Patterns of Traumatic Intracranial Bleeds at Kenyatta National Hospital in Nairobi, Kenya.

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Background: ***This study was designed to describe the pattern of traumatic intracranial bleeds at the Kenyatta National Hospital (KNH).***
Methods: ***A descriptive cross sectional analysis of consecutive patients who had traumatic intracranial bleeds, and admitted at the KNH between December 2010 and March 2011 was performed. A total of 51 patients with traumatic intracranial bleeds were recruited in the study with a male: female ratio of 24.5:1.***
Results: ***Subdural (29.4%) and Intra-cerebral (29.4%) hematomas were the commonest among these patients. Intra-ventricular bleeds (2%) were the least common. On the basis of chronicity, Acute Subdural hematomas (64.7%) were the commonest, while subacute subdural hematomas (5.9%) were the least common. Assaults (33.3%) and Road Traffic Accidents (27.5%) were the leading causes among aetiology, while bomb blasts (2%) were the least.***
Conclusion: ***Acute subdural hematomas are the commonest traumatic intracranial bleeds. Further, assaults and road traffic accidents account for the leading causes of traumatic intracranial bleeds. Specific interventions based on findings of this study will guide clinicians in the care of these patients and form entry points for further clinical studies.***

Key words: Patterns, Trauma, Intracranial, Bleed

Introduction

Traumatic Brain injury is an insult to the brain, resulting from an external mechanical force, leading to temporary or permanent impairment in physical or cognitive functions of the patient[1]. Traumatic brain injury remains among the highest global causes of morbidity and mortality. In the US alone, approximately 1.7million traumatic brain injuries (TBIs) occur each year, in isolation or as polytrauma[2]. The CDC estimates that about 50,000 individuals die from traumatic brain injuries. Approximately 100,000 people suffer permanent disability.

Traumatic intracranial hemorrhages are responsible for high mortality and morbidity globally. In Taiwan, head injury was ranked third among top 10 leading causes of death, 1964-1996. It is still among the top ten causes of death currently[3]. In China, the Incidence of traumatic brain injury was reported to be 56 per 100,000 populations in 1982[4], while in New South Wales Australia, the incidence was 100 per 100,000[5] populations. There has been a reported age specific variation in the incidence, and severity of traumatic brain injury with resultant intracranial hemorrhages. On the overall however, incidence seems to peak among the adolescents and early adulthood groups[6, 12, 13]. Some studies have reported the peak of traumatic brain injury to be among individuals aged between 15-24 years[7]. In the same study, men have been reported to be at more risk of traumatic brain injury with a male to female ratio of 2:1[7]. This ratio however tends to even out with increasing age, due to related risk factors like falls among others. Describing the pattern of traumatic intracranial bleeds in our setup helps clinicians formulate timely intervention and treatment plans. It also provides useful data that forms entry points for similar studies.

Patients and Methods

This descriptive cross sectional study was conducted at the Kenyatta National Hospital (KNH), between December 2010 and March 2011. This is a national referral and teaching hospital. The

hospital has a fully functional neurosurgical service with an independent ward and a neurosurgical intensive treatment area, within the ward. There are three general surgical wards, and a pediatric surgical ward where all head trauma patients admitted within 24 hours of injury, are managed by the neurosurgical service.

All head trauma patients admitted after 24 hours of injury, are admitted in the neurosurgical ward. All critically head injured patients (GCS less than 8), are admitted and managed from the main hospital Intensive care unit. Once improvement is noted clinically, they are upgraded to the neurosurgical intensive treatment area, in the neurosurgical ward.

Patients admitted with head injury were clerked, and upon confirmation of the diagnosis, were recruited in the study after signing the informed consent to participate in the study. Relatives and guardians signed consent on behalf of those patients who could not do so on account of clinical condition. Data on socio-demographic characteristics, pattern and causes was collected using a questionnaire administered to patients who met the inclusion criteria. Data collected was analyzed using statistical package for social sciences (SPSS) version 16.0. Approval for the study was granted by Kenyatta National Hospital/ University of Nairobi Research and Ethics Committee.

Results

The commonest intracranial bleeds were subdural, 29.4% (n=15), and intra-cerebral hemorrhages, 29.4% (n=15). The least were intra-ventricular hemorrhages, 2.0% (n=1) (Table 1).

Table 1. Types of intracranial bleeds

Type	Frequency	Percentage
Epidural	10	19.6%
Subdural	15	29.4%
Subarachnoid	3	5.9%
Intra-cerebral	15	29.4%
Intra-ventricular	1	2.0%

Table 2: Chronicity of intracranial bleeds

Chronicity	Frequency	Percentage
Acute	14	27.5%
Subacute	3	5.9%
Chronic	5	9.8%

Most of the intracranial bleeds were acute, 27.5% (n=14) followed by chronic, 9.8% (n=5), (Table 2).

Majority of the intracranial bleeds were left hemispheric, 25.5% (n=13) followed by right parietal region, 9.8% (n=5). The least was left temporal, 2.0% (n=1) Table 3. The commonest etiology was assaults, 33.3% (n=17), followed by RTA's, 27.5% (n=14). The least was bomb blast, 2.0% (n=1), Table 4.

Table 3: Anatomic location of intracranial bleeds

Anatomic location	Frequency	Percentage
Right frontal	4	7.8%
Left frontal	4	7.8%
Right parietal	5	9.8%
Left parietal	4	7.8%
Right temporal	0	0%
Left temporal	1	2.0%
Right occipital	0	0%
Left occipital	0	0%
Right hemispheric	4	7.8%
Left hemispheric	13	25.5%
Diffuse clot/ contusion	4	7.8%

Table 4: Etiology of intracranial bleeds

Etiology	Frequency	Percentage
RTA	14	27.5%
Assaults	17	33.3%
Falls	8	15.7%
Spontaneous	8	15.7%
Bomb blast	1	2.0%

Discussion

Intracranial bleeds are one of the leading causes of death in patients with traumatic head injuries. A majority of these deaths can be prevented through timely intervetions, by attending physicians and surgeons. The study was designed with the aim of identifying important patterns of presentation among patients with traumatic intracranial hemorrhages.

The commonest intracranial bleeds were subdural and intracerebral hemorrhages accounting for 29.4%, (n=15) respectively. The least common were intra-ventricular hemorrhages, 2% (n=1). In a similar study on traumatic brain injury, Pablo P. et al[8]. reported subdural hemorrhages in 30% of patients, intra-parenchymal and epidural hemorrhages were noted to be 22% each, which compares closely to findings in our study. These findings compare closely to the observed findings in our study. This could be due to a number of factors, especially relating to mechanism, and severity of traumatic head injuries. In a retrospective study, Ogun GO[9], noted subdural hematomas to be the commonest,

60% with an associated skull fracture in 8% of these patients. Epidural hematomas were observed in 37% of patients, and all these were associated with vault fractures.

Acute intracranial hematomas were the commonest according to timing of presentation, 64.7% followed by chronic intracranial hematomas, 9.8% then Subacute intracranial hematomas, 5.9%. Acute intracranial hematomas remain the commonest finding, because a majority of patients present in the early stages of head trauma. Miller et al[10]. found acute intracranial hematomas to be commonest in a related study on mild head injuries. This is also the critical time of therapeutic intervention to maximise patient survival. The commonest intracranial hematomas were left hemispheric in 25.5%, while left temporal clots, 2% were the least common. Whereas it is a known fact that anatomical location of an intracranial bleed, depends in part, or wholly on mechanism of injury, some clots have been observed remote from expected locations. This is critical information for hematomas in anatomical locations where minimal pressure, presents with life threatening complications, like the uncus of the temporal lobe, or the brainstem.

In a study of radiopathologic distribution of traumatic brain lesions, Gentry LR[11] et al noted diffuse axonal injury, 48.2% to be the commonest pattern, followed by cortical contusion 43.7%. The least common pattern was primary brainstem injuries, 3.6%. These findings and pattern of classification differ with our study, but still demonstrate that hemispheric lesions are among the commonest presentation in traumatic brain injury.

Assaults, 33.3%, were the commonest cause of traumatic intracranial bleeds, followed by Road Traffic Accidents, 27.5%, with the least common cause being bomb blast injuries, 2%. Astudy by Ogun GO[9], found vehicular accidents, 72% to be the leading cause of traumatic intracranial hemorrhage, while falls accounted for 22% of the causes. The difference in pattern of etiology would relate to various differences in socio-economic factors in the respective study populations. Ours was a hospital based study, and perhaps could not represent the national population study, on patterns of traumatic intracranial hemorrhages. Violence was the largest cause of traumatic brain injury, 34% in the Bronx County[14]. This was the County with reportedly high poverty levels, dense population, high unemployment and crime levels. In the Bronx study, road traffic accidents accounted for 32%, while falls were responsible for traumatic brain injuries in 27% of the population. For the elderly population, older than seventy years, falls were the main cause of traumatic brain injury.

In France, the main causes of traumatic brain injury were noted to be road traffic accidents, 60%, and falls, 33%[15].Worth mentioning is the bomb blast injuries, which though rare in our study 2%, present very unique challenges in the care and treatment of these patients. This is due to the multiple organ-system damage, with associated, but not always, mass casualties. Zahid K. et al[16]. Reported 14% of patients sustaining severe head injuries from bomb blasts in Pakistan. These injuries were associated with severe and multiple complications including wound infections, CSF leakages, and epilepsy, among others.

Conclusion

- Traumatic intracranial bleeds remain a common challenge in the treatment and care of head injured patients.
- Timely diagnosis, mainly through CTscan studies, and careful clinical evaluation are key in patient survival.
- There still remains a tremendous knowledge gap on the study of brain trauma in this region. This study forms the basis of subsequent related studies on this common but critical topic.

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