E – Bike related trauma in children and adults

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INTRODUCTION

Electric bicycles (e-bikes) are currently the most widely used form of electric transportation in the world. In the last few years, e-bikes are becoming even more popular. Approximately 29 million e-bikes were produced in 2010, representing a 24.7% increase compared to 2009. These trends are expected to continue and a worldwide increase in demand is predicted.

METHODS AND MATERIALS

Data of all e-bike related injuries presenting to our level 1 trauma center during the years 2014-2016 were collected and analyzed. Adult and pediatric (<18 years) e-bike related injuries were then analyzed separately and compared. In order to better understand the significance of these injuries, we collected data regarding motorcycle (MCC group) and non-E-bike (NEB group) injuries in the same period of time and randomly selected cases to match the number of E-bike injuries.

RESULTS

Forty-eight patients suffering from e-bike related injuries presented to our trauma center between 1.1.2014 and 31.12.2016. Seventeen (35%) patients were under 18 years old, 40 (85%) were male. The overall most common mechanism of injury was falling off the e-bike in 24 patients (50%), followed by collision with static objects in 9 patients (18.8%). Head (38%) and facial (33%) injuries were most common. Orthopedic trauma was predominant with extremity injuries – fractures in 35 (73%) followed by significant lacerations 14 patients (29%). Severe trauma (ISS >15) was found in 17 (35%) patients. Length of hospital stay was 10.8±6 days, 12 patients (25%) required ICU and 21 patients (43.7%) required surgery. Compared to adults, children (<18 years) had significantly more head and face injuries (P=0.05).

CONCLUSIONS

Our study suggests that E bike related trauma may involve serious injuries and have typical injury patterns that resemble those seen in motorcycle-related injuries. Children are more likely to suffer from head and face injuries due to their higher head to body ratio. We suggest that these injuries should therefore be triaged appropriately, preferably to a medical facility with proper trauma capabilities.

Mechanisms of injury

in e-bikes related trauma on presentation to the trauma unit – comparison of children (0-18 years) to adults.

Table 1 – comparison between children and adult with e bike related injury

	Children (number – 17)	Adults (number – 31)	P value
Age, mean (SD), years	13.7 (4)	39.7 (16.2)	<0.001
Gender, number of males (%)	13 (76.4%)	28 (90%)	0.19
Helmet usage, number (%)	2/9 (22.2%)	1/14 (7.1%)	0.29
ISS, mean (SD)	9.7 (±10.8)	13.5 (±8.3)	0.18
ISS >15, N (%)	4 (23.5%)	13 (41.9%)	0.2
Surgical intervention in the OR (%)	7 (41.1%)	14 (45.1)	0.79
Length of hospital stay, mean (SD), days	7.6 (15.8)	11.5 (6.7)	0.63
Number of patients hospitalized in ICU (%)	3 (17.6%)	9 (29%)	0.38

Body site of injury

in percentage in e-bikes related trauma on presentation to the trauma unit – comparison of children (0-18 years) to adults.

Types of injury

in percentage in e-bikes related trauma on presentation to the trauma unit – comparison of children (0-18 years) to adults.

Table 2 – comparison between e bike, motorcycle and non-electric bicycle related injury

	non-electric bicycle (n= 47)	Electric bike (n= 47)	motorcycle (n=47)	P value
Age, mean (SD), years	15.4(13.9)	29.7 (17.9)	29.6 (10.9)	* P<0.001; # P<0.001; & P=0.97
Gender, number of males (%)	44(93.6%)	41 (87.2%)	44 (93.6%)	* P=0.29; # P=1; & P=0.29
Helmet usage, n/n accounted for (%)	8/30 (27%)	3/23 (13%)	44/47 (93%)	* P= 0.6; # P<0.0001; & P<0.0001
ISS, mean (SD)	3.8 (4.5)	12.1(9.4)	12.6 (11.4)	* P<0.001; # P<0.001; & P=0.82
ISS >15, N (%)	2 (4.3%)	17 (36.2%)	13 (27.7%)	* P=0.0001; # P<0.01; & P=0.38
Surgical intervention (%)	2 (4.3%)	21 (43.7%)	12 (25.5%)	* P<0.0001; # P<0.01; & P=0.06
Length of hospital stay, mean (SD), days	1.6 (1.5)	10.8 (6)	9 (8.6)	* P<0.001; # P<0.001; & P=0.24
N hospitalized in ICU (%)	2 (4.3%)	12 (25.5%)	14 (29.8)	* P<0.01; # P=0.001; & P=0.6

*non e-bicycle and e-bike; # non e-bike and motorcycle; &e-bike and motorcycle

Body site of injury

in percentage in non-electronic bicycle, e-bikes and motorcycle related trauma on presentation to the trauma unit/emergency department

Types of injury

in percentage in non-electronic bicycle, e-bikes and motorcycle related trauma on presentation to the trauma unit/emergency department