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CLINICAL ASPECTS OF EXTRADURAL HAEMATOMA OF CHILDREN AGED 0 – 15 YEARS IN YAOUNDE

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ABSTRACT

Extradural haematoma (EDH) is defined as an acute bleed between the dura mater and the inner surface of the skull. Clinical presentation in children is variable and atypical according to lesional localizations. In Cameroon, we found out that, no such studies dealing specifically with children extradural haematoma has been carried out. The general objective as to ameliorate the healthcare management of children extradural haematoma by describing its epidemiological, clinical and scenographic aspects and treatment. Consequently, a cross-sectional descriptive study going from December 1st 2006 to April 30th 2017 was carried out in six different hospitals of Yaoundé/Cameroon. Study reveals that, extradural haematoma accounts for 7% of cranial trauma and the prevalence of extradural haematoma in children was 19.26% from this study. Extradural haematoma in children may result following a slight cranial trauma without any initial loss of conscious nor neurological trouble. The most frequent scenographic localization was frontal and the management was not always immediate in our hospitals. Contusions and cerebral edema were the most associated lesions and surgery was practiced in 56.25% of the cases with 43.75% conservative treatment. No death has been registered in the course of this study.

Key words: extradural haematoma, children, cerebral scanner, trauma

INTRODUCTION

Cerebral lesions due to cranial trauma is an important cause of morbidity and mortality in infants. The evaluation of its incidence in pediatric patients varies according to its case definition and methodology, yet the annual rate varies from 130 to 200 cases per 100 000 habitants [1]. These cranial traumas causes severe intracranial lesions among which is found extradural haematoma (EDH). Extradural haematoma is an acute collection of blood between the inner surface of the skull and the dura-mater which recovers the soft and repressible brain (encephalon) due to the bleeding of the extra cerebral intracranial vessels. In children it is rare, but the frequency has increased with time, from 8.2% in 2007 [2] to 9.6% in 2014 [3]. Globally, the mortality most be less than 15% but may vary between 6 to 20% for clean cases, 40% in case of the lesion of the carotid sinus and may attain up to 45 to 90% in case of underlying cerebral lesions. Mortality and morbidity remains very important and more importantly in relation to diagnosis and late transfer to specialized centers. Also EDH benefited in progress with the outcome of imaging technologies and immediate management (50% between 1970 and 1977; 12.5% between 1983 and 1984) [4]. EDH remains the principal neurosurgical emergency in children. Till date, there exist no reliable predictive clinical sign associated [1]. The limited studies carried out regarding children shows clinical and radiological presentations varying with the regions concerned as such creating a serious diagnostic and therapeutic problem. It is important to note that, in Cameroon, studies concerning EDH in children has not been conducted. As a result, we found it judicious to conduct this study so as to define the clinical and radiological characteristics of EDH of children in our context by focusing on clinical and Scannographic aspects of EDH in children aged 0-15years. The goal of this study was to ameliorate the management of EDH in pediatric patients and specifically to sort out the epidemiological aspects, the principal emergent signs and Scannographic characteristics as well as the adequate treatment possibilities.

METHODOLOGY

1- Study Design and Setting

We conducted a descriptive cross-sectional study with a retrospective and prospective data collection phases. The study was carried out in six different hospitals of Yaoundé-Cameroon notably: central hospital of Yaoundé (CHY), general hospital of Yaoundé (GHY), military hospital of Yaoundé (MHY), mother and child center of the Chantal BIYA foundation (CME), university hospital of Yaoundé (CHUY) and VERJOSEL Surgical Clinic (VSC), from December 1st, 2006 to April 30th, 2017 for both retrospective and prospective periods of study.

2- Study Subject and Method

Concerned in this study were children of age between 0-15 years diagnosed with an extradural haematoma in the above listed hospitals of Yaoundé. As such, were included in this study were children managed for intracranial EDH confirmed by a cranium scanner and were non-included EDH without any scan proofs and incomplete medical files. Sampling was a consecutive non exhaustive and probabilistic method with data collection recorded on pre-established files.

3- Statistical Data Analysis

It was a descriptive univariate query analysis with qualitative variables presented in the forms of frequencies and percentages and quantitative variables presented by means and averages.

RESULTS

1- Epidemiological Profile of EDH in Children

a- Global prevalence of EDH in study hospitals

135 cases of EDH was recorded during study among which 109 counted for adults and 26 for children aged 0-15years. The prevalence of EDH for children in this design was estimated at 19.26%. Figure 1 below shows the distribution of EDH in the hospitals concerned.

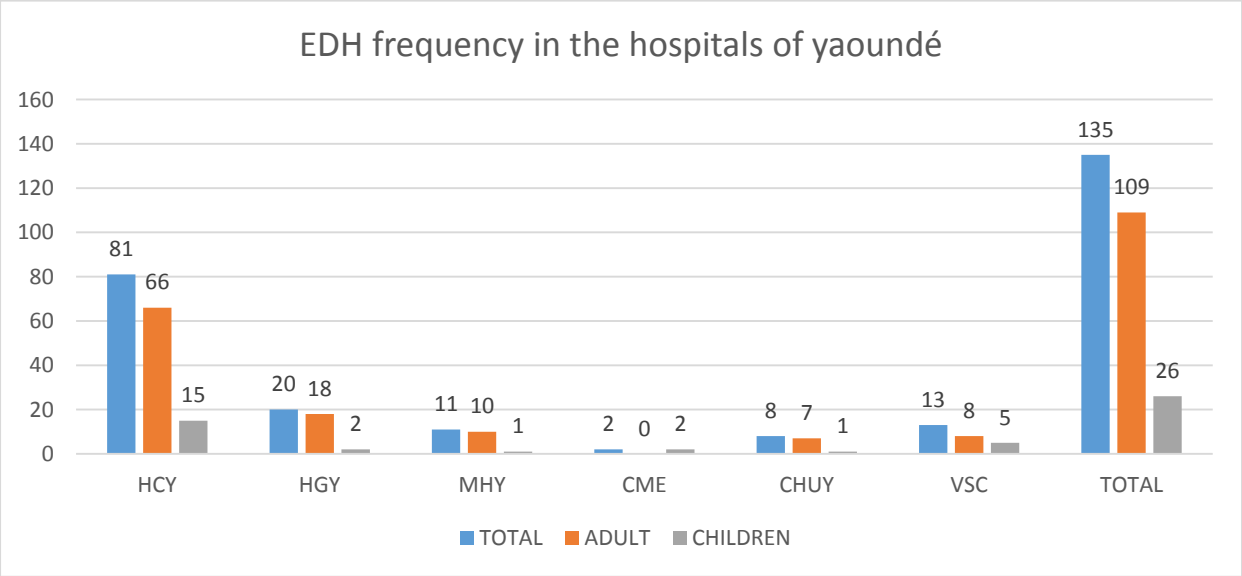

Figure1: distribution of EDH in the hospitals of study

b- Distribution of EDH Following Age

The mean sample age was 8.28 years with extremes going from 7 month to 15 years. The age of 11 years dominated the sample size with 18.75% representation as shown below.

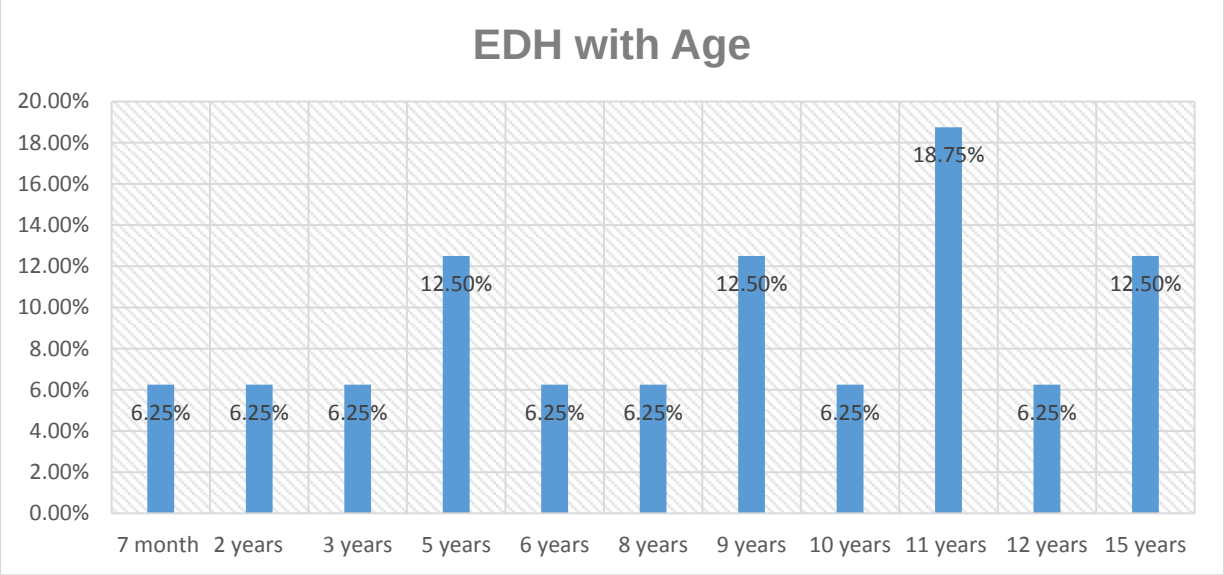

Figure 2: distribution of EDH following age

c- Contributive Past Medical History

In the sample study, more than 93% of the children had no contributive medical past history. Just one case of a past EDH surgery was notified in the files in a 5 years old child in the central hospital of Yaoundé.

d- Etiologies of EDH

The most frequent etiology was violent falls in 37.50%, followed by public highway accidents with 31.25%, brutality follows with 18.75% and assaults with stones accounted for 12.50%. The table below is a summary of the etiologies.

Table 1: etiologies of EDH in children, Yaoundé

Etiologies	Frequency (n)	Percentage (%)
Violent falls	6	37.50%
Road traffic accidents	5	31.25%
Brutalities	3	18.75
Stone assaults	2	25.50%
Total	16	100.0%

2- Clinical Aspect

a- Signs of Hemodynamic Instability

Concerning hemodynamic instabilities, 12 children presented divers troubles with tachycardia as the major sign present. 4 (18%) children presented no hemodynamic trouble as shown below.

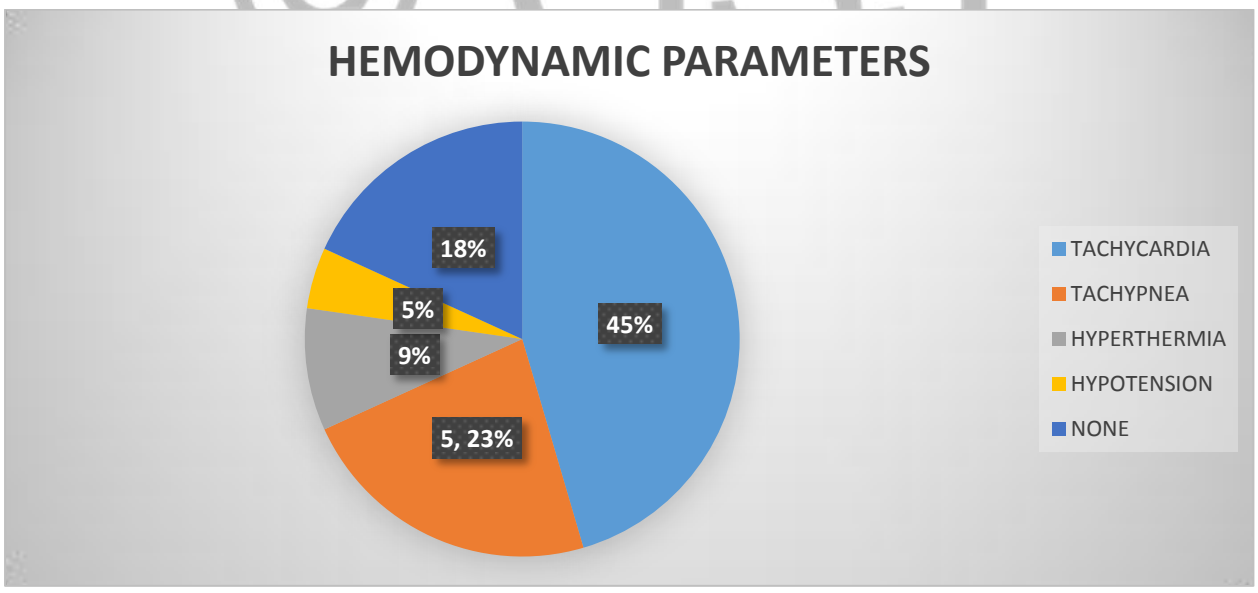

Figure 3: frequency of hemodynamic troubles

b- Accompanying Signs

The design study revealed that out of the series of 16 cases, 37.50% of the children had an initial loss of consciousness whereas 12.50% had a complete loss of consciousness. Free interval was noticed in 6.25% and non-determined in 25% of the cases.

Table 2 below gives a summary of the symptoms encountered in the emergency unit of the study hospitals. Headaches and vomiting were the most frequent with 62.50% and 43.75% respectively. Seizure/convulsion, drowsiness, irritability represented 6.25% each, whereas, pain of a member or pollakiuria represented 25% and anemia counted for 12.50%.

Concerning neurological signs, more than half of the sample conserved conscious or was conscious at admission. Signs of focalization found included non-reactive unilateral mydriases, hemiparesis, non-reactive arch of the foot and facial nerve damage. We realized that 11 children out of 16 had no focalization signs and the most frequent local sign was sub-cutaneous haematoma.

Table 2: neurological signs observed in the emergency unit

Neurological signs in the emergency unit	Frequency (n)	Percentage (%)
GCS/15		
14 to 15	**9**	**56.25%**
9 to13	4	25.00%
≤ 8	3	18.75%
Focalization Signs		
None	**11**	**68.75%**
Unilateral Mydriasis	2	12.50%
Motor deficit	2	12.50%
Non reactive	1	6.25%
Cranial nerve involvement	1	6.25%
Local Signs		
Sub-Cutaneous Haematoma	**7**	**43.75%**
None	4	25.00%
Periorbital bruising	3	18.75%
Scalp wound	3	18.75%
Otorrahgia	2	12.50%
Rhinorrahgia	1	6.25%
Tympan haematoma	1	6.25%

3- Para Clinical Profile

a- Localization of EDH

Frontal localization of the EDH of children predominated in this study with 43.75%. A particular case was noted in a girl child of 12 years at the central hospital of Yaoundé where the localization was multiple: right anterior frontal and right parietal going from the temporal fossa with respective thickness of 14.6mm and 4mm.

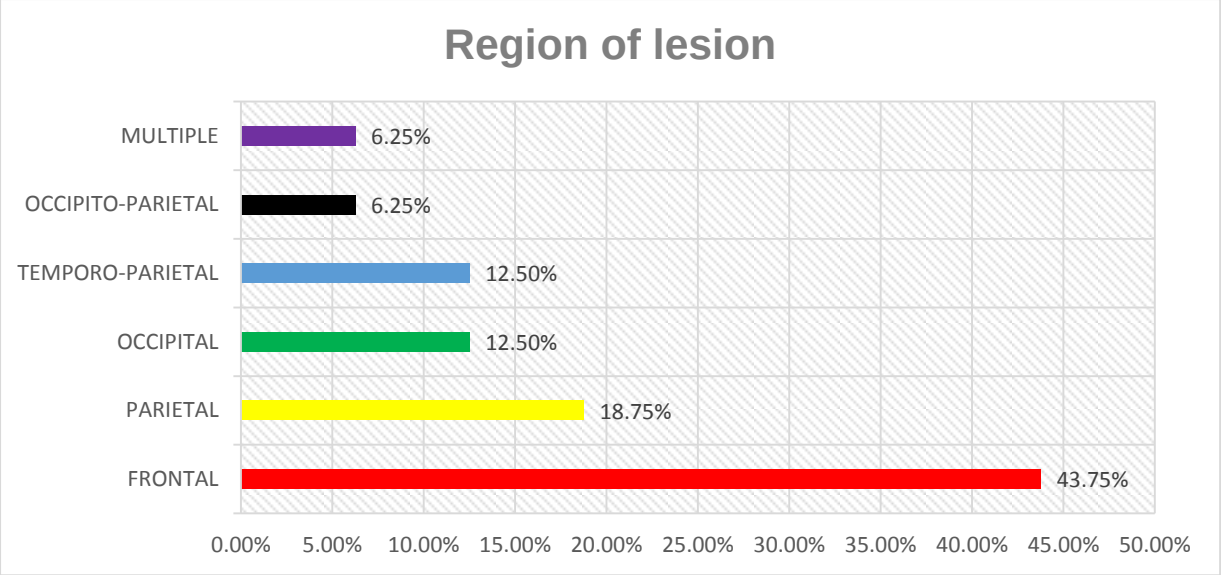

Figure 4: Scannographic localization of children EDH

4- Treatment Methods

a- Applied Treatment methods

Surgical of conservatory treatment was made with a predominant surgical treatment of 56%.

b- Surgical Technique

Craniotomy with evacuation of the haematoma and a Redon drain insertion was the most practiced surgical technique and counted for 55.6%.

c- Clinical State at the End of Hospitalization

Seven children benefited for a conservative treatment among which six had a good neurologic state when leaving hospital and one with a hemiparesis persistence in a child of 3 years.

Totally, 9 children underwent surgery. More than 88% had a favorable evolution of their state with good neurologic state when leaving hospital. We observed 20 days after a craniotomy, some neurological troubles in a girl child of 8 years.

DISCUSSION

a- Extradural Haematoma Global Prevalence in Children

The global prevalence of EDH in this study was of the order of 19.26%. Similar results were equally obtained in literatures [5,6,7,8]. These different frequencies when compared differs slightly as a result of the methodology of study used, the period of study and the region of study.

The average age of the sample was 8.28 years with extremes at 7 month and 15 years. This result is near to that of **Palomeque R and al.,** [9]who had and average sample age of 8 years. **Gerlach R** and al.[10], in a sample study of 39 cases obtained an average age of 6.93 years, less than what we obtained. The difference may be as a result of his sample representation of 39 cases compared to 26 of our study, and the age limit difference of 16 years instead of 15 years in our design study.

In spite of the spontaneous etiologies reported in literatures, EDH is generally as a result of cranial trauma [10,11,12,13,14]. In this study, violent falls represented 37.50% of the cases and stands for the first etiology as reported by several authors [10,12,13]. However, it is important to note that this frequency is less than those obtained in recent years because a non-neglected proportion of brutality (18.75%) was not cited by other authors.

b- Clinical Aspect

Initial loss of conscious was present in 37.50%, results similar to those of **Pang D and al., [15] and Ceylan S and al., [16].** In fact, initial loss of consciousness nowadays is not considered as a pathognomonic sign of EDH be in adults or children. It is equally the case of a free interval space where we found 6.25%. For **Goutelle A and al.,[17]** free interval space was a capital sign and almost present and found in 80% of the

cases of EDH in children. In the view of these results and our observations of the literatures [18,19], this assertion seems to have less or no credit nowadays.

Most frequent symptoms at admission were headaches (62.50%) and vomiting (43.75%). **Schutzman S and al.; Choi H and al.; and Sencer A and al.;[**12,20,21] reported equally vomiting and headache in their studies whereas **Ciurea A and al.;[**18] reported irritability as a principal symptom during a study carried out in 2010.

The Glasgow score varied according to studies: **Schutzman S and al**.; [12] obtained 49% Glasgow score between 13 to 15; **Paiva W and al.;** [13] obtained 57% score between 13 to15 and **Ciurea A and al.;** [18] obtained 36.60% score between 13-15. All the above studies including this design reveals that children at admission had almost a normal neurological state. 68.75% of the sample showed no sign of focalization. Unilateral mydriasis and motor deficit was both found in two children (12.50%).

c- Para Clinic Profile

Concerning the Scannographic characteristics, we observed in this study a case of multiple EDH in a girl child of 12 years at the general hospital of Yaoundé. The haematoma was basically located in the frontal and parietal regions with 43.75% and 18.75% respectively. **Ciurea A** and al.; [18] recorded a temporo-parietal predominance in 46.60% and exclusively parietal in 23.30%. This difference may be as a result of the fact that, they included in their study exclusively children below 2 years of age. For **Pillay R and Peter J** [22], principal localizations were: parieto-occipital with 54%, occipital with 25%. It is important to note that recent studies though including adults showed that, EDH was mainly located in the frontal region [3,8,23].

Cranial bone fracture counted for 43.75%. Among these fractures, bone depression in regard of EDH represented 57.14%. Contusions and cerebral edema were the most

associated intracerebral lesions obtained. Similar results were obtained from certain authors who worked on adult EDH [10,24,25].

d- Treatment Methods

Surgery counted for 56.25% in this study. This may be as a result of the fact that EDH usually leads to a displacement of the medial line and brain herniation. Certain authors thought that, EDH with medial line displacement requires necessarily surgery [25,26,27]. Yet, among the 43.75% of the children who benefited a conservative treatment in this study, some of the haematoma in the sample group lead to a medial line displacement. We therefore noticed that, a conservative treatment in children is possible even though secondary surgical risks is high.

Craniotomy associated to evacuation of the haematoma with a Redon drain insertion was the most practiced surgical technique (55.55%).

All the admitted children in this sample of study survived, yet, two of the children suffered sequels of neurological troubles.

CONCLUSION

We conclude by saying that, the prevalence of EDH in children in Yaoundé was 19.26% with a male predominant sex ratio of 3:1 and a mean sample age of 8.23 years. All the haematoma of the children had as origin traumas, violent falls and road traffic accidents as the most represented etiologies. Headaches and vomiting were the most frequent symptoms observed at admission. The Scannographic revelation of the EDH showed that, the EDH of children was mainly located at the frontal region. It has the tendency to be voluminous in children causing a cerebral herniation. The treatment method of our milieu remain the surgical and conservative method with a surgical predominance.

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