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BRIEF REPORT

Animal-Related Motorcycle Collisions in North Dakota

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Objective.—To study the epidemiology and mortality of animal-motorcycle collisions.

Methods.—A retrospective study of all motorcycle collisions recorded in the North Dakota Department of Transportation Crash Reporting System from January 2007 to December 2009 was conducted. Mortality was designated as the main outcome measure.

Results.—Seven hundred sixty-six collisions involving 798 motorcycles were included in this study; 48 of these collisions were with animals (6.3% of all motorcycle collisions). Deer were the most common animal involved (81%). Most animal-motorcycle collisions took place during nighttime with clear weather and on straight rural roads. Drivers were older in animal collisions compared with nonanimal collisions (median of 44 vs 30 years old, respectively, $P < .0001$). Most drivers were males, whereas most passengers were females. Helmets were worn by only 32% of drivers and 12% of passengers. There were 4 (8%; 95% CI, 3%–20%) fatal animal collisions; 9% of the collisions with large animals were fatal compared with 3% of nonanimal collisions ($P = .0411$).

Conclusions.—Animal-motorcycle collisions are a small subgroup of all motorcycle collisions, but with a high mortality rate. Efforts should be made to increase helmet usage, mitigate these collisions, and increase awareness of this problem among motorcycle riders.

Key words: animal, collision, deer, mortality, motorcycle

Introduction

Each year in the United States, it is estimated that 1 to 2 million collisions occur between vehicles and large animals (defined as an animals capable of causing substantial property damage on impact; eg, deer and larger).[1] Most animal-vehicle collisions (AVCs) occur in rural areas, on roads with 55 mph or higher speed limits, during evening or nighttime hours, and in the darkness.[2,3] Kangaroos and wallabies are the predominant animals that cause AVCs in Australia, camels cause many accidents in Saudi Arabia, and moose and deer primarily cause accidents in Europe and Canada.[4] The vast majority (as high as 90% in some states) of reported AVCs in the United States involve deer.[1]

Motorcycles are the second most common vehicles involved in fatal AVCs in the United States. Williams and Wells reviewed 147 fatal AVCs between 2000 and 2002 in 9 states in different regions of the United States (Colorado, Georgia, Minnesota, Missouri, North Carolina, Ohio, Pennsylvania, South Carolina, and Wisconsin); 37% of these fatalities involved a motorcyclist striking an animal and falling off the vehicle (65% of the killed motorcyclists were not wearing helmets).[3] In another study, motorcycles were 6 times more likely to be involved in fatal AVCs than other vehicles.[2]

In these previous studies, motorcycles were a subgroup of all the vehicles colliding with animals. Studies looking specifically at animal-motorcycle collisions in the medical literature are lacking. We therefore sought to analyze the epidemiology of animal-motorcycle collisions in North Dakota.

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Methods

In this retrospective study, we examined all motorcycle collisions recorded in the database of the North Dakota

Department of Transportation Crash Reporting System from January 2007 to December 2009. The information in this database is obtained from a Crash Report completed by the law enforcement officer investigating the collision. The report includes where and when the crash occurred, who was involved, what the drivers were doing, what kind of vehicles were involved, what caused the collision, and whether there were injuries or fatalities. When the investigation is complete the Crash Report is submitted to the North Dakota Department of Transportation and uploaded into the Crash Reporting system. In North Dakota, reporting of vehicle accidents resulting in injury to or death of any person, or property damage to an apparent extent of at least $1000, is mandatory.[5]

On March 23, 2010, the Crash Reporting System was queried for the purpose of this study. The data collected included: time, date, and location of the collision; environmental conditions at the time and the site of the collision; type of road; age and gender of the driver and passenger of the motorcycle; presence of alcohol; use of helmet; and whether the collision was fatal. A fatality is defined as any person who dies within 30 days of the collision. We manually reviewed all animal collisions to identify the animal. In addition, information about motorcycle license was manually obtained from the original police report in all animal collisions and all fatalities.

StatView (version 5.0; SAS Institute, Cary, NC) was used for statistical analyses. Data are summarized as median (interquartile range [IQR]) or percentages. The proportion of motorcycle collisions with animals was calculated. Animal collisions were compared with nonanimal collisions, and fatal animal collisions were compared with nonfatal animal collisions. Comparisons for continuous data were made using the Mann-Whitney U test, and for categorical data, the χ^2 or the Fisher exact tests. The 95% confidence interval (CI) was calculated when needed. A probability value of less than .05 was considered statistically significant. The Institutional Review Board of Saint Alexius Medical Center, Bismarck, North Dakota, approved the study, and a waiver of informed consent was granted. In addition, a data use agreement for disclosure of protected (individually identifiable) health information was obtained from the North Dakota Department of Health.

Results

Between 2007 and 2009, 810 collisions occurred involving 843 motorcycles in North Dakota. After excluding 44 of these collisions (45 motorcycles) because the motorcycle was parked with no operator, 766 collisions involving 798 motorcycles (27 collisions involved 2 or more motorcycles) were included in this study. Forty-eight of these collisions (49 motorcycles) were with animals (6.3% of all motorcycle collisions); 39 (81%) with a deer, 4 (8%) with a dog, 1 (2%) with an antelope, 1 (2%) with a donkey, 1 (2%) with a horse, 1 (2%) with a moose, and 1 (2%) with a pheasant. Compared with nonanimal collisions, most animal collisions took place during nighttime with clear weather and on straight rural roads (Table 1).

Compared with nonanimal collisions, drivers were older in animal collisions (Table 2). Most drivers were males, whereas most passengers were females. Alcohol was present in a small proportion of the drivers (4% in animal and 11% nonanimal collisions); however, testing was not performed in the majority of collisions. The proportion of drivers and passengers wearing a helmet was similar in both types of collisions (Table 2).

Of the 49 drivers involved in animal collisions, 8 (16%) had no motorcycle license, 6 (12%) had an out-of-state motorcycle license, and in 1 (2%) the information was missing. Thirty-four (69%) drivers were licensed in North Dakota, and had been for a median (IQR) of 9 years (3–30). No difference was noted when comparing the years of motorcycle license between fatal and nonfatal animal collisions (data not shown).

FATALITIES

Four (8%; 95% CI, 3%–20%) fatal animal collisions occurred compared with 22 (3%; 95% CI, 2%–5%) fatal nonanimal collisions ($P = .0510$). The 4 fatal animal collisions caused 4 deaths: 3 drivers died in deer collisions, and 1 passenger died in a moose collision. The 22 fatal nonanimal collisions caused 24 deaths, 18 drivers and 6 passengers. If the collisions with small animals (dog and pheasant) are excluded, then 9% of the collisions with large animals were fatal compared with 3% of nonanimal collisions ($P = .0411$).

Information regarding the drivers and passengers who died is presented in Table 3.

Discussion

Animal-vehicle collisions are a serious public health problem. Most studies looking into AVCs have analyzed the characteristics and risk factors of fatal animal collisions.[2,3] We were able to find only one study looking at the mortality of animal-motorcycle collisions. In the study by Nelson et al,[6] a retrospective chart review at a tertiary referral center in Wisconsin for a 9-year period (1993–2002), the authors identified 55 deer–motorcycle collisions in which 7 (12.7%) individuals died. This mortality rate, however, can be an overestimation if only the sickest patients were admitted and then referred to