INTRODUCTION

In a vast # of countries outside the US, many utilize motorcycles (MTC) for transportation. In 2010, 4,502 people were killed nationally in accidents involving motorcycles. That was in increase from 2009 (4,469). Given that MTC fatalities make up an increasing proportion of total traffic fatalities, our attention turns to methods that might reduce MTC fatalities. One method of reducing MTC fatalities is through helmet use. One study found that helmets reduce the risk of head injury by around 69% and death by around 42%.

The relative risk of injury for MTCists is 8x that of passenger-car occupants, per vehicle mile. With regard to death, MTC are 35x more likely to die in an MVC than are those in a car. On a per-trip basis, MTC are 58x more likely to be killed than passenger-vehicle occupants (Weiss 2010).

Reducing head injury & subsequent death can be reduced using proper MTC helmets. A meta-analysis of 61 observational studies concluded that MTC helmets reduce injury by 69% & death by 42%.

OBJECTIVE

The purpose of our study is to evaluate whether wearing a helmet during a MTC accident that results in head trauma, lowers the risk of severe brain injury (GCS < 8).

Glasgow Coma Scale

The GCS is a way that physicians communicate the severity and depth of coma in a patient who has suffered traumatic brain injury (TBI). Mental alertness varies from fully alert to lethargic and stuporous all the way to deep coma, where a patient is minimally responsive or unresponsive to external stimuli. The GCS grades this level of consciousness (LOC) on a scale from 3 (worst, deep coma) to 15 (normal). The GCS is the cumulative score of 3 areas of examination. Eye, Verbal, and Motor function are all tested by the clinician and the findings dictate the GCS.

MATERIALS & METHODS

We conducted a 5a year retrospective review of existing evidence using the data base available through ARMC medical records. We requested data from 04/01/07a 04/12/12 for patients coded with motor vehicle accident results that concurred with brief LOC to prolonged LOC.

The report identified 203 patients; the patient’s charts were then reviewed and only patients that were in an accident while operating a MTC were included. After review of all charts, this elicted 22 patients, which will become our study group (n=22).

Patient Sample

77.3% of patients were male, with 22.7% female. The minimum age in the study group is 15, max age 61, with a mean age of 34.23.

We collected from the patients’ medical records: age, sex, whether they were wearing a helmet at the time of the accident, and GCS score at the time of head trauma as shown in the table below.

<table>
<thead>
<tr>
<th>Age</th>
<th>Sex</th>
<th>Helmet</th>
<th>GCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>M</td>
<td>Y</td>
<td>15</td>
</tr>
<tr>
<td>22</td>
<td>M</td>
<td>Y</td>
<td>15</td>
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<td>25</td>
<td>F</td>
<td>Y</td>
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<td>27</td>
<td>M</td>
<td>Y</td>
<td>15</td>
</tr>
<tr>
<td>29</td>
<td>M</td>
<td>Y</td>
<td>13-15</td>
</tr>
</tbody>
</table>

RESULTS

17 of 22 patients were male. The other 5 were female. The 3 who had < GCS 15 at some time during their hospital visit were all male. Age range of patients appropriate for this study were 15-61 years old. The average age was 25.86 yo. As the above table shows 21 patients (95.4%) confirmed wearing a helmet during the time of the accident, one patient’s helmet use was unknown. All patients had GCS score in the normal range, with 21 patients scoring 15 and one patient scoring 13-15, still within normal range. The one patient scoring 13-15 was reported wearing his helmet.

Discussion

There were several challenges in finding appropriate retrospective subjects for this study on traumatic brain injury & its association with helmet use in the context of motorcycle riding. Hundreds of patient MVA encounters were searched manually in order to determine motorcycle vs. automobile accident. A number of the MTC accidents were lumped with also bicycle accidents. Some of the MTC accidents were lumped with MVC/MVb.

Additionally, manual searches were required in order to determine helmet use. Neither of these entries were available by electronic search. 24 of 25 MTC accident patients were documented to have been wearing a helmet at the time of the accident. There was one subject in whom helmet use was questionable. The records show neither use nor disuse of head protection.

There is not enough info in the above study to determine whether or not helmet use is on the rise. We do not have info about helmet use in people who did not go to the ED for treatment. We also do not have data regarding helmet use in those who expired, or who went to other treating facilities. Alternate hospitals for those in San Bernardino county could have been utilized due to insurance coverage of the patients. There may be a socioeconomic effect wrt MTC riding, helmet use, speed of vehicle, involvement of alcohol or drugs, and GCS outcome. This study indicates that helmet use in MTC injured patients is correlated with favorable GCS. However, a control group was not able to be obtained, secondary to nearly all motorcycle trauma records indicating helmet use.

A further challenge would be to determine age and condition of helmet used. Helmets are to be retired after a # of years secondary to natural breakdown of materials. Additionally, they are also supposed to be discarded and not used again if there is a sig. impact in its history. Other studies also show good outcomes in those with helmet use. Other research was done on related, yet significantly different material studies. Only about 50 studies were returned in a combination of PubMed searches for English, helmet, head injury, clinical trial, RCT, humans, and stroke.

CONCLUSIONS

In the future, a # of studies could be conducted to learn further about the effect of MTC helmet use in preventing head trauma. In the day and age of social media, there should be an entry that differentiates motorcycle accidents from ATVs, automobiles, and bicycles. There should also be an easily-filtered entry that calls attention to cases that involve helmets, or specifically do not have such protective headgear. As mentioned earlier, the efficacy of helmet is affected by age and use. Future studies could possibly involve these details.

Other study ideas that could be generalized to a larger population include ones that involve bicycles as well as ATVs. Perhaps assessing helmet use of all kinds for many different sporting/commuting purposes would be better suited to making broader statements suppose of safety promotion. This might include team contact sports such as rugby, football, as well as other outdoor activities such as rock climbing and rollerblading.


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Head Trauma in Motorcycle Accidents
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