Patients younger than age 16 yrs (%)		7%
Average Length of Stay (days)		4.98 ± 0.56
Disposition		
Home		78%
Home w/ services		12%
Rehabilitation placement		9%
Death		1%

Table 2			
Mechanism of Snowmobile Injury (N=107)			
Reported reason	Number	%	
Thrown/flipped/roll-over	35	33	
Struck stationary object	29	27	
Injured by machine itself	10	9	
Struck another snowmobile	6	5	
Struck car/train/truck	6	5	
Other	2	2	
Unspecified	19	18	

Results

Documentation of helmet use was available for only 31 of the patients; of which 13% were unhelmeted. Causes included thrown/flipped/roll-over (33%), striking a stationary object (27%), being struck by a snowmobile (9%), striking another snowmobile (5.5%) or car/train/truck (5.5%), other (2%) or unspecified (18%). Head injuries occurred in 35% patients, including concussion, SAH, SDH, contusion, and facial/skull fracture. Spinal fractures occurred in 21% of the patients. Fractures to the thoracic spine were the most common (50%), followed by the cervical (41%) and lumbar (36%) spine. There were also three brachial plexus injuries, one tibial nerve injury, and one ICA dissection. Average LOS was 4.98 +/- 0.56 days. Disposition was home (78%), home with services (12%), rehab placement (9%) and one death. Details regarding non-neurological systemic injuries are shown in the table.

Table 3		
Spectrum of Injuries		
Characteristic		
Spinal fractures		(21%)
Cervical		41%
Thoracic		50%
Lumbar		36%
To Operating Room		9%
Head Injuries		(35%)
Peripheral Nerve (3 brachial plexus, 1 tibial nerve)		(4%)
Vascular (ICA dissection)		(1%)

TABLE 4		
Non-neurological Injuries Resulting From Snowmobile Incidents		
Injury		No (%) of patients (N=107)
Orthopedic		
Upper Extremity		17 (16)
Lower Extremity		36 (34)
Hip/Pelvis		6 (6)
Abdominal		
Liver		4 (4)
Kidney		2 (2)
Spleen		13 (12)
Other		2 (2)
Thoracic		
Pulmonary Contusion		17(16)
Pneumo-/Hemothorax		20 (19)
Rib Fractures		31 (29)
Clavicle Fracture		12 (11)
Scapula Fracture		3 (3)

Conclusions

Snowmobiles are a significant source of multitrauma, particularly neurological injury. Neurosurgeons can play key roles in advocating for neurological safety in snowmobiling.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the spectrum of neurological injury seen in snowmobiling participants, 2) Discuss, in small groups, the means by which these injuries can be avoided or reduced, 3) Identify root causes of injury to develop strategies for prevention.