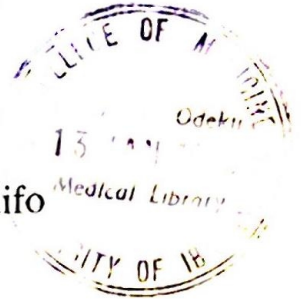


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Epilepsy following non-missile head injury among African people in Dar es Salaam: a retrospective clinical analysis study

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Summary

Over a period of 2 years, 26 subjects with epilepsy following non-missile head injury were referred to the neurology clinic at Muhimbili Medical Centre, Dar es Salaam. The mean age was 28.5 yr. Twenty of these subjects were males. Sixteen (62%) were victims of road traffic accidents, six (23%) had direct blows of the head and four (15%) had fallen from heights. The first late seizure occurred 2 weeks after injury in all subjects. Fifty-eight per cent had the first late seizure between the third and seventh month after injury. Only 8% had the first seizure after 1 year of injury. Post-traumatic amnesia of over 24 h was the commonest recorded complication and occurred in 58% of subjects. Other complications were: depressed fracture (31%), acute intracranial haematoma (27%) and early seizures (12%). Twenty per cent of subjects had no complications. The role of the head injury complications as a factor in increasing the risk of late epilepsy as well as individual susceptibility to seizures is discussed.

Résumé

Pendant une période de deux années, 26 malades de l'épilepsie ont atteint des coups à la tête qui ont été transmis à la clinique neurologique de Muhimbili M.C. à Dar-es-Salaam. L'âge moyen des malades était de 28.5. Vingt de ces malades étaient des hommes et seize (62%) étaient victimes des accidents de la route. Six (23%) souffraient des coups directs sur la tête et quatre (15%) tombaient de haut en provenance d'une certaine hauteur. La première attaque retardée se manifestait deux semaines après la blessure. Cinquante-huit pourcent

souffraient la première attaque retardée entre le troisième et septième mois après la blessure. Seulement 8% souffraient la première attaque une année après la blessure. Amnésie post-traumatique était la plus fréquente complication enregistrée, attribuant pour 58% des malades. D'autres complications étaient: des fractures écrasées (31%), l'hématome intracraniale aigue (27%) et des attaques prématurées (12%). Vingt pourcent des malades n'avaient pas des complications.

Introduction

The phenomenon of epilepsy occurring after injuries to the head has been recognized since the pre-historic era. Epilepsy following head injury may develop after only a few months or more often after several years, when the patient has otherwise made good recovery, thereby causing appreciable socio-economic disability to the individual. Non-missile head injury is an important cause of epilepsy in developed countries. Because of the increasing incidence of road traffic accidents in developing countries, non-missile head injury is assuming a major role as a cause of epilepsy. For instance, in India a study by Joshi *et al.* [1] revealed that head injury was the commonest aetiological factor, and in Nigeria, Danesi [2] found head injury to be the second commonest acquired aetiological factor for seizures.

Epilepsy following non-missile head injury has been well studied in most developed countries. In the U.K. about 3% of all non-missile head injury admissions and about 16% of those admitted in neurological units developed epilepsy [3]. Epilepsy following missile wounds of the head in the African has been studied in

Nigeria by Adeloye and Odeku [4]. There are few other studies of epilepsy following non-missile head injury in the African. A recent study by Ruberti [5] gave details of major features of post-traumatic epilepsy.

Non-missile head injuries are increasing in most developing countries, therefore the study of epilepsy following non-missile head injuries has become imperative. The aim of this study was to analyse the characteristics of African patients referred to the neurology clinic with epilepsy following non-missile head injury and to gather information for further prospective studies in Tanzania.

Subjects and methods

Patients with epilepsy following non-missile head injury referred to the neurology clinic over a 2-year period were studied using a standardized questionnaire.

The date and cause of injury were recorded, as well as the time interval from the injury to the onset of seizures. The description of the seizures was obtained from relatives or independent observers. Only patients with two or more seizure attacks were included in the study. Seizures that occurred during the first week of injury were classified as early seizures. The complications of injury were extracted from case notes at the time of injury or from a letter by the referring doctor or a description from relatives. A family history of epilepsy or any other predisposing factor was recorded. A thorough neurological examination was carried out. All subjects had radiographs of the skull and a 16-channel EEG using a provocation procedure for photic and over-breathing stimulation. All EEGs were reported as follows: 'epileptiform' if there were symmetrical spike and wave complexes often terminating in slow

waves, focal discharges only or occasional paroxysms of symmetrical slow waves without spikes; 'abnormal but non-specific' if there were an excess of theta or delta activity often not enhanced by over-breathing, with normal background alpha rhythm; and 'normal EEG' if none of the features of the first two groups were shown. Angiography was done only where a haematoma was suspected.

Seizures were classified according to the revised proposal by the International League Against Epilepsy [6].

Results

Age and sex

Except for one subject above the age of 40, all were aged 40 and below (Table 1). Of these, 19 (76%) subjects were between 21 and 40 years of age. The mean age was 28.5 yr. There was a preponderance of males, with a male:female ratio of 3:1.

Time of first seizures after head injury

Early post-traumatic epilepsy occurred in eight subjects (31%) (Fig. 1). Most subjects (58%) experienced their first seizures between the third and seventh month after injury.

Causes of injury and EEG abnormality

Sixteen subjects (62%) were involved in motor road traffic accidents; the majority of these had consumed excess alcohol (Table 2). Six (23%) had blows on their heads, and four head injuries (15%) were due to falls from heights. Abnormal EEGs occurred significantly more frequently in head injuries from vehicle

Table 1. Age and sex of patients with epilepsy following non-missile head injury

Sex	Age (yr)					Total
	<10	11-20	21-30	31-40	>41	
Male	—	4	5	10	1	20
Female	1	1	3	1	—	6
Total	1	5	8	11	1	26

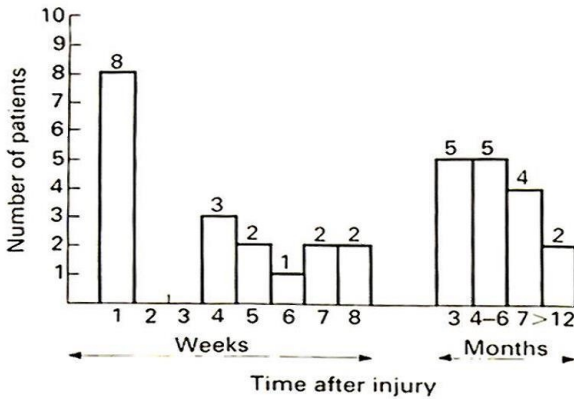


Fig. 1. Time of first seizures in non-missile head injury.

Table 3. Non-missile head injury complications

Type of complication	Number of subjects* (%)
Post-traumatic amnesia >24 h	15 (58)
Early seizures	8 (31)
Depressed fractures	7 (27)
Acute intracranial haematoma	3 (12)

*Eleven subjects had more than one complication.

Table 2. Causes of head injury and EEG abnormality

Causes	Normal	Abnormal non-specific	Epileptiform	Total (%)
Road traffic accident	1	7	8	16 (62)
Assault	1	2	3	6 (23)
Fall from heights	2	1	1	4 (15)
Total (%)	4 (15)	10 (39)	12 (46)	26 (100)

accidents (94%) than from falls and assaults (70%) ($P < 0.05$, Fischer's test).

Seizure types

Nine (34%) subjects had generalized motor seizure and seven (27%) had complex partial seizures. Others were simple partial seizures in eight subjects (36%) and unclassifiable in two subjects.

Complications of head injury

Twenty-one (77%) subjects had associated head injury complications (Table 3). Of these, 15 (58%) had a post-traumatic amnesia of more than 24 h. Eight (31%) had early seizures, seven (27%) had depressed fractures and three (12%) had intracranial haematoma evacuation.

Eleven (42%) subjects had more than one complication. Post-traumatic amnesia of more than 24 h was the only complicating factor of trauma in five (19%) subjects. Five (19%) subjects had no associated complications.

Discussion

Epilepsy following non-missile head injury in Dar es Salaam is a complication afflicting predominantly young male victims, a finding similar to those in Western World [7]. Over two-thirds of subjects in this study had sustained head injury from road traffic accidents and had consumed alcohol. Trauma is a frequent cause of mortality and morbidity in most developing countries when infectious diseases are excluded. Childhood febrile convulsions and birth injuries are still the major cause of

epilepsy in Africa [2]. However, trauma is becoming a major aetiological factor as the use of motor vehicles becomes more common. Post-traumatic late seizures tend to persist and can cause appreciable disability. Prevention of such seizures is a necessity. In this study 92% of subjects developed their first seizure after the second week of injury and over half of these between the third and seventh month. This finding is similar to those in Western World [8]. This interval is probably a reflection of cerebral gliosis formation secondary to intracerebral tissue damage, haemorrhage and secondary infection.

Road traffic accidents were associated with significantly more abnormal EEGs and most of these had generalized motor seizures or partial complex seizures. This implies that road traffic accidents cause more severe anatomical damage. However, seven patients with mild head injury had abnormal EEGs. In these patients, trauma could have acted as trigger to an already vulnerable brain [9]. Head injury in the presence of acute intracranial haematoma [8], depressed fracture and early seizures [10] considerably increases the risk of developing late epilepsy in Caucasians. Seventy-seven per cent of subjects in this study had associated complications of head injury. More than half had more than one complication. It would appear that these complications are important in increasing the risk of late seizures in Africans as in Caucasians. Controlled and prospective studies in Africans with non-missile head injury will clarify this finding. Complications of non-missile head injury have been shown to be important predisposing factors in late epilepsy in a study from Nairobi [5]. However, the number of Caucasian patients and Africans was not delineated. Post-traumatic amnesia of over 24 h duration was the most frequent recorded complication in this study. Jennet [3,10] in his prospective studies did not find PTA over 24 h on its own a significant risk factor for late epilepsy. In this study the high frequency could have been an error of reporting or recording by the attending clinicians. It is also possible that early seizures could have prolonged depression of level of consciousness. However, it is suggested from this study that PTA over 24 h

on its own could be a significant risk factor in Africans for developing late post-traumatic epilepsy. Prospective studies will elucidate the significance of this complication. About 20% of subjects in this study had no associated complications of head injury. This could be attributed to susceptibility or diminished threshold of the individuals studied to epileptic seizures.

In conclusion, road traffic accidents are the single major cause of non-missile head injury in Dar es Salaam; causing a rare but a long-term disability of epileptic seizures in its victims who are often young people. Cranial complications of head injury seem to increase the risk of epilepsy. However, individual susceptibility and threshold to seizures could also be a major factor in increasing the risk of epilepsy. Prospective studies are needed to clarify these observations.

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