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Intracranial Suppurations in Togo: Etiologies and Treatment

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Abstract

Objective: Intracranial suppurations are a cosmopolitan pathology whose prevalence depend of the region of the world. They are mostly caused by oto-laryngological infections. Despite the progress, they remain serious diseases in Africa. The objective of this study was to report the epidemiology, clinical and etiological aspects of intracranial suppurations in Togo. **Method:** This was a retrospective and descriptive study carried out from January 1, 2012 to December 31, 2020 including all cases of intracranial suppuration treated in the neurosurgery unit of Sylvanus Olympio university hospital in Lomé. The evolution was evaluated at discharge, at 3 and 6 months after. **Results:** We collected 185 cases of intracranial suppuration. The average age of the patients was 12.6 years with a male predominance (72.4%). The main clinical signs were the infectious syndrome (92.4%), intracranial high pressure (51.4%), focal deficit (38.4%) and seizures (20.5%). An otolaryngological infections history was noted within 3 months in 72.4%. The brain CT scan noted a predominance of empyema (63.8%) mostly subdural (64.4%). Radiological sinusitis was found in 57.3%. We identified etiology in 69.2% predominated by otolaryngological causes. Patients received medical and surgical treatment in 77.3%. The bacteriology was positive only in 7 cases. The mortality rate was 15.1%, mostly no operated cases (78.6%). At 6 months 84% recovered without sequelae. The predictive prognostic factors for mortality were: coma ($p < 0.001$), absence of surgical treatment ($p < 0.02$). **Conclusion:** Intracranial suppuration remains frequent in our country, mainly due to oto-laryngological pathologies. The clinical presentation is not always specific and Bergman's triad is rarely complete. The results of treatment are good if it is early.

Keywords

Intracranial Abscess, Empyema, Togo

1. Introduction

Intracranial suppurations are collections of pus due to pyogenic germs developed within the parenchyma (abscess), or in the virtual cavity (empyema) [1]. Intracranial suppuration is a cosmopolitan pathology whose prevalence depend of the regions of the world but with no clearly documented prevalence. While in Europe and North America they became rare (1 - 3 cases per year) [2], in developing countries where socioeconomic conditions are unfavorable, the prevalence of intracranial suppuration remains high (10 - 20 cases per year) [3]. The data often available are patchy with either only pediatric cases or a single type of intracranial suppuration (abscess or empyema) [4] [5]. They are mostly caused by otolaryngological infections [6] [7]. Current advances in imaging and microbiology have globally improved the prognosis. Despite this progress, they remain serious diseases in Africa due to diagnosis delay [8]. The objective of this study was to report the epidemiology, clinical and etiological aspects of intracranial suppuration in Togo.

2. Patients and Method

This was a retrospective and descriptive study carried out from January 1, 2012 to December 31, 2020 including all cases of intracranial suppuration treated in the neurosurgery unit of Sylvanus Olympio university hospital in Lomé. Data collection was done using a pre-established survey form. The form was successfully pre-tested before the start of the survey. The questionnaires were completed directly using patient clinical records. The variables assessed were:

- Quantitative: Age, temperature, Glasgow score, complete blood count, C-reactive protein, type, number of suppuration on CT scan, treatment modalities and the evolution.
- Qualitative: Gender, profession, underlying pathologies, etiology, diagnostic delay, infectious syndrome, signs of intracranial high pressure, neurological deficit and meningeal syndrome.

The evolution was evaluated at discharge, at 3 and 6 months after. Multi-variable analysis (R logiciel) was used to determine predictors factors of death. The factors assessed were consciousness at admission, type of treatment, the type of suppuration. Two-sided p values < 0.05 was considered statistically significant.

3. Results

We collected 185 cases of intracranial suppuration. The average age of the patients was 12.6 years with a male predominance (72.4%). The average consulta-

tion time was 20.5 days (extreme 6 - 40 days). The socio-demographic and clinical characteristics of the patients are summarized in a Table 1.

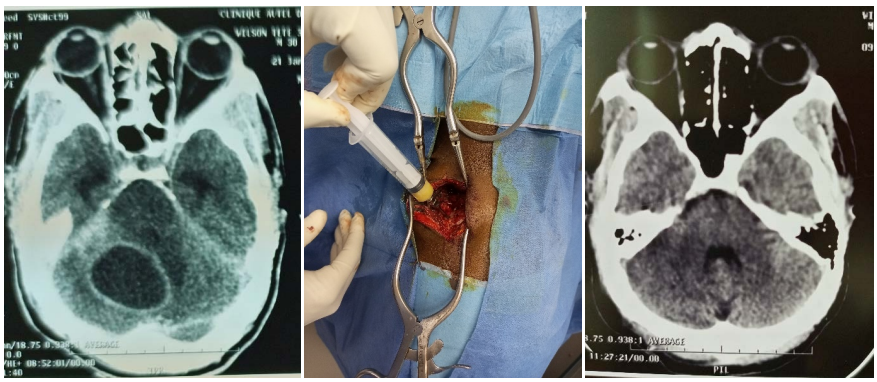
On admission, 8.1% patients were in a coma. The Bergman's triad was found in 17.8% of cases. An otolaryngological infections history was noted within 3 months in 72.4%. All patients had initially performed a brain CT scan and 2.7% an MRI. There was a predominance of empyema (63.8%) mostly subdural (64.4%). The frontal region was the most common location in 56.2% followed by inter-hemispheric location in 12.4%. Wenoted posterior cerebral fossa location in 3 cases (Figure 1).

In 3.2% of cases, there was a double localization. Radiological sinusitis was found in 57.3%. Cerebral hernia was noted in 14.6% and hydrocephalus in 4.9%. Biologically, CRP was high in all cases with neutrophilic polymorphonuclear leukocytosis in 71.4% of cases, inflammatory anemia in 66.4%. HIV serology was performed in 41.6% and was negative in all cases. We identified etiology in 69.2% predominated byotolaryngological causes (Table 2).

No cardiac cause was found. In our study, 77.3% of patients received medical and surgical treatment, remain exclusively by medical treatment. Antibiotic therapy was probabilistic mostly by association 3rd generation cephalosporin, imidazole and aminoglycoside combination (56.2%). The mean duration of antibiotic therapy was 43.3 days. The most surgical technique used was burr holes

Table 1. Socio-demographic and clinical characteristics of the patients.

	Number (n)	Poucentage (%)
Infectious syndrome	171	92.4
Intracranial high pressure	95	51.4
Focal deficit	71	38.4
Seizures	38	20.5
Meningeal syndrome	43	23.2
Consciousness impairment	71	38.4



(a) (b) (c)

Figure 1. Right cerebellum abscess (a); puncture with Cushing trocar (b); post-operative scan (c).

(61.5%), flap (15.4%), craniectomy. Sinusitis was treated surgically in 2.7%. Thebacteriology was positive only in 7 cases isolating: *Staphylococci* (4), *Klebsiella Pneumonia* (2) and *Eccherichia Coli* (1). A postoperative CT scan was performed in 9.2% and additional surgery made in 5.4%. The average hospital stay was 25.2 days. The mortality rate was 15.1%, mostly no operated cases (78.6%). At 6 months outpatient control, 84.3% showed up. The overall evolution is summarized in Table 3.

The predictive prognostic factors for mortality were: coma ($p < 0.001$), absence of surgical treatment ($p < 0.02$). There was no difference in mortality between abscesses and empyema ($p = 0.4$).

Table 2. Repartition according to etiologies of intracranial suppuration.

.	**Total**	**Abscess**	**Empyema**
Sinusitis	106 (57.3%)	12	94
Frontal (30)			
Maxillary (53)			
Ethmoid (12)			
Otitis (3)			
Sphénoidal (3)			
Pansinusitis (5)			
Craniocerebral wound	9 (4.9%)	9	0
Meningitis	7 (3.8%)	0	7
Sepsis	3 (1.6%)	3	0
Craniotomy	3 (1.6%)	2	1
Unknown	57 (30.8%)	41	16
Total	**185 (100%)**	**67 (36.2%)**	**118 (63.8%)**

Table 3. Global evolution at 6 mois out patient visit (156).

	Number (n)	Frequency (%)
Recovery without sequelae	**131**	**84%**
Recovery with sequelae	**25**	**16%**
Epilepsy	2	1.3%
Motor deficit	11	7%
Language disorder	3	1.9%
Hydrocephalus	2	1.3%
Psychomoteur retardation	7	4.5%
Death	**0**	**0**

4. Discussion

This study shows that intracranial suppuration remains a serious health problem in our country (18.5 annual cases). This rate would probably higher than reported because of difficulty for rural population to reach specialized health care. It is mostly pediatric disease. This predominance of the population is widely found in the literature [9] [10] [11]. The fragility of immune system and the occurrence of otolaryngological infections during this period of life may explain it. There was a diagnostic delay due to self-medication and also neglect of symptomatology by parents. The other factor is the similarity of intracranial suppuration with meningitis and malaria in our environments leading to diagnostic errors [5] [10]. In our series, 6 patients underwent a lumbar puncture for suspected meningitis. The focal deficit is the main evocative sign often motivating the realization of brain imaging. Its frequency in suppuration varies between 34 and 70% [12] [13].

The predominance of empyema is also reported in the literature [7] [10] [14] [15] [16]. The origin of initial infection determines the location of the intracranial suppuration. Thus, sinus infections would most often be responsible for the development of frontal intracranial suppuration and otological infections would readily be responsible for temporal and the posterior fossa intracranial suppuration. This frontal location is widely found [17] [18] [19]. Although the fever is inconstant because of self-medication, the infectious biological signs are often constant [20] [21] [22] [23]. The predominance of otolaryngological infections could be largely explained by the influence of the climate of our country. In the dry season, dusty favor the occurrence of otolaryngological infections. Intracranial empyema would most often be the endocranial complication of poor management of otolaryngological pathology. However, this is not a specificity in our country but a common cause of intracranial suppuration [7] [15] [22] [23]. The isolation of causal germs in our country is often difficult due to technical limitations, but also frequent prior antibiotic therapy [24] [25]. In the literature, this examination found streptococcus more frequently as bacterial associations, which was not found in our study [26] [27]. Antibiotic therapy in the treatment of suppuration is classic with a large consensus on the choice of molecules [28] [29] [30]. However, there is no consensus on its duration. In our practice, we institute parenteral and oral antibiotic therapy for 6 weeks. In all cases, antibiotic treatment should only be stopped according favorable clinical and radiological arguments [31]. Suppuration surgery is also classic. The indications depend on the type of suppuration, the location, the volume, the mass effect, the association of osteitis and the general condition of the patient [26] [27] [32] [33] [34]. The results are generally good if management is early (84% in our series) [28] [30]. The antibiotics decrease mortality ranging from 0 to 32% [2] [4] [9] [26] [27]. The mortality rate from brain abscess fell from 90% in the pre-antibiotic period (1938 - 1950) to 35% in the immediate post-antibiotic one (1950 - 1970) [35]. In our study the mortality was 15.4%. The cause of mortality was generally due to

cerebral hernia, and the majority of patients were not operated because of lack of financial means. However, sequelae are frequent [2] [4] [9] [26] [27]. The state of consciousness of the patients on admission was the main prognostic factor on which the evolution of the disease depended [11] [23].

The limits of our study were represented by the lack of some clinical information like cytobacteriological examination of the pus, which hampered the etiological investigation. In addition, it suffered of the problem of follow up, some patients didn't show up at control. That has biased the exact profil of patients evolution.

5. Conclusion

Intracranial suppuration remains frequent in our country, mainly due to otolaryngological pathologies. The clinical presentation is not always specific and Bergman's triad is rarely complete. Consciousness is a major prognostic factor as well as surgery. Sterile cultures have become increasingly common due to self-medication. The results of treatment are good if it is early.

Authors' Contributions

Essossinam Kpélao: substantial contributions to conception and design, acquisition of data, drafting the article and revising it critically for important intellectual content; final approval of the version to be published.

Kodjo H.M. Ahanogbé: final approval of the version to be published.

Abaltou Bawoubadi: drafting the article and revising it critically for important intellectual content; final approval of the version to be published.

Assila Komlanvi: substantial contributions to conception and design, acquisition of data, final approval of the version to be published.

Agbéko K. Doléagbénou: drafting the article and revising it critically for important intellectual content; final approval of the version to be published.

Kader Moumouni: drafting the article and revising it critically for important intellectual content; final approval of the version to be published.

Solim Bakondé: final approval of the version to be published.

Kossi K. Ségbédji: final approval of the version to be published.

Komi Egu: final approval of the version to be published.

Abdoulaye Hima-Maïga: drafting the article and revising it critically for important intellectual content; final approval of the version to be published.

Dzidoula Lawson: substantial contributions to conception and design, acquisition of data, final approval of the version to be published.

Anthony K Békéti: drafting the article and revising it critically for important intellectual content; final approval of the version to be published. All authors read and agreed to the final version of this manuscript and equally contributed to its content and to the management.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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