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Epidemiological, clinical and etiological aspects of non-traumatic coma in children in the pediatric department of the Dubréka prefectural hospital, Guinea.

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Abstract

Introduction: Coma is defined by the suppression of alertness and consciousness. Clinically, it is characterized by an absence of eye opening and an appropriate reaction to painful stimulation in a patient who otherwise has effective ventilation and hemodynamics. The objective of this study was to determine the epidemiological, clinical and etiological aspects of non-traumatic coma in children in the pediatric department of Dubreka Prefectural Hospital.

Patients and method: This was a prospective and descriptive, study over a period of six months (August 1, 2021 to January 31, 2022) in the pediatric department of the Dubréka prefectural hospital.

Results: The hospital frequency of coma was 12%. The children were aged less than one year (30%), 1-4 years (51%), 5-9 years (6%) and 10-14 years (13%). There was a male predominance (60%) with sex ratio M/F of 1.5. The reasons for consultation were dominated by fever (97%), physical asthenia (97%), anorexia (97%), the notion of convulsive seizures (92%). The physical signs observed were respiratory distress (93%), tachycardia (94%), deterioration of general condition (87%), mucocutaneous pallor (76%). Coma stages II (53%) and III (34%) dominated the clinical picture. Severe malaria (74%), bacterial meningitis (19%), complicated measles (4%) and gastroenteritis + severe dehydration were the etiologies encountered.

Conclusion: Severe malaria and bacterial meningitis were the main etiologies of non-traumatic childhood coma in our study. Children under 5 years old were the most affected. Healing without after-effects was achieved in most of our patients.

Keywords: coma, child, pediatrics, Kamsar hospital.

Introduction

Coma is defined by the suppression of alertness and consciousness. Clinically, it is characterized by an absence of eye opening and an appropriate reaction to painful stimulation in a patient who otherwise has effective ventilation and hemodynamics. The causes of non-traumatic comas are multiple, responding broadly to three pathophysiological mechanisms: neurological, metabolic and toxic. The cause of a coma is the main prognostic determinant [1]. Infection is the most common cause of non-traumatic comas in children worldwide, with, depending on the region, severe *P. falciparum* malaria and bacterial meningitis predominating. Secondary causes are metabolic and toxic. In 15% of cases, no etiology is found [3]. It results from a lesion of the ascending reticular activating formation and the severity depends on the cause and the depth of the coma [2]. Emergency use of EEG and brain imaging is necessary. The prognosis depends on the etiology but early therapeutic measures intended to maintain ventilatory, hemodynamic and hydro-electrolytic homeostasis are essential to avoid worsening it and mortality depends on age and etiology [3].

The objective of this study was to determine the epidemiological, clinical and etiological aspects of non-traumatic coma in children in the pediatric department of Dubreka Prefectural Hospital.

Patients and method

This was a prospective and descriptive study over a period of six months (August 1, 2021 to January 31, 2022) in the pediatric department of the Dubreka prefectural hospital, located in the great suburbs of Conakry. We included in the study all children aged 1 to 14 years admitted to the unit for coma and whose parents agreed to participate in the study. Childhood coma was defined according to the Glasgow or Blantyre scores depending on age.

The Glasgow score was used in children from 3 years old with the following description: Eye opening (E) spontaneous (4 points), on command (3 points), on pain (2 points), none (1 point). Motor response (M) obeys simple commands (6 points), localizes pain (5 points), withdrawal movement (4 points), stereotypical flexion (3 points), stereotypical extension (2 points), no response (1 point).

From the score, we obtained the stages: stage I normal consciousness (15 points), stage II (14-10 points); stage III (9-7 points); stage IV (6-3 points).

The Blantyre score was used in children under 3 years old with the following description: Eye movements (E), directed (1 point), undirected (0 point). Verbal response (V) appropriate (2 points), inappropriate (1 point), none (0 points). Motor response (M) location of the stimulus (2 points), withdrawal (1 point), absent (0 points). Thus the stages obtained: normal stage I (5 points), stage II (3-2), stage III (1 point), stage IV (0 points).

Our data studied were epidemiological, clinical, biological and evolutionary and were collected on a pre-established survey form analyzed by the Epi info7.0 software. Frequencies and proportions were calculated for the qualitative variables; means and standard deviations for quantitative variables.

Results

We recorded 70 cases of coma in the department out of a total admission of 582; the hospital frequency of coma was 12%. The children were aged less than one year (30%), 1-4 years (51%), 5-9 years (6%) and 10-14 years (13%). There was a male predominance (60%) with sex ratio M/F of 1.5. The children came

directly from home (60%), from the health center or a private clinic (40%) (Table I).

The average time to admission was 4.41 ± 2.3 days. On admission, the reasons for consultation were dominated by fever (97%), physical asthenia (97%), anorexia (97%), the notion of convulsive seizures (92%), vomiting (41.4%), disturbances of consciousness (97%), headaches (50%), abdominal pain (43%) and diarrhea (8.6%) (fig1). The physical signs observed were respiratory distress (93%), there tachycardia (94%), alteration of general condition (87%), mucocutaneous pallor (76%), splenomegaly (51%), bronchial congestion (43%), skin folds of dehydration (30%), hepatomegaly (30%), and neck stiffness (13%) (table II). We noted a notion of self-medication at home in 60% of our patients.

Depending on the stage of the coma, there was a predominance of stage II (53%) followed by stage III (34%); stages I and IV were 6% and 7%, respectively. The assessment carried out noted a positive GE in 93%, a hemoglobin level below 11g/dl in 16% and pathological CSF in 19% of our patients (table III)

Severe malaria (74%), bacterial meningitis (19%), complicated measles (4%) and gastroenteritis + severe dehydration were the main etiologies (fig2). The outcome without after-effects was obtained in 56%, with after-effects in 10%, however it was unfavorable in 7% of cases (table IV).

Table I: epidemiological characteristics of non-traumatic coma in children in the pediatric department of Dubreka prefectural hospital.

Epidemiological characteristics	Number N=70	Percentage
Age (years)		
< 1	21	30
1-4	36	51
5-9	4	6
10-14	9	13
Sex		
Male	42	60
Female	28	40
Provenance		
House	42	60
Private clinic	11	16
Health center	17	24

Average age 4.24 ± 2.1 [6 months -14 years]

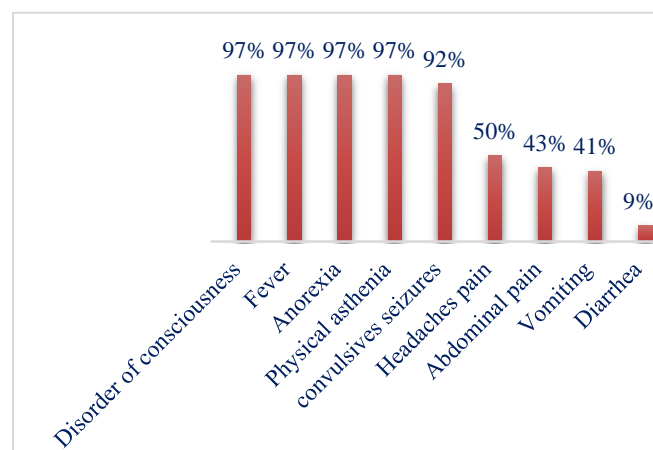


Fig. 1: Symptoms of children with non-traumatic coma in children at the Dubreka Prefectural Hospital.

Table II: Clinical characteristics of children suffering from non-traumatic childhood coma in the pediatric department of the Dubreka prefectural hospital.

Clinical characteristics	Number =70	Percentage
Physical signs		
Neck stiffness	09	13
Tachycardia	66	94
Respiratory distress	65	93
Bronchial congestion	30	43
Hépatomégaly	21	30
Splénomégaly	36	51
General condition altered	61	87
Mucocutaneous Palor	53	76
Dehydration skin folds	22	31
Etiologies of non-traumatic coma in children		
Severe malaria	52	74
Bacterial meningitis	13	19
Complicated measles	3	4
Gastroenteritis and severe dehydration	2	3
Coma stages		
Stage I	4	6
Stage II	37	53
Stage III	24	34
Stage IV	5	7

Table III: Biological assessment of children with non-traumatic child coma in the paediatric department of the Dubreka Prefectural Hospital.

Biological assessment	N=70	Pourcentage
GE/TDR positive	65	93
Hb < 11g/dl	62	89
Hb >11g/dl	08	11
Glycémie <40 mg /dl	g	16
Glycémie >40 mg /dl	59	84
ECB LCS Pathology		
Haemophilus influenzae	08	11.42

Méningococcus	01	1.42
Pneumococcus	04	5.71

Table IV: Outcome of children with non-traumatic child coma in the paediatric department of the Dubreka Prefectural Hospital.

Out come	N=70	Percentage
Issue		
Healing without sequelae	39	56
Healing with sequelae	07	10
Death	05	7
Transfer	19	27
Duration of coma		
<3 days	36	51
4-7 days	22	31
>1 week	12	17

The mean duration of coma was 4.83 ± 2.6 days with extremes [1-12 days]

Discussion

The inadequacy of the technical platform in the laboratory for the performance of blood culture, stool culture and the non-performance of brain imaging in the department were the limits of this study. Thus, the hospital frequency of non-traumatic coma was 12%. Our results are similar to those of Diallo M.L et al. [4]; to those of Asse KV et al. [5] who had reported 17% and 16.3% respectively. Low frequencies were observed by Olivier et al. [3] and Adama et al. [7] respectively 4.32% and 2.53%. In contrast, Rasool et al. [11] in Iran had documented a frequency of 53.22% in their paediatric ward. Children under 5 years of age were the most affected in our study. Our results are similar to those of some African authors [5; 6; 8]. The vulnerability of the child at this age is characterized by the gradual disappearance of antibodies of maternal origin and the gradual development of his immune system at the cost of numerous infections. The average time to admission (4.41 ± 2.3 days) to the service was relatively long; these children had received self-medication from their parents (60%), first went to a health centre or private clinic (40%) before consulting the paediatric department of the Dubreka prefectural hospital. Our results are superimposed on those of Adama et al. [7] who had documented an average duration of admission of 3.2 days in their study. The same results were found in Asse KV et al. [5] where the mean duration was 3.6 days and in Olivier et al. [6] with a mean duration of 3 days). Self-medication is a common practice in our African societies where poverty and cultural beliefs are intertwined. Fever with impaired consciousness and seizures were quite common in our study. Our results overlap with those of some African authors [3; 4; 5; 9; 10]. These signs are the manifestation of infectious diseases, including severe malaria and bacterial meningitis in children. Stage II coma was frequently encountered in our study, it was accompanied by tachycardia, respiratory distress and mucocutaneous pallor. Our results are consistent with those of Adam et al. [7] and RC ibekwe et al. [8]. In our series, they would be related to the relatively long consultation period. Severe malaria and bacterial meningitis were the main etiologies in our series. Our results are similar to those of some African authors

[4; 7; 9,10]. However, our results are different from those of Rasool et al. [11] in Iran, who had reported in their study that the etiologies of coma were dominated by bacterial infections, intoxication, and epilepsy. Our country, Guinea, is an endemic malarial area despite the efforts of the government; Malaria is a stable endemic disease with a long seasonal resurgence of between 6 and 8 months [12]. As for meningitis, upper respiratory tract infections are very common in children; The nervous system is affected by bacteria through hematogenous dissemination [12]. Bacteria that infect infants and older children include *Streptococcus pneumoniae* and *Neisseria meningitidis*. In the past, *Haemophilus influenzae* type b was the most common cause of meningitis, until its vaccination was widely distributed. Current vaccines against *Streptococcus pneumoniae* and *Neisseria meningitidis* also reduce childhood meningitis caused by these organisms [13]. Complicated measles (4%) was a reality in our study. Togo P et al. [14] reported a 3% frequency of coma in children with complicated measles in the paediatric department of the Gabriel Toure University Hospital. Brain infection occurs in about 1 in 1,000 children with childhood measles, often with high fever, headache, seizures, and coma, usually 2 days to 2 weeks after the rash appears [15]. Severe dehydration during gastroenteritis (3%) was documented in our series. According to Asse, kv et al., [5] acute diarrhea with severe dehydration accounted for 0.5% of the causes of child coma in their study. In more severe cases, the child may have seizures, fall into a coma, and have brain damage [16]. The mean duration of coma in our patients was 4.83 ± 2.6 days with recovery without sequelae in 56%. On the other hand, 27% had been transferred to a university hospital in Conakry. However, 7% of our comatose patients died during admission. Balaka et al. [17] had documented in their study a cure in 74.3% and death in 27.6%. According to R.C. Ibekwe et al. [8], during their study, cure was achieved in 60% of children compared to 32.5% of deaths. Some of our patients had been discharged with sequelae (10%). Our results are similar to those of Brisset et al. [9] had documented cases of cure with sequelae in 51% and death in 30% and according to Sékou K et al. [18], Recovery without sequelae was obtained in 60% of cases, with sequelae in 2.2% and death in 25.3%. The young age and the relatively long time it takes for our patients to be treated are responsible for the occurrence of these sequelae.

Conclusion

Severe malaria and bacterial meningitis were the main etiologies of non-traumatic coma in children in our study. Children under 5 years old were the most affected. Recovery without sequelae was obtained in most of our patients. However, sequelae such as axial hypotonia, limb paralysis and aphasia were observed in some. The equipment of our laboratories with reagents, medical imaging and early management by appropriate and effective treatment of comatose children would be necessary in our practices.

Keywords: coma, child, pediatrics, kamsar hospital.

Conflict of interest: none

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