



Bicycle injuries: A matter of mechanism and age

Maya Siman-Tov^a, Dena H. Jaffe^a, Kobi Peleg^{a,b,*}, Israel Trauma Group¹

^a Israel National Center for Trauma and Emergency Medicine, Gertner Institute for Epidemiology and Public Health Policy, Tel-Hashomer, Israel

^b Department of Disaster Management, School of Public Health, Tel Aviv University, Israel

ARTICLE INFO

Article history:

Received 20 June 2010

Received in revised form 1 October 2010

Accepted 7 October 2010

Keywords:

Bicycle-related injuries

Trauma

Mechanism of injury

Prevention

ABSTRACT

Bicycle riding is a popular form of recreation with positive health and environmental effects. These road users are vulnerable to serious injuries, especially when motor vehicles are involved. The goal of this study was to characterize cyclist-related injuries according to motor vehicle involvement for adults versus children.

A retrospective study was carried out using data from 11 trauma centers in the Israeli National Trauma Registry (2001–2007). Injuries were classified according to whether a motor vehicle was involved, and differences in injury characteristics were assessed for adults (18+ years) versus children (1–17 years).

A total of 5529 patients were hospitalized for bicycle injuries, of whom 1765 were adults and 3764 were children. Thirty percent ($n = 1662$) of all bicycle injuries involved motor vehicles, although the rate of injuries resulting in hospitalization was 37% among adults and 27% among children. Injury characteristics and hospital resource utilization differed substantially by age group. Cyclists struck by a motor vehicle presented with more severe injuries requiring more hospital resources and resulting in poorer outcomes than those not involved with motor vehicles. The interaction effect between motor vehicle involvement and age was significant for torso injuries and need for medical imaging. We found that injury characteristics, hospital resource utilization and health-related outcomes for bicycle injuries are highly dependent on patient's age and mechanism of injury. Effect modification of motor vehicle involvement by age may in part reflect physicians' attitudes toward pediatric imaging. The risks identified in this study should be used for preparedness and management of trauma hospitalizations from bicycle injuries.

© 2010 Published by Elsevier Ltd.

1. Introduction

In recent years, bicycle riding has become a popular form of recreation for all ages, and includes bike-path cycling, off-road cycling, athletic training, competitive racing, and touring. The prevalence of bicycle ridership in Israel has risen over the past decade by approximately 15% annually (Dan, 2006) and was complemented by a similar increase in imports and sales (BDI, 2005). At present there are nearly one million active riders in Israel, representing approximately 13% of the population (Or Yarok Organization, 2009).

In 2009 the WHO reported that nearly half of all road deaths were among vulnerable road users—pedestrians, cyclists, and motorcyclists (World Health Organization, 2009). Similar rates were observed in Israel, where 46% (188 of 412) of road deaths

in 2008 were to vulnerable road users (CBS, 2009). While the total number of bicycle-related deaths has decreased over time from 28 deaths in 2001 to 13 deaths in 2008, the number of reported bicycle casualties increased from 304 in 2001 to 440 in 2008 (CBS, 2002, 2009).

Children account for the majority of bicycle injuries likely due to their inexperience and risky riding behaviors (Yeung et al., 2009; Lee et al., 2009; Rosenkranz and Sheridan, 2003). More severe injuries and mortality rates related to bicycling are higher for adults, however, typically the result of collisions with motor vehicles (Kingma, 1994; Thompson and Rivara, 2001; Rosenkranz and Sheridan, 2003; Yeung et al., 2009). Among cyclists, differences in injury severity and outcome, if any, between mechanisms of injury and age group has not been studied.

The goal of this study was to characterize bicycle injuries resulting in hospitalization according to motor vehicle involvement for adults compared to children.

2. Methods

2.1. Data

A retrospective study was performed on data from 11 trauma centers participating in the Israel National Trauma Registry (ITR)

* Corresponding author at: Israel National Center for Trauma and Emergency Medicine Research, Gertner Institute for Epidemiology and Health Policy Research, Sheba Medical Center, Tel Hashomer 52621, Israel. Tel.: +972 3 5354252x1116; fax: +972 3 5353393.

E-mail address: kobip@gertner.health.gov.il (K. Peleg).

¹ Israel Trauma Group (ITG): J. Jeroukhimov, B. Kessel, Y. Klein, M. Michaelson, Y. Mintz, A. Rivkind, D. Soffer, D. Simon, G. Shaked, M. Stein, I. Waksman.