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The significance of post-traumatic status epilepticus in childhood

WALTER GRAND

From the Department of Neurosurgery, University of New York, at Buffalo, U.S.A.

SYNOPSIS Five cases of early post-traumatic status epilepticus in childhood are reported. In all cases the trauma was apparently of a minor nature and the seizures appeared within two hours after injury. In none of the cases was a significant intracranial clot detected, nor was lasting cerebral damage evident. This is in contrast with adults, where status epilepticus after head injury is thought to be an ominous sign. Rapid improvement in level of consciousness after prompt treatment is certainly the most important criterion in assessing the role of the seizures. In the same period of time, post-traumatic status epilepticus was not seen in children with more severe head injury.

Seizures after blunt head injury in childhood are well known. Frequently, the seizure follows a trivial head injury. In fact, according to Jennett (1962), of all early post-traumatic epilepsy (seizures within one week) 32% are related to trivial injury in childhood while only 7·2% are seen in a comparable group of adults. Isolated seizures immediately after head trauma usually do not present a problem in assessing the seriousness of the head injury. This is because the child is usually soon alert or has frequently had the seizure at the scene of the accident and is recovered when seen in the emergency room. However, status epilepticus may pose certain problems in determining the relative severity of the head injury and may present alarming signs. Five cases of status epilepticus after blunt head injury in childhood are presented in order to assess the significance of status epilepticus. Status epilepticus was defined as a convulsion lasting more than one hour, or as a series without return of consciousness for the same time (Aicardi and Chevrie, 1970).

CASE 1

This 8 month old girl fell from a bed onto a carpeted floor striking her head. She immediately had continuous grand mal seizures and when brought to the hospital a right focal component was noted. She was immediately treated with intravenous phenobarbitone and the seizures subsided, but she was semi-comatose and seemed to move the right side of the body less than the left. There was a right Babinski sign. Eight hours later the patient was completely alert with no hemiparesis. Over the subsequent four days the child remained alert but somewhat irritable. She had one grand mal seizure on the fourth day after admission; an electroencephalograph (EEG) at this time was normal and she remained alert with no hemiparesis. A left subdural tap revealed 5 ml. of old, brownish subdural blood. Her head circumference remained normal and the fontanelle soft. She was discharged without symptoms.

CASE 2

This 2 year old boy struck his head on a doorknob while running. He was not unconscious but appeared dazed, and about 20 minutes later he became agitated and confused. On admission to the Emergency Room he was mildly lethargic, with a blank stare, and within an hour he developed status epilepticus. The generalized tonic clonic-movements with subsequent respiratory arrest were stopped with intravenous phenobarbitone and within four hours the child became completely alert. The endotracheal tube was removed. The results of a neurological examination were completely normal. He was discharged without symptoms. An EEG four days after admission showed only a mild diffuse slow wave abnormality.

CASE 3

This 3 year old boy struck his head on the floor while

playing at home. He was not unconscious but 10 minutes later he began to vomit and became comatose and cyanotic. He was admitted to the emergency room having continuous grand mal seizures with a focal right-sided component. He had a respiratory arrest and the left pupil became fixed and dilated. He was rushed to the operating room where bilateral burr holes revealed a thin coating of acute subdural haematoma over the cortical surfaces. The following day he was completely alert with no evidence of hemiparesis and he was discharged five days later. An EEG five months later showed a mild slow wave abnormality in the left temporal region, a few discharges in the left frontal–central region, and occasional discharges in the right frontal–central region.

CASE 4

This 11 year old girl was involved in an automobile accident and immediately became unconscious, began to foam at the mouth, and had continuous grand mal seizures. She was admitted to the emergency room where intravenous phenobarbitone terminated the continuous seizure activity. Within two hours she was completely normal. An EEG the following day was normal and she was subsequently discharged without symptoms.

CASE 5

This 14 year old boy was struck over the right brow, suffering a deep laceration over the right eye. He was not unconscious but two hours later, while being sutured in the emergency room, he began to have continuous grand mal seizures with a focal left-sided component. With intravenous phenobarbitone the seizures stopped and over a five hour period he became more alert. The following day the results of a neurological examination were completely normal. An EEG two days after admission showed a right frontal slow wave abnormality which a month later was almost normal.

DISCUSSION

According to Aicardi and Chevrie (1970) in a study of 239 cases of status epilepticus in children from all causes, 77% presented in status as their first ictal manifestation. This shows the predilection of children to develop status epilepticus initially, regardless of the cause, minor or major. He reported only two cases where trauma was implicated, both of which were associated with acute subdural haematoma. Oxbury and Whitty (1971) reported 10 cases of early post-traumatic status epilepticus in adults, all of whom had sustained a severe head injury. Out of 10 cases, six died, two were severely brain injured, and only two returned to a relatively normal existence. This is in contrast with the five cases in children reported above which were all related to relatively trivial trauma and in which the prognosis was good (Table). However, post-traumatic status epilepticus may prove fatal after minor injury (Small and Woolff, 1957).

It is difficult to predict the incidence of status epilepticus after head injury and, for that matter, the incidence of a single early post-traumatic seizure after trivial trauma. One reason is that some of these children were never unconscious

TABLE

FIVE CASES OF STATUS EPILEPTICUS AFTER MINOR HEAD TRAUMA

Age (yr)	*Unconscious*	*Interval to status*	*Focal component*	*EEG*	*Procedures*	*Hospital course*
8/12	Yes	Immediate	Yes	Normal	Subdural tap: 5 ml. blood, one side	Fever, irritable but alert, normal after 4 days
2	No	1½ hr	Yes	Mild diffuse, slow wave	None	Alert, normal 6 hr later
3	No	10–15 min	Yes (dilated pupil), hemiparesis	Left temporal, slow wave	Burr holes: small, acute subdural haematoma	10 hr later: alert, no hemiparesis
11	Yes	Immediate	No	Normal	None	Normal 4 hr after
14	No	2 hr	Yes	Right frontal, slow wave	None	Normal 8 hr after

and comparison with children admitted for concussions is not valid. There were 102 children under 16 years of age admitted for concussion to the University of Buffalo affiliated hospitals from 1970–1971 during the period that the above five cases of status epilepticus were seen. No cases of status epilepticus in childhood were seen after severe head injury in the same period of time, and it would appear that status epilepticus in children is not usually associated with severe intracranial injury. In none of the children reported here was there a family history or a previous history of a seizure disorder. All skull radiographs were completely normal.

One must be careful in interpreting the role of trauma in the aetiology of a seizure disorder in a child, whether this is status epilepticus or a single seizure. This is particularly true when analysing the results of Aicardi and Chevrie's (1970) 239 cases of status epilepticus in children from all causes. However, in all the present cases, trauma seemed to be a fairly clear factor in the sequence of events. In all the cases the seizures appeared within two hours after injury.

In conclusion, status epilepticus in childhood seems to occur after apparently minor trauma and is not necessarily indicative of a significant intracranial clot. The seizures usually appeared in the acute phase of the head injury. Just as children are more prone to develop single post traumatic early seizures after minor trauma, so it would seem that they are more prone to status epilepticus. This is in contrast with early post-traumatic status in adults where this is thought to be an ominous sign (Oxbury and Whitty, 1971). Of course, one must look carefully for a cause other than trauma in these cases particularly when the head injury seems to be of a trivial nature. The signs during and after status may be quite alarming, as illustrated by case 2 where a fixed dilated pupil and hemiparesis occurred transiently but were not related to a significant intracranial haemorrhage. In assessing the severity of the injury, one should expect rapid improvement of the level of consciousness and disappearance of focal signs when the status is adequately treated. A persistently depressed level of consciousness and focal neurological signs are certainly indicators for searching for a more serious cause for the status epilepticus. It has been generally felt that seizures after trivial injury in childhood, particularly in the acute phase of the injury have a relatively good prognosis as to the development of further seizures (Jennett, 1973). The follow-up in the current five cases is not long enough to produce any firm predictions on the significance of the status epilepticus. All the patients have been maintained on anticonvulsants. Only one child, case 1, had a subsequent seizure after the initial status and this was four days after the head injury.

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