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BRIEF REPORT

Epidemiology of Hunting Stand Injuries Presenting to US Emergency Departments, 2008–2013

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Objective.—To determine the epidemiology of injuries from hunting stands presenting to US emergency departments (EDs).

Methods.—The National Electronic Injury Surveillance System (NEISS) database was queried for ED visits for the period 2008 through 2013 for hunting stand injuries and analyzed for age, diagnosis, sex, race, anatomic location of the injury, the use of alcohol, and association with a gunshot wound.

Results.—There were an estimated 38,308 visits with an average age of 40.0 years (range, 1–83 years). The patients were predominantly male (93.3%), white (99.1%), and seen at small- or medium-size hospitals (80.6%). Disposition from the ED was admission in 20.1% and released in 79.9%. A fall occurred in 80.3%, a gunshot wound in 0.4%, and alcohol was involved in 0.6%. The most common diagnoses were a fracture (34.7%), contusion or abrasion (24.0%), strain or sprain (16.8%), laceration (7.7%), and internal organ injury (5.4%). Those injured in a fall were more frequently admitted (23.0% vs. 8.7%) and more likely to have a fracture (37.9% vs. 9.1%). Those with a fracture were older (44.6% vs. 37.9%). Those with internal organ injuries were more frequently admitted (44.8% vs 18.6%).

Conclusions.—This study has characterized the epidemiology of hunting stand injuries with most occurring from falls. A fracture was the most common injury with a very low alcohol intoxication rate. These baseline data can now be used to compare other studies of hunting stand injuries and guide prevention strategies, such as education regarding the need for safety measures to prevent falls.

Key words: firearm, injury, hunting, epidemiology, tree stands, hunting stands

Introduction

Recreational hunting is a popular sport in the United States. The US Fish and Wildlife Service estimated that approximately 13 million people annually participated in hunting activities between 1991 and 2011.[1] Hunting stand injuries (Figure 1) have a higher associated mortality than gunshot injuries for hunters.[2,3] There have been several small studies evaluating the injuries associated with such stands,[2–9] and one has investigated the overall pattern of injuries across a national database to include all patients.[10] The purpose of this study was to expand the pattern of injuries from hunting stands using a national database, and specifically focus on fracture location as well as if the patient fell from the stand, sustained a fracture or gun shot wound, and/or was alcohol involved. This will provide a comprehensive perspective of this issue and the associated injuries. These data can then be used to propose future prevention programs for patients and education of first responders (eg, emergency medical technicians), and to guide medical kit development and future studies.

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Methods

The data for this study were obtained from the National Electronic Injury Surveillance System (NEISS). The NEISS collects data from a probability sample of hospitals in the United States and its territories that have at least 6 beds and an emergency department (ED). The sample contains 5 strata, 4 based on size (the total number of ED visits reported by the hospital: small [0–16,830], medium [16,831–21,850], large [28,151–41,130], and very large [>41,130]) and 1 stratum consisting of children's hospitals of all sizes. Currently there are 100 hospitals in the NEISS. Each hospital has an associated weight based on its ED size and geographic location. To produce national estimates of

Figure 1. A hunter sitting in a hunting stand during the winter. A fall from such a height can result in serious injury. (Figure courtesy of the Indiana Department of Natural Resources.)

injuries, the statistical weights must be used rather than raw case counts. Estimates across the entire data set (in this instance the United States and its territories) are thus calculated using appropriate statistical software that accounts for the stratified, weighted data. This database is in the public domain and can be found at www.cpsc.gov/library/neiss.html.

The detailed data for ED visits for the 6-year period from January 2008 through December 2013 owing to hunting stands (NEISS product code 1895) was downloaded from the NEISS website and analyzed for age, diagnosis, sex, race, anatomic location of the injury, and the use of alcohol. Race was classified as White, Black, Amerindian (Hispanic and Native American), and Indo-Malay (Asian origins).[11] The years 2008 through 2013 were chosen to amplify the data from the previous published study which stopped at 2007.[10] This study received an exemption from the local institutional review board.

The narrative features for each case were analyzed to determine whether the patient fell from the stand or sustained a gunshot wound, or whether alcohol was involved. The terms used for gunshot wound were *shot, gunshot,* and *GSW.* The terms used for a fall were *fall, fell,* and *fallen.* The terms used to search for alcohol were *alcohol, EtOH, intoxicated, drinking, drank, drunk, club, ethanol, saloon, tavern, liquor, booze, beer, whiskey, brandy, rum, vodka, scotch, tequila, wine, sake, champagne,* and *cognac.*

STATISTICAL ANALYSES

Statistical analyses were performed with SUDAAN 10 software (RTI International, Research Triangle Park, NC, 2008), which accounts for the weighted and stratified nature of the data. Continuous data are reported as the mean, and discrete data, as frequencies. Analyses between groups of continuous data (age) were performed with the Student's *t* test (2 groups) or analysis of variance (3 or more groups). Differences between groups of discrete data (sex, race, ED disposition, stratum, diagnosis, month, weekday, and yes or no for internal organ injury, fall from stand, gunshot wound, alcohol involvement, and fracture) were analyzed by the χ^2 test. A probability value of less than .05 was considered statistically significant. As this was an exploratory descriptive study, there were no preconceived outcomes. However, I did analyze for any differences between those who had or had not fallen from the stand, sustained a gunshot wound, sustained a fracture, or sustained an internal organ injury.

Results

During the 6-year period there were an estimated 38,308 ED visits (95% CI [35,595, 40,925]) owing to hunting stand injuries (Table 1). This gives an annual average of 6385 patients sustaining injuries from hunting stands. The average age of the patients was 40 years (Figure 2). The demographics are shown in Table 1; most patients were white men. The distribution of injuries is shown in Table 1 and Figure 3. One fifth of the patients were admitted, and approximately 80% fell from the stand. Alcohol use and sustaining a gunshot wound were very rare. The most common diagnosis was a fracture. Detailed analyses of the internal organ injuries revealed that 2126 (83.2%) involved the brain or head (from a simple concussion to intracranial bleed, excluding skull fractures), 301 (11.8%) the chest (eg pneumothorax, mediastinal hemorrhage), and 177 (5.0%) the abdomen (eg, liver or spleen laceration). Detailed analyses of the disposition are shown in Table 2. With increasing hospital size there were fewer patients transferred to another hospital, but more were directly admitted.

Discussion

There are several studies that discuss falls from tree or hunting stands (Table 3).[2–10] There is one previous study