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Original Article

Pattern of Head Injury and Recovery in First and Second Rider in Motor Bike Accidents

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Abstract

Background: To compare the rate and pattern of head injury sustained by the first vs. second rider and mortality rate and functional outcome of the two groups.

Methods: In this cross sectional study all adult patients presenting with head injury resulting from a motorcycle accident, during the study period were enrolled.Proforma's were filled by the on-duty doctor, including the demographic details, details regarding helmet and first or second rider, neurological status, additional injuries and radiological pattern of injury. These patients were divided into two groups: Group-1 (First riders) and Group-2 (Second riders) and both groups were compared for the above details, and followed. All patients received the standard treatment for their respective injuries and the two groups were compared for the mortality and neurological and functional outcome, assessed by using the Extended Glascow Outcome Scale. (EGOS).

Results: A total of 360 patients were included in the study. Of these,65% patients were in group-1 and 35% were in group-2. The mean age of the two groups was 27.86 and 30.12 years respectively. All patients in group-1 were males while 61.9% in group-2 were males. Majority of the riders in both groups were not wearing helmets at the time of accident. Major injury in both the groups was facial injury but the frequency of facial injury was significantly higher in group-1 as compared to group-2 i.e. 20.5% vs. 11.9% (p = 0.040). CT brain showed normal scan in 15.4% patients in group-1 and in 2.4% patients in group-2. In group-1, CT brain showed highest frequency of traumatic brain contusions (24.4%) followed by Extradural hematomas (14.1%) and cranium fracture (12.8%). In group-2, CT brain showed highest frequency of traumatic brain contusions (35.7%) followed by cranium fracture (16.7%), ASDH (9.5%) and TSAH (9.5%). Complete recovery was significantly higher in group-1 as compared to group-2 (p = 0.011).

Conclusion: In motor bike riding head injury is a potential threat not only to the 1st rider but also to the 2nd rider as well. By using helmets head injury, which is fatal in most of the instances, can be avoided.

Key Words: Head Injury, Motor Bike, Helmet

Introduction

Head injury is the main cause of death in motorcycle accidents. Motorcycle riders are much more vulnerable than vehicle drivers for several reasons: they are less protected and less visible than other road users, however their use is increasing given that motorcycle is an economical transportation among the youth, especially in a third world country like Pakistan. Many studies done worldwide have shown that wearing a helmet decreases the head injury as well as the mortality rate in motorcycle accidents, but little has been done so far to explore the injury pattern sustained by the first and the second rider, or to compare their mortality rates and functional outcome. [1-3]

There are many possible causes of brain injuries (TBIs), but one of the leading causes is motorcycle accidents[1]. Motorcycle accidents combined with auto accidents are the biggest cause of TBIs in the United States. For motorcyclists, one out of five involved in accidents sustains head or neck injuries which lead to most motorcyclist deaths. More than three thousand people die in the US each year in motorcycle accidents, while another fifty thousand sustain non-fatal injuries. Motorcycle riders are much more vulnerable than vehicle drivers for several reasons: they are less protected and less visible than other road users as well being smaller than other vehicles, however their use is increasing given the increase in auto- and fuel prices, hence making motorcycle an important vehicle for transportation among the youth, especially in a third world country like Pakistan. But the cost of an accident that causes traumatic brain injury can be severe, a factor that is again more important in developing countries like ours. Traumatic brain injury causes

brain damage that can range from a mild concussion to severe disabilities such as trouble in communicating, personality changes, schizophrenia, or even a coma. Because the brain cannot heal itself the way other organs do, these are often lifelong problems that cost tens of thousands of rupees to treat. Family members are also affected as they bear a serious emotional and financial burden. [4-5]

Many studies done worldwide have shown that wearing a helmet decreases the severity of head injury as well as the mortality rate in motorcycle accidents.[2,3,] NHTSA published a report in Oct., 2008, that showed, helmet wearing is associated with decreased head and neck injuries. Similar studies have been showing this same result time and again, but little has been done so far to explore the injury pattern sustained by the first and the second rider, or to compare their mortality rates and functional outcome. This is important because, especially in our culture, it is common for the lady to be the second rider, and it is common sight to see a lady sitting in the rear of motorcycle, in an awkward side-saddle position, her feet dangling dangerously, often with a baby in her lap. There is no concept for a helmet for these 2nd (and 3rd) riders in our society. [6-9]

Patients and Methods

This cross-sectional comparative study was carried out at DHQ hospital, Rawalpindi from 1st Oct 2014 to 31st March 2016 . DHQ hospital, Rawalpindi, is a reference centre for neuro-trauma, hence we get patients not only from all over the city and the adjacent areas, but also from the northern areas, AJK and most of the upper Punjab as well. All adult patients presenting to DHQ Hospital, with head injury resulting from a motorcycle accident, during the study period were enrolled after informed consent by the patient or the family, in case of unconscious patients. Children and patients or families unwilling for participation were excluded at this point.

Proformas were filled by the on-duty doctor, later handed over to the chief investigator, including the demographic details, details regarding helmet use and neurological status, additional injuries and radiological pattern of injury sustained by the first and/or second rider.Total 360 patients fulfilling the inclusion criteria were included in the study through non-probability consecutive sampling. These patients were divided into two groups: First riders were included in group-1 and Second Riders were included in group-2. Both groups were compared for the above details, and followed. All patients received the standard treatment for their respective injuries, as per our standard protocol, and no distinctive treatment was given to any of these patients for being part of the study, hence this was a strictly observational study, and no intervention done.

The two groups were compared for the mortality and neurological and functional outcome, assessed by using the Extended Glascow Outcome Scale. (EGOS). Qualitative variables were described as frequency and percentages and compared through chi- square test. A p-value < 0.05 was considered as significant.

Results

A total of 360 patients were included in the study. Of these, 234 (65%) patients were in group-1 and 126 (35%) were in group-2. Average age in group-1 was 27.86 years (SD = 10.12) and in group-2 it was 30.12 years (SD = 15.71). Both the groups were comparable with respect to age (p = 0.146). In group-1 all (100%) the individuals were males while in group-2, 78 (61.9 %) were males. Majority of the riders in both groups were not wearing helmets at the time of accident but the frequency of not wearing helmet was significantly higher in group-2 (p = 0.003). Majority of the patients in both the groups did not have any significant associated injuries. Major injury in both the groups was facial injury but the frequency of facial injury was significantly higher in group-1 as compared to group-2 i.e. 20.5% vs. 11.9% (p = 0.040) (Table-1).

Table 1: Associated Injuries Frequency in the two groups of patients

	None	Neck	Fascial	Long bone fractures	Chest	Others	Multiple system involvement
Gp – 1 Ist Rider	122	5	47	18	3	20	14
Gp – 2 2nd Rider	80	2	17	5	0	12	8

CT brain showed normal scan in 15.4% patients in group-1 and in 3 (2.4%) patients in group-2. In group-1, CT brain showed highest frequency of traumatic brain contusions (24.4%) followed by Extradural hematomas (14.1%) and cranium fracture (12.8%). In group-2, CT brain showed highest frequency of traumatic brain contusions (35.7%) followed by

cranium fracture (16.7%), ASDH (9.5%) and TSAH (9.5%). The difference was statistically significant (p < 0.001). (Table-2).Complete recovery was significantly higher in group-1 as compared to group-2 (p = 0.011). Frequency of good EGOS score (score: 5 – 8) was significantly higher in group-2 as compared to group-1 (p = 0.007). Mortality rate was similar in both the groups (p = 0.781). (Table-3)

Table- 2: Comparison of CT brain between both the groups

CT brain findings	Group-1 (n = 234)	Group-2 (n = 126)	p-value
Normal	36(15.4%)	3 (2.4%)	< 0.001
Brain contusions	57 (%)	45 (%)	0.022
EDH	33 (14.1%)	9 (7.1%)	0.050
Cranium fracture	30 (12.8%)	21 (16.7%)	0.318
DAI	21 (9%)	3 (2.4%)	0.017
TSAH	15 (6.4%)	12 (9.5%)	0.285
ASDH	12 (5.1%)	12 (9.5%)	0.111
ICB	6 (2.6%)	9 (7.1%)	0.038
Multiple	24 10.3%)	12(9.5%)	0.825

EDH: Extra Dural Haematoma;DAI: Diffuse Axonal Injury ; TSAH: ; ASDH: ; ICB: Intra Cerebral Bleed

Table-3: Comparison of outcome between both the groups

Final Outcome	Group-1 (n = 234)	Group-2 (n = 126)	p-value
Complete recovery	144 (61.5%)	60 (47.6%)	0.011
Good EGOS (5-8)	30 (12.8%)	30 (23.8%)	0.008
Disability (EGOS <5)	24 (10.3%)	18 (14.3%)	0.256
Death	36 (15.4%)	18 (14.3%)	0.781

Discussion

Motor bike accidents are a frequent and rising cause of head injury in the urban areas as motor bike becomes more and more popular as an economical means of transport. [1] The rising prices of fuel and the cheaply available motorbikes, and that too on easy installments, have actually given rise to a trend of buying and riding motorbikes, especially among the youth and also in the lower middle class. Unfortunately, both these groups lack the essential road civic sense and view the ownership of the motorbike as a means of trespassing the roads, rather than a responsibility. The sad result is too many motorbikes violating too many traffic rules, even on the busiest of roads and highways, thereby jeopardizing not only their own safety but that of the other road-users too. Riding in the middle of the road, or crossing the road on a main highway, overtaking from the wrong side, forcing cars to stop or sway are favorites of the motorbike riders. Not to mention here, the one-wheeling, a favorite pastime of our youngsters, but invariably fatal if and when done on busy roads and highways. Hence the role of everyone in the society is important and must come into play, to decrease the motorbike related injuries in the riders, including the parents, the law-enforcement agencies and the government.[3,4] Strict laws should be made and enforced, parents should take timely and strict action to prevent their children from engaging in such activities and awareness campaigns should be launched to make all classes of our society familiar with the civic road sense and make them realize that driving and riding on a road is not so much a privilege as it is a responsibility. Motorbikes come cheap, but the responsibility the ownership brings comes expensive, and the price that we pay for the lack of it is much too high.[10-15]

It has been proved time and again, in international studies, that helmet use is mandatory for motorbike riders to help prevent head injury.[2-8] Laws are in place and the implementation of these laws has decreased the mortality from head injury in motor cycle accidents.[3,4] Not only this, it has also decreased the hospital stay and financial burden of head injury from motor cycle accidents[5,6]. The cochrane systemic review done in 2004 has also found that helmet use decreases the frequency, severity and mortality from motor cycle related head injury. But again, in our society, this has been turned into a dilemma. First, because helmets are expensive, so to say, and like we mentioned before, motorbike comes cheap.. But what is not mentioned here, is the price of a head injury caused by the lack of a helmet, which ranges from well over a lac to millions in terms of time of work lost, family and social burden, etc. [16-20]

In this study, we focused on the head injury pattern seen in the 1st and the 2nd rider in motorbike accidents, another important aspect of our irresponsible attitude towards road safety, because even people who believe and accept the need for helmet use, present a very interesting picture in our society. It is common belief and practice in our society that only the 1st rider needs and deserved maximum protection in case of accident. Hence, if a guy would want to ride a motor-bike very safely, he would buy himself a helmet, but almost never for the 2nd rider, which unfortunately, more

often than not is a lady, and is usually sitting in a side-saddle manner, her feet dangling on one side, often with a baby in her lap. May God help the poor creatures in case the motorbike has to stop suddenly or take a sharp turn, as can happen on a busy road. [21] Can someone put an end to this horrible practice? Since no sane man would put his whole family into danger knowingly, we can only give him the benefit of doubt by saying maybe he is himself not aware of the dangers of this practice. [22-25]

Conclusion

1. Motor bike riders are at high risk for severe head injury and although the head injury pattern on CT brain is more severe for 1st rider in our study but the associated injuries as well as the outcome is comparable in both groups.
2. By using helmets head injury, which is fatal in most of the instances, can be avoided.

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