Alcohol 53 (2016) 1–7

Contents lists available at ScienceDirect

Alcohol

journal homepage: http://www.alcoholjournal.org/

Alcohol use by urban bicyclists is associated with more severe injury, greater hospital resource use, and higher mortality

Monica Sethi [a], Jessica H. Heyer [a], Stephen Wall [b], Charles DiMaggio [a], Matthew Shinseki [a], Dekeya Slaughter [a], Spiros G. Frangos [a,*]

[a] Department of Surgery, New York University School of Medicine/Bellevue Hospital Center, New York, NY, USA
[b] Department of Emergency Medicine, New York University School of Medicine/Bellevue Hospital Center, New York, NY, USA

ARTICLE INFO

Article history:
Received 3 September 2015
Received in revised form
26 March 2016
Accepted 28 March 2016

Keywords:
Alcohol
Bicycle injury
Bicycle trauma
Traffic safety
Intoxication

ABSTRACT

Alcohol use is a risk factor for severe injury in pedestrians struck by motor vehicles. Our objective was to investigate alcohol use by bicyclists and its effects on riding behaviors, medical management, injury severity, and mortality within a congested urban setting. A hospital-based, observational study of injured bicyclists presenting to a Level I regional trauma center in New York City was conducted. Data were collected prospectively from 2012 to 2014 by interviewing all bicyclists presenting within 24 h of injury and supplemented with medical record review. Variables included demographic characteristics, scene-related data, Glasgow Coma Scale (GCS), computed tomography (CT) scans, and clinical outcomes. Alcohol use at the time of injury was determined by history or blood alcohol level (BAL) >0.01 g/dL. Of 689 bicyclists, 585 (84.9%) were male with a mean age of 35.2. One hundred four (15.1%) bicyclists had consumed alcohol prior to injury. Alcohol use was inversely associated with helmet use (16.5% [9.9–25.1] vs. 43.2% [39.1–47.3]). Alcohol-consuming bicyclists were more likely to fall from their bicycles (42.0% [32.2–52.3] vs. 24.2% [20.8–27.9]) and less likely to be injured by collision with a motor vehicle (52.0% [41.7–62.1] vs. 67.5% [63.5–71.3]). 80% of alcohol-consuming bicyclists underwent CT imaging at presentation compared with 51.5% of non-users. Mortality was higher among injured bicyclists who had used alcohol (2.9% [0.6–8.2] vs. 0.0% [0.0–0.6]). Adjusted multivariable analysis revealed that alcohol use was independently associated with more severe injury (Adjusted Odds Ratio 2.27, $p = 0.001$, 95% Confidence Interval 1.40–3.68). Within a dense urban environment, alcohol use by bicyclists was associated with more severe injury, greater hospital resource use, and higher mortality. As bicycling continues to increase in popularity internationally, it is important to heighten awareness about the risks and consequences of bicycling while under the influence of alcohol.

© 2016 Elsevier Inc. All rights reserved.

Introduction

A staggering number of traffic fatalities have been linked to alcohol. Of the 858,741 traffic fatalities from 1982 to 2001 in the United States (US), 43% were associated with alcohol use (Cummings, Rivara, Olson, & Smith, 2006). Alcohol is a well-recognized risk factor for traffic collisions because it can impair judgment and cognitive function (Stübig et al., 2012). Driving a motor vehicle while intoxicated leads to a significantly increased risk of severe injury and mortality, and legislation has been passed to combat the problem of driving under the influence (Dultz et al., 2011; Stübig et al., 2012). Urban pedestrians who use alcohol have also been shown to demonstrate risky behaviors which put them at risk for injury by motor vehicles (Dultz et al., 2011). The use and sequelae of alcohol by bicyclists in these settings are less clear.

In the last decade, bicycling has increased substantially in popularity in many cities worldwide. With the recent implementation of the largest bicycle-sharing program in the US, New York City (NYC) is representative of this trend. In NYC, there are no laws prohibiting bicycling under the influence, even though the proportion of bicycle injuries related to alcohol consumption has been increasing (Twisk & Reurings, 2013). Although the body of literature on alcohol-linked bicycle injuries is limited, alcohol consumption among cyclists has been shown to increase the risk of an injury or fatal crash (Li, Baker, Smialek, & Soderstrom, 2001; Martínez-Ruiz et al., 2013; Olkkonen & Honkanen, 1990). The association between alcohol use and bicycle-related injury has been studied (Li & Baker, 1994; Li, Shahpar, Soderstrom, & Baker, 2000;

The authors report no conflicts of interest.

* Corresponding author. NYU School of Medicine, 550 First Avenue, NBV 15 S7, New York, NY 10016-9196, USA.
E-mail address: spiros.frangos@nyumc.org (S.G. Frangos).

http://dx.doi.org/10.1016/j.alcohol.2016.03.005
0741-8329/© 2016 Elsevier Inc. All rights reserved.

Orsi, Ferraro, Montomoli, Otte, & Morandi, 2014; Stübig et al., 2012), yet precise information about mechanisms of injury, injury severity, medical management, and detailed outcomes is sparse. Moreover, the design of previous studies has been inconsistent and the sample size of published reports has often been small.

The objective of this study was to investigate alcohol use by bicyclists and its role in bicyclist injuries, including its effects on riding behaviors, medical management, injury severity, and mortality within a congested urban setting. Despite the lower speeds inherent in a high-population urban center, we hypothesize that alcohol use by urban bicyclists is independently associated with greater injury severity and worse outcomes.

Materials and methods

An observational study of injured bicyclists presenting to Bellevue Hospital Center (BHC) – a Level I regional trauma center – was performed. Data were collected in a prospective fashion between February 1, 2012 and August 31, 2014, excluding a 14-week interruption (between October 29, 2012 and February 7, 2013) when clinical services were disrupted as a result of Superstorm Sandy. BHC's primary catchment area includes midtown and lower Manhattan and western Brooklyn. The BHC emergency department (ED) evaluates over 100,000 patients annually.

Bicyclists who presented to the BHC ED within 24 h of injury were approached for enrollment in the study. Children under 13 years of age were excluded from analysis. Demographic and incident-related data were elicited primarily from the patients (i.e., self-report) and supplemented by data from first responders as available. Data were collected with the use of a standardized data collection template, and data collection was performed by a dedicated study coordinator, attending trauma surgeons, emergency medicine physicians, physician assistants, and the trauma program coordinator. Patients were interviewed only when they were determined to have capacity and able to give informed verbal consent. If patients were unwilling to consent, they were not included in the study. If mental status precluded informed consent in patients who were head-injured, family was approached and served as a surrogate for consent. Pre-hospital care reports were also reviewed if available.

Data collection involved over 100 distinct variables. Alcohol use at the time of injury was determined on a case-by-case basis by history or blood alcohol level (BAL). BALs were obtained as part of a routine work-up in many cases, including those where triage criteria warranted a trauma team activation. A BAL of >0.01 g/dL, the lowest detectable value for the clinical laboratory, was considered positive and an indication of use prior to the incident. If laboratory data were not available, self-reported history of alcohol use in the recent hours prior to the incident was obtained.

Outcomes variables included the best Glasgow Coma Scale (GCS) score at the time of arrival, initial computed tomography (CT) imaging studies, Abbreviated Injury Scale (AIS) score, Injury Severity Score (ISS), admission status, hospital length of stay (LOS), procedures (e.g., surgeries, intubations), disposition, and mortality. Briefly, ISS is an anatomical scoring system for patients with multiple injuries. Each individual injury is assigned an AIS, with numerical scores for the three most severely injured body regions squared, and added to determine the ISS. AIS and ISS were calculated for each patient after attending radiology evaluations were finalized.

Data were analyzed using STATA version 13.0 statistical software. Means and proportions with 95% Confidence Intervals (CIs) were reported for continuous and categorical data and stratified by alcohol use. Any missing data points were specified for the relevant variables as footnotes in the tables. In contrast to scene-related variables, hospital-based variables (e.g., AIS score, procedures performed, imaging results) had no missing data. We used multivariable ordinal logistic regression to model the effect of alcohol use on injury severity, as defined by a five-category injury severity score, while controlling for other variables. Results of the multivariable logistic regression are represented by adjusted odds ratios (AOR) and 95% CIs. Additionally, the multivariable model employed multiple imputations to account for missing data using the method of chained equations.

Both the New York University School of Medicine and the BHC institutional review boards approved the studies. Funding was provided by a Highway Safety Grant from the State of New York Governor's Traffic Safety Committee.

Results

Six hundred eighty-nine bicyclists met inclusion criteria. Five hundred eighty-five (84.9%) were male with a mean age of 35.2 years [range: 13–82]. Of the 689 patients in this study, BALs were drawn on 279 patients (40.5%). BAL was positive (>0.01 g/dL) in 70 patients, who were marked as having used alcohol at the time of injury. Four hundred ten patients (59.5%) did not have BALs drawn, based on a recent history of alcohol use provided by the patient. Thirty-three additional bicyclists were included in the alcohol group (Fig. 1). One patient who had an undetectable BAL on arrival to BHC had been transferred from another hospital with documented alcohol use prior to the crash. In total, 104 (15.1%) bicyclists were under the influence of alcohol at the time of injury, while 585 (84.9%) bicyclists were not.

Demographic characteristics

Bicyclists' demographic characteristics stratified by alcohol use are listed in Table 1. There were no statistically significant differences in gender or ethnicity between the alcohol-use and no alcohol-use groups.

Riding behaviors and mechanisms of injury

Bicyclists' behaviors and mechanisms of injury are detailed in Table 2. Bicyclists who used alcohol were more likely to be riding for leisure (65.6% [55.0–75.1] vs. 42.0% [37.9–46.3]), and less likely to be working (4.1% [1.1–10.2] vs. 23.9% [20.5–27.6]). Alcohol use was inversely associated with wearing a helmet (16.5% [9.9–25.1] vs. 43.2% [39.1–47.3]). Alcohol-consuming bicyclists were more likely to fall from their bicycles (42.0% [32.2–52.3] vs. 24.2% [20.8–27.9]) and less likely to be injured from collisions with motor vehicles (52.0% [41.7–62.1] vs. 67.5% [63.5–71.3]). Alcohol-consuming bicyclists were also less likely to be hit by a car door (2.1% [0.2–7.5] vs. 13.2% [10.5–16.3]). There were no significant differences in other riding behaviors, including riding with or against traffic, riding in a bike lane or path, or crossing against the signal or stop sign.

A higher proportion of alcohol-consuming cyclists was injured in the borough of Brooklyn (28.9% [20.1–39.0] vs. 13.1% [10.5–16.2]) and a lower proportion was injured in Manhattan (69.1% [58.9–78.1] vs. 85.3% [82.2–88.1]). Intoxicated bicyclists were more likely to be injured from the hours of 12:00 AM to 6:00 AM, and less likely to be injured during the daylight hours of 9:00 AM to 3:00 PM (Table 2). Injuries sustained during morning or evening rush hours did not differ between groups. There were no differences between groups with respect to day of the week or road surface conditions.

Download English Version:

https://daneshyari.com/en/article/1066811

Download Persian Version:

https://daneshyari.com/article/1066811

Daneshyari.com