Frequency of Haemorrhagic Contusion in cases of Head Injury as Determined by Computed Tomography Imaging.

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Abstract:

Background: Most industrialized and particularly developing countries suffer from traumatic brain injuries (TBIs). It is also possible that this may result in a temporary or permanent disability.

Methodology: To determine if traumatic head injuries are associated with hemorrhagic contusions, we will collect the age, gender, and radiological characteristics of patients with head injuries. The study also aims to shed light on the process and molecular pathways responsible for hemorrhagic development to better understand the disease.

Results: Our results revealed that hemorrhage and contusions of the brain are often observed in Pakistan's population following a severe blow to the head, which result in hemorrhaging.

The hemorrhagic contusions are a common type of brain injury observed in Pakistan's population following a severe blow to the head. However, the study found that only 24.6% of patients showed signs of hemorrhagic contusion when they were examined by CT. The head injuries are the most common cause of death and disability in the most productive age group of the population. The study was conducted in Pakistan, which has an incidence rate of 50 head injuries per hundred thousand people. Motor vehicle accidents are the leading cause of brain trauma,

accounting for nearly 70 percent of all head injuries each year. The study examined approximately 130 individuals, mostly male, and found that accidents involving motor vehicles were the leading cause of head injuries. The age range of 45 to 59.5 years had the highest incidence of head trauma, and only 24.6% of patients showed signs of hemorrhagic contusion when they were examined by CT.

Conclusion: In Pakistan's population, hemorrhagic contusion following a severe blow to the head is prevalent. The study provides valuable data on patients who present with head injuries, including their ages, genders, and radiological characteristics. The current study can help healthcare professionals treat patients with head injuries at the right time and improve patient outcomes.

Keywords: head injuries, brain trauma, hemorrhagic contusion, prevalence, incidence rate, motor vehicle accidents.

INTRODUCTION

The most common cause of death and disability in the most productive age group of the population is head injuries (1). According to data collected from public hospitals, Pakistan has an incidence rate of 50 head injuries per hundred thousand people (2). Motor vehicle accidents account for nearly 70 percent of all head injuries each year, making them the leading cause of brain trauma (3). There is a significant burden on the nation's healthcare system due to head trauma, since it can result in death and disability (4). There are many different types of brain injuries, but bleeding cerebral contusions are one of the most serious (3). A computed tomography (CT) scan can be used to diagnose fractures, intracranial hemorrhages, and other sequelae of head trauma, such as cerebral edema, without invasive measures (5). A CT scan is most likely to reveal a brain contusion, which accounts for 14.1% of all CT scan findings. Besides subarachnoid hemorrhage, subdural hematoma and extradural hematoma were also found (5.8% and 4.6%, respectively) (2). An almost complete and irreversible dysfunction of tissues can be seen on a CT scan if a hemorrhagic contusion is present (6). In patients who have sustained blunt head trauma, acceleration or deceleration trauma, or coup or contre coup injuries, brain contusions can be hemorrhagic or non-hemorrhagic. It is possible to find brain contusions in patients who have sustained blunt head trauma as well as in those who have sustained deceleration and acceleration injuries *(7)*. It was only CT that could accurately determine the

location, mechanism, and approaching herniation of the injury. By reliably distinguishing the many forms of gross neuropathological lesions, it has led to quick and successful management (8).

This study evaluates and describes the patterns of CT results in head trauma, and then compares those findings with those from earlier studies performed at other hospitals. Besides determining what causes head injuries, this study collects data on patients who present with head injuries, including their ages, genders, and radiological characteristics. An objective of this study was to determine whether traumatic head injuries are associated with hemorrhagic contusions. We can measure the size of the problem by examining the incidence of hemorrhagic contusions found in individuals who have suffered head trauma. By doing so, we will be able to treat the patient at the right time.

MATERIALS AND METHODS

Study design and setting

During a six-month investigation at the Hayatabad Medical Complex Hospital in Peshawar, Pakistan, a radiology investigation was conducted.

Data collection

The study was conducted with permission from the hospital's ethical and research council. It was found that patients ranged in age from 10 to 70 years old, and had experienced head trauma no more than three days before surgery. The study considered such patients for inclusion. The study excluded haemophiliacs and patients using anticoagulant therapy, such as warfarin, enoxaparin, heparin, and rivaroxaban. Since these patients are at an elevated risk for spontaneous intracranial hemorrhage, they are confounding variables in the study. Based on WHO's formula, 130 individuals were evaluated, each of whom suffered a hemorrhagic brain contusion at a rate of 14.1%2, with an accuracy margin of 6% and 95% confidence level. If the patients were not awake, their guardians or next of kin were consulted regarding the nature of their injuries, and their consent was obtained. Also, the name, age, and gender of the patient were recorded. Without using any contrast, a computed tomography scan was performed on the patient from the foramen magnum all the way up to the vertex. In the axial plane, a scan was performed. A record of abnormal findings was kept.

Statistical analysis

The social sciences-specific statistical software was used (SPSS Ver. 15.0). We presented the means and standard deviations of the numerical variables. A frequency and a percentage value were assigned to each categorical and qualitative factors. A number of groups of patients were analyzed to determine how age, gender, and kind of injury affected hemorrhagic contusion effects. The post-stratification analysis was conducted using the Chi-square test. Statistical significance was determined by a p-value less than 0.05. A chart, table, and graph were used to present all the information gathered.

RESULTS

The research was carried out on a total of 130 patients who were brought in after suffering acute head trauma. The sample had a mean age of 37.7 years, with a standard deviation of 12.2 years. We created three distinct age categories for the students (Table 1).

There was a total of 130 individuals participated in the research, 76.9% of whom were male patients, and 23.1% of whom were female patients (Table 2) .

A fall from height and motor vehicle accidents were the most prevalent causes of traumatic brain injury (TBI) in the past. (Table 3)

When computed tomography was performed on patients, hemorrhagic contusions were observed in 24.6%. (Table 4)

In the following table, patients with hemorrhagic contusions were sorted according to their age, gender, and type of injury. (Table 5-7)

N	Range	Minimum	Maximum	Mean	STD. Deviation
130	40.50	19.00	59.50	37.5	12.2

Age groups	Frequency	Percentage
19 to 30 years	43	33.1
> 30 to 45 years	40	30.8
> 45 to 59.5 years	47	36.2
Total	130	100.0

Table 1. Age wise distribution of the sample (n = 130)

Gender	Frequency	Percentage
Male	100	76.9
Female	30	23.1
Total	130	100.0

Table 2. Gender wise distribution of the sample (n = 130)

Case of injury	Frequency	Percentage
RTA	52	40
Fall from height	47	36.2
Hit on head	31	23.8
Total	130	100.0

Table 3. Cause of injury (n = 130)

Hemorrhagic contusion on CT	Frequency	Percentage
Yes	32	24.6
No	98	75.4
Total	130	100.0

Table 4. Hemorrhagic contusion on compute tomography (n = 130)

Age Groups	Hemorrhagic contusion on CT		P VALUE
	Yes	No	
19 to 30 years	16	27	
	37.2%	62.8%	
> 30 to 45 years	0	40	
	0.0%	100.0%	< 0.001
> 45 to 59.5 years	16	31	
	34.0%	66.0%	
Total	32	98	
percentage	24.6%	75.4%	

Table 5. Age groups wise stratification of contusion

Gender	Hemorrhagic contusion on CT		P VALUE
	Yes	No	
Male	27	73	
	27.0%	73.0%	
Female	5	25	0.249
	16.7%	83.3%	
Total	32	98	
percentage	24.6%	75.4%	

Table 6. Gender wise stratification of contusion

Cause of injury	Hemorrhagic contusion on CT		P VALUE
	Yes	No	.270
RTA	12	40	
	23.1%	76.9%	
Fall from height	15	32	
	31.9%	68.1%	
Hit on head	5	26	
	16.1%	83.9%	
Total	32	98	
percentage	24.6%	75.4%	

Table 7. Cause of injury wise stratification of contusion

DISCUSSION

There are many types of brain injuries, among them bleeding cerebral bruises or intracranial haemorrhages, part of the general category of traumatic brain injuries that encompasses a range of other types as well. An injury to the brain caused by a contusive injury will undoubtedly be compounded by microvascular dysfunction (9). On a computed tomography (CT) scan, a contusion typically appears as a hemorrhagic lesion; however, some wounded tissues or portions of a contusion can appear healthy (isodense) or hypodensity. Contrary to laceration, a contusion does not compromise the pia mater in any way when compared to a laceration. Unlike a

hematoma, a contusion does not mix blood and brain tissue, while a hematoma does. Despite the fact that a lot of research has been done on the topic, it contains some ambiguity. An intracranial aneurysm may cause the delayed hemorrhage in some cases (10). A progressive hemorrhagic injury is defined as an epidural hemorrhage, a subdural blood clot, an intraparenchymal contusion or blood clot, or a subarachnoid hemorrhage. Injuries themselves have also been referred to by this phrase (11). Using such broad terms is imprecise, and molecular mechanisms responsible for progression may vary between instances. In order to prevent confusion, it referred as the hemorrhagic evolution of a contusion (HPC). It referred (1) the traumatic brain contusion and its effects are the primary focus of our investigation. hemorrhage progression; and (2) it merely to characterize the phenomenology of much more blood on the CT scan; rather, it w shed light on the process, the molecular pathways responsible for hemorrhagic development. This will allow us to better understand the disease. (12) found that the incidence of ischemic brain injury is proportional to the severity of the traumatic brain injury (TBI), the age of the patient, the presence or absence of a compound head trauma, and the anatomical location of the injury (frontal, temporo-parietal, or occipital). Epidural hemorrhage (EDH), subdural hemorrhage (SDH), intraparenchymal hemorrhages (IPH), and subarachnoid hemorrhage are the four subtypes of intracerebral hemorrhage (IB) that can be distinguished by their respective locations (SAH).

The first 24 to 48 hours following a traumatic brain injury are crucial for intracranial bleeding to begin or worsen. As a result of these discoveries, researchers are more interested than ever in treating IB with hemostatic medicines that might stop or slow its progression (13).

It depends on the inclusion criteria of the various studies to determine the frequency of IB following a TBI. The frequency of contusions in our study was significantly higher than that of IB reported in other studies. The incidence rates of IB reported in studies that also included patients with TBI hospitalized for their condition were comparable to ours. In the CRASH Study, which was the largest experiment ever conducted on patients with TBI, 56% had some kind of IB, while 27% had a subarachnoid hemorrhage. These numbers are comparable to the 22% incidence that was described in this research (12). The frequency range for EPH and SDH was 7-20% and 20-36% correspondingly in the IMPACT research, which included 9 randomized clinical trials in TBI patients. Our study reported a frequency similar to that reported by (14).

reported on 12 examples of contusion in individuals who were comatose in their study, which is considered to be the first description of the condition. The first report of this health condition was published by (15), who described 12 instances of contusions among comatose individuals. 11 of the 12 patients had been injured within 48 hours of diagnosis; six patients had not undergone decompression surgery. Four patients had undergone decompressive surgery and developed lateral contusions. Two patients developed lesions near their operative site that were not thought to be a result of surgery.

(16) identified two patterns of hemorrhagic advancement (small or medium haemorrhages initially that later grew larger; a salt and pepper or flecked irregularity at first seen on CT that eventually switched to a high-density looks), and tried to point out that in situations with extra- and intracerebral hemorrhages, surgical intervention of an extracerebral hematoma could have an impact in advancement of the intraparenchymal element.

(17) discovered a collection of 22 patients who are admitted in a coma who had hematomas that developed into lesions that required surgical excision. These patients had hematomas at the time of admission. Among these individuals, fifteen had diffuse damage that developed, while seven had previously received treatment and invented new non-contiguous hemorrhagic lesions. All of these patients were diagnosed with diffuse injury initially. (11) 81 conducted a study on individuals who had undergone two CT scans during the first twenty-four hours after suffering a head injury. Several types of hemorrhagic lesions were examined in this study, including epidural, subdural, subarachnoid, and intraparenchymal bleeding (contusion). Contusions are the most susceptible to early hemorrhage progression, with a 51% risk, according to the research team. According to the aforementioned research conducted by (17), the researchers found that approximately fifty of the people who had a craniotomy performed after the initial CT scan afterwards displayed signs of the evolution of a hemorrhagic condition.

(13) proved that haemorrhage growth between the base point and 24-h CT scans occurred in more than 50% of subjects who displayed with traumatic hemorrhagic lesions 2 mL or larger. (13) discovered that while smaller hemorrhagic lesions have a greater chance of expanding, larger hemorrhagic lesions have a stronger tendency to have significantly greater increases and, as a result, a greater risk of having a clinical impact. Approximately 130 individuals were examined for our research, of whom the majority were male. Our results revealed the age range of 45 to 59.5 years had the highest incidence of head trauma. Accidents involving motor vehicles

were the leading cause of head injuries. On the other hand, only 24.6% of patients showed signs of hemorrhagic contusion when they were examined by CT.

CONCLUSION

Hemorrhage and contusions of the brain are often observed in our population following a severe blow to the head, which result in hemorrhaging. This high prevalence may be attributed to the fact that our culture has a large number of accidents that involve high-speed impacts and that occur more frequently in those who are under the age of 30 and over the age of 45.

The hemorrhage and contusions of the brain are often observed in the population following a severe blow to the head, which results in hemorrhaging. The high prevalence of these injuries may be attributed to the fact that Pakistan has a large number of accidents that involve high-speed impacts and occur more frequently in those who are under the age of 30 and over the age of 45. The study aimed to determine whether traumatic head injuries are associated with hemorrhagic contusions, and by examining the incidence of hemorrhagic contusions found in individuals who have suffered head trauma, it will be possible to treat the patient at the right time.

How results highlight the need for further research to determine effective prevention strategies and treatment options for head injuries, particularly those resulting from motor vehicle accidents. The study's results suggest that efforts should be made to reduce the incidence of high-speed impacts and improve road safety measures to prevent head injuries. Additionally, healthcare providers should be aware of the high prevalence of hemorrhagic contusions in patients with head trauma and consider early intervention to prevent further complications.

CONFLICT OF INTEREST: Authors have no conflict of interest

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