

Assessment of State of Convulsive Child in Hospital National Children Albert Royer, Dakar

Thiam Lamine^{1*}, Ndiaye Moustapha², Kocko Judith Eva Sandrine¹, Niang Babacar¹, Ly-Dème Indou¹, Faye Papa Mactar¹, Ba Abou¹, Thiongane Aliou¹, Ba Idrissa Demba¹, Fall Aamadou Lamine¹, Seck Ndiogou¹, Sow Ndeye Fatou¹, Boiro Djibril¹, Ndiaye Ousmane¹, Sy-Signate Habi¹ and Sarr Mamadou¹

¹National Centre Hospitalier Albert Royer Children Dakar UCAD Dakar, Senegal

²Neurology Service of the National Hospital of Fann, Dakar UCAD, Senegal

*Corresponding author: Thiam Lamine, National Centre Hospitalier Albert Royer Children Dakar UCAD Dakar, Senegal, Tel: 00221 77 570 49 92; E-mail: thiamlkt@yahoo.fr

Received date: October 17, 2016; Accepted date: November 14, 2016; Published date: November 21, 2016

Copyright: © 2016 Lamine T, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Abstract

Introduction: The state of epilepticus in children is considered as a medical emergency which involves the vital and functional prognosis of the patient. The difficulties of this support in our country are linked to the lack of pediatric intensive care unit. The aim of our study is to evaluate the clinical, therapeutic, scalable and etiological states of epilepticus in children at Hospital Albert Royer National Children, Dakar.

Methods: This is a prospective study which includes all patients aged between 2 months and 16 years who were hospitalized between 1 August, 2014 and 31 May, 2015 for a prolonged convulsion over 5 minutes and/or with at least 3 episodes of successive convulsions. We have not included the newborns and non-convulsive state epilepticus patients. The treatment protocol consists of the use of diazepam as first line, after 60 minutes if the crisis persists; diazepam phenobarbital was associated with the second line.

Results: We collected 53 cases of state epilepticus (29 boys and 24 girls), which turned out to be a hospital incidence of 4.2%. The mean age was 48.5 months. Three quarters of our patients (n=40) were received emergency beyond 30 minutes after the onset of convulsions where the generalized seizures (n=42) were more common than partial seizures (n=11). The convulsions occurred in a context of fever in 38 patients. The metabolic balance was in favor of hyponatremia in 13 cases. Twenty-four patients (45.3%) have received only phenobarbital diazepam combination within 60 minutes after the onset of seizures.

Conclusions: The state epilepticus cases are frequent in the hospital emergency department especially for infants from 2 months to 3 years. It was observed that the patients unfortunately received emergency in late beyond 30 minutes after the onset of convulsions.

Keywords: Convulsion; Convulsive status epilepticus; Phenobarbital diazepam association

Introduction

The state epilepticus (SE) of a child is characterized by prolonged or repeated seizures at brief intervals. It is very common in middle of pediatric intensive care [1]. This is a medical emergency that involves the vital and functional prognosis of the patient. Without immediate treatment, the case fatality is high [2]. The high mortality is partly explained by the lack of standardized protocol [3]. In our country, the management difficulty is related primarily to the lack of anticonvulsant drugs which can be delivered by injection and inaccessibility of assisted ventilation in children. The aim of our study is to evaluate the clinical, therapeutic, scalable and etiological SE in children at the National Hospital of Albert Royer Children, (NHARC) Dakar.

Materials and Methods

This is a descriptive and analytical prospective study conducted at NHARC over a period of 10 months from 1 August, 2014 to 31 May, 2015. The study included all patients aged between 2 months and 16

years old who were hospitalized with seizure extended for more than 5 minutes and/or with at least three successive episodes of seizures without a return to normal consciousness. We have not included infants and non-convulsive status epilepticus in the study.

For all included patients, we collected epidemiological, clinical and laboratory investigated data. The treatment protocol of intention was first constituted by the use of diazepam to 0.3–0.5 mg/kg/dose via intravenous or intra-rectal, upon admission along with one renewal depending on the necessity. After 60 minutes, if the crisis persists, diazepam phenobarbital was associated with the second line treatment regime. The dose of the latter drug ranged from 10 to 15 mg/kg/day through slow intra venous entry and the data analysis was performed with the Epi-Info software version 6 provided by the CDC. Quantitative data was presented as the mean with standard deviations or as medians with minimum and maximum, depending on the type of distribution.

Results

Epidemiological data

During our study, we collected 53 cases of SE from 1263 children hospitalized in the hospital emergency ward, accounting to hospital incidence of 4.2%. The average age of patients was 48.5 months [4-192 mois]. The observation showed, infants of 2 to 36 months accounted for 54.7% of the total study population (Figure 1). The sex ratio was 1:2 (29 boys against 24 girls).

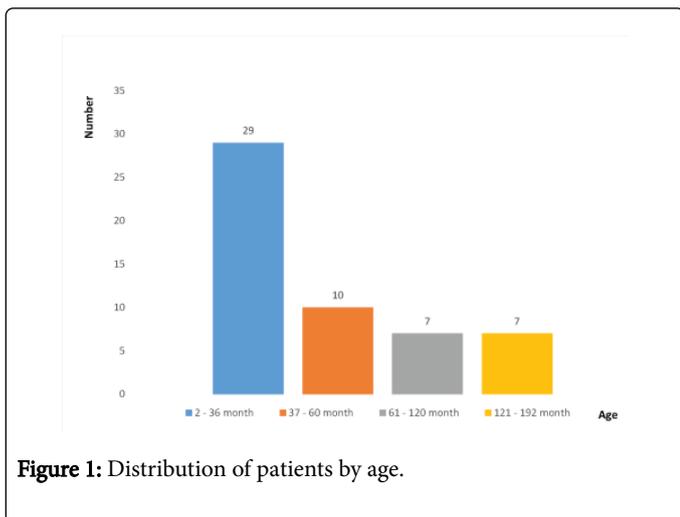


Figure 1: Distribution of patients by age.

Clinical data

Among the 53 cases of SE, six children were from a consanguineous household with three first degrees and another three with third degree. The children who have psychomotor developmental disorders were 17 in number and those who have epilepsy under treatment were 13 in number. Three quarters of our patients (n=40) were received by the emergency department beyond 30 minutes after the onset of the SE. The average length of an episode of seizures in our patients was 19 minutes [5-60 minutes]. Fifty one patients (96.2% of cases) had duration of less convulsive episode or equal to 30 minutes. Only two patients (5% of the cases) had longer than 30 minutes of seizures. Generalized seizures (n=42) were more common than partial seizures (n=11), which were 79.2% against 20.8%. Three quarters of patients (n=39) had tonic-clonic seizures (Table 1).

Seizures	Total number	Type of Seizure	Number	Percentage
Tonic-clonic seizure (T.C.S)	39	Generalized T.C.S	37	69.8
		Partial. T.C.S	2	3.8
Tonic seizure (T.S)	4	Generalized T.S	3	5.7
		Partial. T.S	1	1.9
Myoclonus (M)	10	Generalized. M	2	3.8
		Partial. M	8	15.1

Table 1: Distribution of different types of seizures.

Convulsions occurred in a cold environment in 38 patients (71.7%). Physical examination revealed dehydration in three cases (5.7%), neurological signs in eight cases (15.1%), a type of meningeal syndrome, right hemiparesis and tone of the disorder. The extra-neurological signs such as bronchial syndrome, running nose and sore throat were found in 21 cases (39.6%).

Para clinical data

About one third of patients (n=16) were benefited from Electroencephalogram (EEG) within an average of 4.2 days (2-14 hours) relatively after admitting in the hospital. The EEG was performed after hemodynamic stabilization and once the seizures were over. It allowed regaining power malfunction of existing or pre-inaugural epilepsy in 26 cases (72.2%). All patients received systematic metabolic balance during their hospital stay (serum electrolytes, serum calcium, serum magnesium, blood sugar):

- Thirteen children (14.5%) had less hyponatremia 135 Meq/l
- Two children had a lower hypoglycemia 0.6 g/dl
- Two patients had hypomagnesemia less than 18 mg/l
- There were no cases of hypocalcemia

An infectious balance (lumbar puncture; thick film; urine culture) was performed in 38 patients (71.7%) where one patient had severe malaria. A case of bacterial meningitis was diagnosed. Out of the 53 patients only 11 children, all epileptic patients, had received a brain scan after hemodynamic stabilization once the seizures were over. Eight patients had a brain injury type of cortico-subcortical atrophy; hydrocephalus of epidural collection and stroke.

Etiological aspects

In our study the occasional causes predominated in particular metabolic and infectious origin (Table 2). Hyponatremia accounted for 24.5% (13 cases). Infectious causes were represented by acute respiratory infections in 17 cases (32.1%); otorhinolaryngology infections in four cases (7.5%); febrile acute gastroenteritis in four cases (7.5%); bacterial meningitis in one case (1.9%) and cerebral malaria in one case (1.9%) where epilepsy are often intertwined.

Causes		Number	Total	Percentage
Metabolic	Hypokalemia	0		
	Hyponatremia	13		
	Hypoglycemia	2	17	71.7
	Hypomagnesemia	2		
	hypocalcemia	0		
	ARI	17		
Infectious (71.7% n=38)	Otorhinolaryngology	4		
	Acute gastroenteritis	4	27	50.9
	Meningitis	1		
	Cerebral malaria	1		
Epileptic		26	26	49.1

Table 2: Distribution of etiologies found.

In our study, no case of rupture or under medication dosage was noted in 13 out of 26 children with epilepsy receiving treatment, while they are often implicated in practice in our context of low socioeconomic conditions. In 8 patients, the etiology was not found.

Therapeutic aspects

All patients received emergency oxygenation through glasses, fluid and electrolyte resuscitation based on isotonic serum glucose infusion with more electrolytes. Diazepam intra venous was administered to all patients upon admission to the emergency and renewed once. This drug was administered on an average of 26.07 minutes compared to the beginning of the crisis (30 to 4320 minutes). Only 13 out of the 53 patients (24.5%) were received within a maximum of 30 minutes responding to first-line protocol. No child had received the drug in intra rectal. The phenobarbital diazepam combination with intravenous route was used routinely in all patients. Only twenty-four (24) patients or 45.3% received the association within 60 minutes after the onset of seizures. None of our patients required tracheal intubation and sedation.

Evolutionary aspects

No cases of immediate deaths were noted in our patients during the study period. The average hospital stay was 6.5 days, with a range from 1 to 22 days. Fifteen patients had neuropsychological sequel type of epilepsy (n=10) and motor deficits (n=5).

Discussion

Epidemiological data

The hospital incidence of 4.2% found in our study superimposed the level of specialization of our hospital. Indeed, the incidence of hospital SE varies with the patient's home structure. It increases with the specialization of the structure from 0.3% of admissions to general hospital, 17.4% in a pediatric intensive care unit [4,5]. This impact could increase with the creation of a pediatric intensive care center within our structure.

The male and infants under 3 years were explained by the vulnerability and immaturity of the immune system of the child population group [4]. In our study, half of the patients (49.1%) had epilepsy. A study at the national level would notice a higher frequency of the SE epileptic children compared to the general population, which has been found in several American studies [6]. In our study there is an unexplained discrepancy between the high prevalence of epilepsy and the absence of inbreeding. Indeed most African authors have shown the high risk of epilepsy with the existence of consanguinity between parents [7].

Clinical data

In our study 96.2% of patients had duration of less crisis or equal to 30 minutes, which would explain a stable hemodynamic status at admission. Indeed the impact of the child's SE is correlated with the duration of the crisis. After experiencing 30 minutes of such conditions of exhaustion, inadequate cerebral oxygen requirements were evident [8]. Besides, the prognosis was more severe when seizures were generalized tonic-clonic type [9]. The greater frequency of generalized tonic-clonic found in our series (69.8% of cases) was correlated with that found by several authors, 55.8% of cases in Brazzaville and 77.9%

of cases in Algeria [10,11]. The tendency to generalize, by recruiting neural circuits and the interval between the onset of seizures and ICU admission partly explain the prevalence of generalized seizures compared to the partial seizures. In addition to this, the problem of detecting the previous partial epileptic events or partnering with generalized seizures also existed. In our study the focal seizures accounted for 20.7%. It is comparable to those found by Boumendil [11].

Para clinical

In our study, one fifth of the patients (n=11) received EEG. This shows the difficulty of accessibility of this additional examination in our working conditions. In addition, the GET is not essential in the diagnosis of acute phase SE. Most authors do not even mention the EEG as that can be part of the initial measures of immediate packaging [12]. In our study, 24.5% of patients had hyponatremia. This percentage was high compared to European data (4.9% in France) and US (2.5% in Canada) [5,13]. The most common electrolyte disorder in our countries compared to developed countries is partly explained by diarrhea and dehydration (EDS 2014). The search for dehydration and the determination of serum electrolytes is essential in the etiological research of SE in children in this context.

The rate of hypoglycemia (3.8%) found in our study was lower than those reported in the African and European literature: 12% in Kenya and 7.9% in France [5,14]. In our study, 11 patients who underwent a brain CT were all children with epilepsy. This could be partly explained by the frequency of epileptic children in our cohort. The indications of brain imaging are mainly represented by the existence of a neurological localization sign of head trauma, signs of immunosuppression, fever or performing a lumbar puncture [14]. The percentage of chronic brain injury (hydrocephalus; cortico-subcortical atrophy), was not necessary the direct cause of SE, which was higher when compared to acute brain injury (45.4% against 27.3%). In addition, three scanners were among the eleven regular incomes (27.3%). A more rigorous analysis of clinical symptomatology crisis could review the scanner indications in our epilepsy patients.

Etiological aspects

With any infection, infectious causes of SE were more frequent in our series with a total of 50.9%. Lower respiratory infections occupied the first place followed infections otorhinolaryngology. Indeed, according to EDS 2011 respiratory infections are the leading cause of infant and child morbidity in Senegal. Meningitis and severe malaria are relegated in last place because probably the advent of vaccination (Extended Programme of Immunisation) and progress in the anti vectorial fight against malaria.

Therapeutic aspects

Among the 53 patients collected, only 13 patients received the first dose of diazepam within 30 minutes from the beginning of the crisis, which responded to first-line protocol of the French language resuscitation society [15]. This low rate of early care in the teaching hospital patients was also found by Mbodj et al. [1] 76.36% of patients were received at the hospital after the twelfth hour. This partly explained by the use of diazepam absence in peripheral structures and inaccessibility of university hospitals in the country. This drug could be used rectally by paramedical staff in peripheral environment especially

for epileptic children followed by the recommendation of the attending physician.

Evolutionary aspects

In our series no case of immediate deaths were noted in contrast to what was described in the literature; 29% in another study conducted in Dakar; 26.5% in Brazzaville; 25% at Saint Vincent de Paul Hospital France [1,10,16]. This is explained by the definition of the cases in our study, which allows early treatment before the 30th minute. The percentage of neurosensory sequel was noted in our study which was comparable to the previous study by Mbodj et al. [1]. By cons in Brazzaville found 10 times less sequel [10] which is correlated with the incidence of infectious causes including malaria in this study.

Conclusion

SE is common in the emergency department of the National Hospital of Albert Royer Children Dakar particularly in infants from 2 months to 3 years. The patients have unfortunately received in the emergency section late beyond 30 minutes after the onset of convulsions. We had systematically injected diazepam and phenobarbital by intravenous route in the treatment of first intension.

References

1. Mbodj I, Ndiaye M, Sene F, Sene F, Sow PS, et al. (2000) Management of the state of epilepticus in the conditions of developing countries. *Neurophysiol Clin* 30: 165-169.
2. Nemoto EM, Frankel HM (1970) Cerebrovascular response during progressive hyperthermia in dogs. *Am J Physiol* 218: 1060-1064.
3. Sofou K, Kristjansdottir R, Papachatzakis NE, Ahmadzadeh A, Uvebrant P (2009) Management of prolonged seizures and status epilepticus in childhood : A systematic review. *J Child Neurol* 24: 918-926.
4. Le Pommelet C, Orbach D, Devictor D (1996) Management of the state of epilepticus of the child. *J Pediatr Puericult* 6: 335-340.
5. Thomas P (1999) Classification, clinical forms and diagnosis of adult epilepticus. *Rean Urg* 4: 401-412.
6. Hauser WA (1990) Status epilepticus: epidemiologic considerations. *Neurol* 40: 9-13.
7. Ndiaye M, Sarr MM, Mapoure Y, Sene-Diouf F, Toure K, et al. (2008) Classification, clinical forms and diagnosis of adult epilepticus. *Rev Neurol* 164: 162-168.
8. Broglin D (1995) Status of epilepticus: pharmacokinetic basis of antiepileptic treatment. *Rean Urg* 4: 431-441.
9. Lowenstein DH, Bleck T, Macdonald RL (1999) It's time to revise the definition of status epilepticus. *Epilepsia* 40: 120-122.
10. Cardorelle AM, Okoko AR, Yoka Mamate AD, Moyon G (2005) The state of convulsive illness in pediatric resuscitation in Brazzaville. *Arch Pediatr* 12: 1400-1406.
11. Boumendil D (2014) Convulsive disorder in children: management in resuscitation and etiological approach. University of Oran, Algeria.
12. Tenailon A, Ameri A, Baron D, Bernard G, Clair B, et al. (1995) Consensus conference in intensive care and emergency medicine: management of the state of epilepticus (child and adult). French Language Resuscitation Society. *Rea Urg* 4: 387-396.
13. Lacroix J, Deal C, Gauthier M, Rousseau E, Farrell CA (1994) Admissions to a pediatric intensive care unit for status epilepticus: A 10 year experience. *Crit Care Med* 22: 827-832.
14. Sadarangani M, Seaton C, Scott J (2008) Incidence and outcome of convulsive status epilepticus in Kenyan children: a cohort study. *Lancet Neurol* 7: 145-1450.
15. Outin H, Blanc T, Vinatier I (2009) Emergency and resuscitation management of epileptic seizures in adults and children (newborn excluded). Formal recommendations from experts under the auspices of the French Language Resuscitation Society. *Resuscitation* 18: 4-12.
16. Dulac O, Aubourg P, Checoury A, Devictor D, Plouin P, et al. (1985) Evil convulsive states of the infant: semiological, etiological and prognostic aspects. *Rev EEG Neurophysiol* 14: 255-262.