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PATIENT PROFILE AND OUTCOME OF SUBDURAL HAEMATOMAS, A SINGLE CENTRE EXPERIENCE IN KENYA

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ABSTRACT

A subdural haematoma (SDH) is a collection of blood between the dura matter and the arachnoid membrane. A prospective cross sectional descriptive study of all patients admitted with subdural haematoma as diagnosed on CT scan was conducted at the Nakuru level five hospital between 1st January 2015 and 30th November 2015. Four hundred and forty five patients were admitted with a diagnosis of head injury. Of these a total of sixty seven (67) patients were diagnosed on head CT Scan to have a subdural haematoma. There were sixty males and seven females with a male to female ratio of 8.6:1. The age ranged from three years to one hundred years with a mean of 43years (std 21.36.) The commonest causes of traumatic subdural haematoma in this subset of patients were falls and assault or violence related each at 25.4%. Sixty four percent (n=43) of the patients had mild head injury, 19 patients (28%) had moderate head injury while five patients (7.5%) had severe head injury. At discharge fifty one patients (76.1%) recorded a good recovery, five (7.5%) had varying degrees of disability while eleven patients died (16.4%). There is an important co relationship between the post non surgical resuscitation Glasgow coma score at admission and poor outcome ($p<0.001$). Likewise a history of loss of consciousness ($p=0.031$) and the presence of other associated injury ($p=0.038$) predicted a poor outcome.

KEY WORDS: Subdural, haematoma, head injury.

1.0 Introduction

A subdural haematoma (SDH) is a collection of blood between the dura matter and the arachnoid membrane. Subdural haematomas are classified as acute, sub acute and chronic. This is arbitrary in reference to the time lapse since the injury occurred with acute subdural haematomas being less than seventy two hours old, sub acute being within three to ten days and chronic subdural haematomas being several weeks since the accumulation of blood in the subdural space. Subdural haematomas are further termed simple if they are not associated with a brain contusion or complex if an accompanying brain contusion or severe parenchymal brain injury is present. Acute subdural haematomas are commoner in the youth due to accidental injury while chronic subdural haematomas are more common in the elderly where it has been noted that patients over sixty years old account for more than half of the chronic subdural haematoma. This is due to the fact that the elderly tend to have more atrophy of the brain and especially if they are alcoholic (Van den Doel EM, 1986). Sub dural haematomas have been reported since the 1840s and are mostly caused by trauma but spontaneous SDH have been reported widely in the literature (Van den Doel EM, 1986). Subdural haematomas are present in 5-25% of patients with severe head injury with a male;female ratio of 3;1.Although there has been tremendous improvement in the management of patients with subdural haematomas in terms of diagnostic equipments , monitoring , rescue and evacuation of these patients' haematomas, SDH are associated with a high morbidity and mortality. Surgery is indicated in the majority of these patients but even when the best medical and surgical care are offered early the outcome for subdural haematoma patients is guarded (Izumihara A et al 2013, Tosaka M et al 2013).This is often due to complex medical issues especially in the elderly and due to the fact that subdural haematomas are associated with an extensive primary injury (Tamura R et al 2016, Kotwica Z, Brzezinski J 1993). The increase in intracranial pressure in patients with subdural haematoma causes herniation of brain tissue and a reduction in cerebral blood flow which usually are the cause of mortality. Mortality rates of 36-79% have been noted in patients with acute subdural haematoma and chronic subdural haematoma has been reported as a common cause of treatable dementia (Kotwica Z, Brzezinski J 1993, Kyu-Hong Kim 2009). Poor prognostic factors in subdural haematomas have been identified as low initial and post resuscitation GCS, alcohol use, motor cycle accident, pupillary abnormalities among others (Servadei F et al 2000, Wilberger JE Jr et al 1990). Simple subdural haematomas have a lower mortality rate (20%) as opposed to the complex subdural haematomas (60%). Further it has been noted that if chronic, subdural haematomas can enlarge by drawing in fluid along an osmotic gradient or formation of membranes that in turn bleed easily and enlarge the accumulation (Atkinson JL, Lane JI, and Aksamit AJ 2003, Kawakami Y et al 1989).This study aims to highlight the presentation, incidence, the functional outcome (as measured by the Glasgow outcome scale at discharge (Jennett B and Bond M 1975) of patients with subdural haematomas as seen at the Nakuru level five hospital in Kenya.

2.0 Methods

A prospective cross sectional descriptive study of patients diagnosed with subdural haematoma by CT scan conducted at the inpatient surgical departments of Nakuru level five hospital between 1st January 2015 and 30th November 2015. All patients diagnosed to have subdural haematoma on CT scan were included .Descriptive patient demographic data, clinical presentation data, imaging investigations done, surgical treatments offered, intensive care admission and the length of stay in the unit, length of hospital stay and Glasgow outcome scores (Jennett B and Bond M 1975, Koc RK et al 1997) at discharge were captured using a questionnaire. This data was entered into SPSS version 21 and analyzed. Discrete variables were compared using the chi square test while continuous data was analyzed using the Students' T test. A p value < 0.05 was considered significant. Ethical approval was obtained from the institutions' ethics review board.

3.0 Results.

Four hundred and forty five patients were admitted in the hospital with a diagnosis of head injury during the eleven month's study period. Of those a total of sixty seven (67) patients were diagnosed on head CT Scan to have a subdural haematoma and were recruited into the study representing 15.05% of all patients with head injury. The hospital incidence of subdural haematomas was therefore more than six patients a month. The age ranged from three years to one hundred years with a mean of 43years, median and mode of 35 years (Std 21.36) with half of the patients being of age between thirty and sixty three years. There were two peaks in age distribution; at 30-39 age group representing the youthful population who presented with acute subdural haematoma and another peak at 60-69 age groups consisting of mostly chronic subdural haematoma patients. (See figure 1 below).

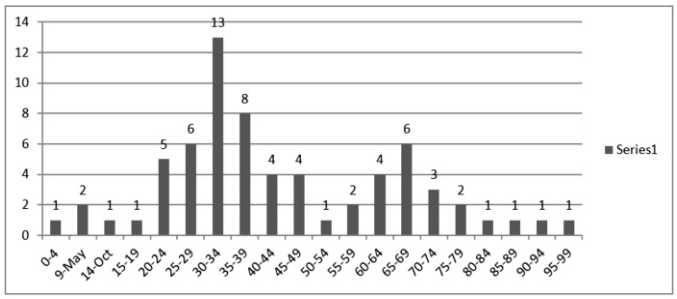

Figure 1 showing distribution of age of patients in years.

Fifty four percent of the patients (36 patients) were transferred into the facility from nearby hospitals while 46% arrived directly without an intermediate hospital. There were sixty males and seven females giving a male: female ratio of 8.6:1.

Thirty seven patients were treated by way of burr holes; two underwent craniotomy while the rest (28 patients) were managed conservatively. The patients managed conservatively were those whose subdural haematomas were noted on CT scan to be less than ten millimeter thick, with a midline shift of less than five millimeters and without neurologic deficits. There was no difference in outcomes of the patients who were surgically managed by evacuation of their subdural haematoma viz a viz those conservatively managed. ($p=0.237$).

The cause of injury was as shown below.

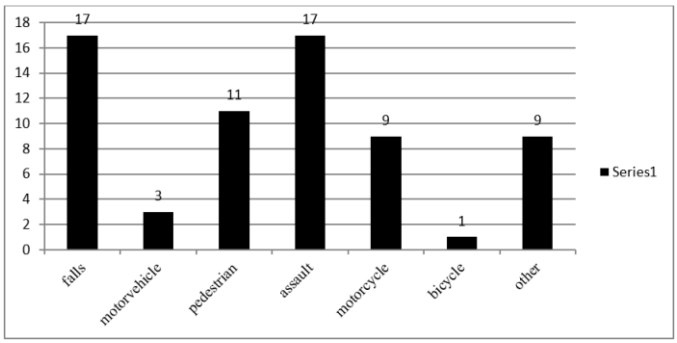

Figure 2. A bar chart showing the causes of acute subdural haematoma.

The main cause of traumatic subdural haematoma in this subset of patients was falls and assault/ violence related each at 25.4%. Motorcycle accidents were responsible for 13.4% of the subdural haematomas, injuries to pedestrians 16.4%, motor vehicle accidents 4.5% of the total number of patients and in another 13.4% of the patients the cause could not be identified. (See Figure 2).

Sixty four percent (n=43) of the patients had mild head injury, 19 patients (28%) had moderate head injury while five patients (7.5%) had severe head injury.

Nine patients (13.4%) had presented with a convulsion. Thirty seven patients had lost consciousness at some time since injury representing 55.7% of all subdural haematoma patients attended to. The mean duration of loss of consciousness was 4.67 hours and a range of 0 hours to 48 hours (Std 10.5 hours).A history of loss of consciousness at any time predicted a poor outcome.(*P*=0.031). Ten patients (14.9%) presented with otorhoea while four patients (6%) presented with rhinorhoea. Eleven patients (16.4%) presented with a raccoon eye. Twenty six patients (38.8%) had a skull x ray done as their initial imaging investigation before the diagnostic CT Scan. MRI and ultrasound of the brain/head were each done for one patient. One patient had a coexistent extradural haematoma on top of the subdural haematoma and another one patient had an intracerebral haematoma . Seven patients (10.4%) had an associated brain contusion. Four patients had a linear skull fracture while five patients had a depressed skull fracture. Fourteen patients (20.9%) had other associated injuries that varied from fractured ribs to fracture mandible and multiply injured patients. Presence of other associated injuries was a determinant of poor outcome. (*P*=0.038). (See table 1). Twenty three patients (34.3%) arrived into the hospitals' A/E department within twenty four hours with the rest arriving after twenty four hours since time of injury. Length of hospital stay ranged from one to thirty days with a mean of 7.88 days (Std 5.98)

One patient was admitted to the ICU where he stayed for seven days and died. A Glasgow Outcome Score at discharge (GOS) showed eleven patients died (16.4%) six of whom had been transferred in from peripheral facilities. Of the patients who died ten were male and one female. Of the remaining patients who survived five (7.5%) patients had varying degrees of disability while fifty one patients (76.1%) recorded a good recovery. (See table 1 below).Poor outcome (GCS) at discharge was determined by a low post non surgical resuscitation GCS (p value < 0.000), history of loss of consciousness (*p*=0.031), and the presence of other associated injury (*p*=0.038). (Table 1)

Table 1. Showing outcome viz a viz the various patients' characteristics.

Patient characteristics.		Death (GOS 1)	Variable disability (GOS 2 and 3)	Good recovery (GOS 4 and 5)	P value
Sex	Male	10	4	46	0.766
	Female	1	1	5	
Age	<30	2	1	16	0.075
	31-60	5	1	23	
	>61	4	3	12	
Transfer into hospital	yes	6	3	27	0.954
	No	5	2	24	
GCS	Mild	2	4	37	<0.001
	Moderate	5	1	13	
	Severe	4	0	1	
Treatment offered	Burr holes	3	3	31	0.237
	craniotomy	0	0	2	
	Non surgical	8	2	18	
Presence of convulsions	yes	2	2	5	0.081
	no	9	2	44	
Presence of otorrhoea	Yes	3	1	6	0.402
	no	8	4	45	
Presence of raccoon eye	yes	2	1	8	0.846
	no	7	3	41	
History of loss of consciousness	yes	10	2	25	0.031
	no	1	3	26	
Presence of rhinorrhoea	Yes	1	1	2	0.313
	no	10	4	49	
Associated other injury	Yes	5	2	8	0.038
	no	5	3	43	
Associated brain contusion	yes	2	0	5	0.528
	no	9	5	45	
Associated linear skull fracture	yes	0	0	4	0.506
	no	11	5	46	
Associated depressed skull fracture	Yes	2	0	3	0.253
	no	8	5	47	
Intra cerebral haematoma	yes	0	0	1	0.850
	no	11	5	49	
Admitted to the ICU	yes	1	0	0	0.079
	no	10	5	50	

4.0 Discussion

Subdural haematoma is a common neurosurgical emergency reported to have an incidence of 5% to 25% of all patients with head injury (Koc RK et al 1997).Our incidence rate in this study is 15.05% which falls within this range. The age distribution of patients with subdural haematoma showed two peaks one in the slightly younger age group of between 30 to 39 years. This group consisted mostly of patients who had acute subdural haematoma. The other peak was noted at 60-69 year age bracket where most of the patients presented with chronic subdural haematomas. More males suffer subdural haematomas as compared to females (m;f ratio 8.6:1) which is in keeping with the level of outdoor activities of men as compared to females in Kenya. This pattern of male involvement has been replicated in other studies (Kiboi J.G et al 2010). Falls and assault combined accounted for more than half the patients with acute subdural haematoma. This pattern was also seen at KNH (Kiboi J.G et al 2010) and by Gennarelli (Gennarelli TA and Thibault LE 1982) where he noted that 72% of their acute subdural haematoma patients were due to falls and assault as opposed to 24% who had the injury due to vehicular trauma. He explained from his experiments that the acceleration and deceleration forces from falls and assault are much higher than the forces that obtain in vehicular trauma. This thus explains the puzzle of why most SDH patients are injured from falls and assault as opposed to vehicular trauma even though vehicular trauma is more common. The mortality rate in subdural haematoma remains high. In this study the mortality rate is 16.4% and a functional recovery of 76.1% which compares with a mortality rate of 20.1% and a functional recovery of 45.6% that was recorded at KNH by Kiboi and a mortality rate of 21.75% seen in China by Tian et al. (Kiboi J.G et al 2010, Tian H et al 2008). Elsewhere it has been reported that the mortality rate from acute subdural haematoma ranges from 36-79% (Kotwica Z, Brzezinski J 1993, Kyu-Hong Kim 2009). While it's not abundantly clear why local studies seem to have lower mortalities, only 10.4% of the patients in this series had a brain contusion in addition to the acute subdural haematoma. This is in contradistinction to other studies that have quoted a higher associated brain contusion at 82% of such patients (Kotwica Z, Brzezinski J 1993). It is reported that the mortality rate in simple subdural haematoma is 20% but rises steeply to 60% in those with complicated subdural haematomas. This fact may explain the difference in mortality as seen in this study i.e. the patients that we identified in this study had a lower primary brain injury component compared to the other studies (Kotwica Z, Brzezinski J 1993). There was no statistically significant difference in outcome between those patients treated surgically and those conservatively managed (p=0.237). This could be due to the fact that those conservatively managed patients had smaller haematomas and thus naturally selected as patients who may have had a lower primary injury. Poor outcome (GCS) at discharge was determined by a low post non surgical resuscitation GCS (p value < 0.000), history of loss of consciousness (p=0.031), and the presence of other associated injury (p=0.038). This has been reported in other studies as well in addition to advanced age, pupillary abnormalities and delay in offering surgery. (Servadei F et al 2000, Wilberger JE Jr et al 1990, Kiboi J.G et al 2010).

5.0 Conclusions.

The subdural haematoma patient is mostly an adult male with a mean age of 43years, median and mode of 35 years. The commonest causes of subdural haematoma are falls and assault/ violence related each at 25.4%, motorcycle accidents, injuries to pedestrians, motor vehicle accidents while in another 13.4% of the patients the cause could not be identified. A low post non surgical resuscita-

tion Glasgow coma score influences a poor outcome. Likewise, a history of loss of consciousness and the presence of other associated injury predict a poor outcome in subdural haematoma patients.

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