Health Sciences & Disease
The Journal of Medicine and Biomedical Sciences

Original Research

The Efficacy of Screening and Treatment of Ruptured Aneurysm in Sub-Saharan African Countries: Case of Yaounde, Cameroon

Efficacité du dépistage et du traitement de la rupture d'anévrisme dans les pays d'Afrique Subsaharienne: cas de Yaoundé, Cameroun

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Keywords: subarachnoid hemorrhages, aneurysm, Yaounde, Cameroon

Mots-clés: hémorragie sous-arachnoïdienne, anévrysme, Yaoundé, Cameroun

ABBREVIATIONS

SAH : Sub-arachnoid hemmorage
WFNS : World Federation of Neurosurgical Societies
AVC : Accident Vasculo- Cérébral
CT scan : Computed Tomography scan
MRI : Magnetic Resonance Imaging
SSC : Sub-Saharan Centers
ICU : Intensive Care Unit

ABSTRACT

Introduction. Subarachnoid Hemorrhages (SAH) secondary to ruptured aneurysm (RA) are frequent and severe pathologies. **Methods.** From January 1st 2016 to December 31st 2020, all consecutive spontaneous SAH cases admitted in the teaching hospitals of Yaounde were analyzed. **Results.** During the study period, 774 stroke cases were registered, including 90 cases of SAH (11.63%) with a sex ratio of 1/1.5. The median age was 49 years [range: 17 – 72].-The patients were admitted to the internal medicine unit (48%), the neurosurgery unit (37%) and the intensive care unit (15%). The classification was WFNS I (47.9%), WFNS II (27.1%), WFNS III (10.4%), WFNS IV (10.4%) and WFNS V (4.2%). Positive diagnosis was made by CT scan (85.4%), MRI (14.6%) and lumbar puncture combined to CT scan (10.4%). The delay was 24hrs (33%), 24-48hrs (17%), after 72hrs (50%); Fischer modified score was Grade I (29.2%), Grade II (25%), Grade III (22.9%). The main etiology found was ruptured aneurysms (76%) and arteriovenous malformation (10%). Treatment consisted of microsurgical clipping of aneurysms and external CSF diversion; the other patients were treated medically. **Conclusion.** The high loss of patients from the admission to the neurosurgical consultation of SAH is common in Yaounde. It was due probably to disorientation of the patients, underdiagnosis and lack of endovascular equipment, the reinforcement of knowledge for a better screening and orientation of SAH to the right services and the right specialties in our environment is needed.

RÉSUMÉ

Introduction. Les hémorragies sous-arachnoïdiennes (HSA) secondaires à une rupture d'anévrisme sont des pathologies fréquentes et graves. **Méthodes.** Du 1er janvier 2016 au 31 décembre 2020, tous les cas spontanés consécutifs d'HSA admis dans les hôpitaux universitaires de Yaoundé ont été analysés. **Résultats.** Durant cette période, 774 cas d'AVC furent enregistrés, dont 90 cas d'HSA (11, 63 %) avec un sex ratio de 1/1, 5. L'âge médian était de 49 ans [de 17 – 72ans]. Les patients étaient admis en médecine interne (48%), en neurochirurgie (37%) et aux soins intensifs (15%). La classification était WFNS I (47, 9%), WFNS II (27, 1%), WFNS III (10, 4%), WFNS IV (10, 4%) et WFNS V (4, 2%). Un diagnostic positif a été posé par tomodensitométrie (85, 4 %), IRM (14, 6 %) et ponction lombaire combinée à la tomodensitométrie (10, 4 %). Le délai était de 24 heures (33%), de 24-48 heures (17 %) , après 72 heures (50 %); Le score modifié de Fischer était grade I (29,2 %), grade II (25 %) , grade III (22,9 %). L'étiologie principale était une rupture d'anévrismes (76 %) et une malformation artérioveineuse (10 %). Le clippage microchirurgical des anévrysmes et la derivation ventriculaire externe du LCR étaient les principaux traitements, les autres patients étant traités médicalement. **Conclusion.** La perte élevée de patients de l'admission à la consultation neurochirurgicale de l'HSA est fréquente à Yaoundé . Les raisons probables sont la mauvaise orientation des patients, le retard de diagnostic et l'absence de technologies pour la voie endovasculaire. Le renforcement des connaissances pour un meilleur dépistage et une meilleure orientation de l'HSA vers les bonnes spécialités dans notre environnement est nécessaire.

INTRODUCTION

In 2017, 80% of all incident strokes, 77% of all stroke survivors, 87% of all deaths from stroke and 89 of all stroke-related DALYs was in low- to middle-income countries(Krishnamurthi); 09% of these strokes was related to SAH. In Cameroon, where it is frequent, it seems underdiagnosed and neglected because of lack of resources for diagnosis and care of patients(Masson). Diagnosis and effective management of subarachnoid hemorrhages respond to a codification and a precise algorithm, from the onset of symptoms, the first consultation and promptness in accessibility to the specialized service(Akıncı). Patients must be transferred to a neurovascular unit, and the exclusion of the aneurysm has to be made in 72 hours after the onset of the symptoms. Management by neuro-anesthesiologists, neurosurgeons is mandatory to improve the outcomes, and therefore, the vital and functional prognosis in the short, medium and long term(Susan). In low- and middle-income countries, the high morbidity and mortality rates are accentuated by a dysfunction of this mechanism. It is imperative to shed light on this therapeutic dynamic in order to set up improvement measures, to evaluate the orientation and the management of patients with SAH in Yaounde.

PATIENTS AND METHODS

It was a cross-sectional study, with retrospective and prospective data collection consisting of patients above 15 years olds diagnosed with spontaneous SAH from the 1st of January 2016 till the 30th of June 2021. The socio-demographic, clinical, risk factors, management and the evolution parameters within 28 days were studied. Data was collected and registered in a pretested questionnaire and were analyzed with SPSS software version 26, Microsoft Office Word and Excel version 2010.

RESULTS

During The study period, 774 cases of strokes were registered, 90 were SAH (11.63%) with an intra-hospital incidence rate of 2.27/100.000persons/y. Sex ratio was 1/1.5, 19 males and 29 females; median age was 49y.o [17 – 72].

Many patients were admitted at the internal medicine unit (48%), some at the neurosurgery unit (37%) and few at the Intensive care unit (15%). Half of patient were managed without neurosurgical involvement from the admission to the death or discharge. Risk factors were hypertension (33.3%), Alcohol (20.8%). We noticed that 81% patients were going directly to the hospital (before 24Hrs) after onset of presenting complains, only 03 (06%) between 24hrs to 72hrs and 06 (13%) over 72hrs. After consultation, patients were classified WFNS I (47.9%), WFNS II (27.1%), WFNS III (10.4%), WFNS IV (10.4%) and WFNS V (4.2%). Positive diagnosis was made by CT scan (85.4%), MRI (14.6%); lumbar puncture with three test tubes was combined to CT scan (10.4%). The positive diagnosis was made in a 24hrs time delay (33%), between 24hrs to 48hrs (17%) and after 72hrs (50%); also, Fischer modified score was Grade I (29.2%), Grade II (25%) and Grade III (22.9%) were the most represented. The CT Angio aimed at finding the etiology, but was done in only 44 % of cases. The main etiology was Ruptured aneurysms (76%) followed by arteriovenous malformation (10%).

Table 2: Global treatment for SAH

Treatment	Number (N=48)	Percentage (%)
Specific treatment		
Microsurgical clipping	13	27,1
Endovascular treatment	00	
Symptomatic treatment		
Medical hospitalisation	41	85
Intensive Care Units	07	15
Analgesics	48	100
Laxatives	32	66,7
Anxiolytics drugs	30	62,5
Loxen Protocol	11	22,9
Gastric protector	29	60,4
Anti HTA drugs	27	56,3
Anti Oedemateous	17	35,4
Vasospasm	42	87,5

Treatment consist of surgery by microsurgical clipping of aneurysms for 13 patients (27.1%), the rest were treated medically (fig 1.)

Table 1: therapeutics choice for etiology treatment

Treatment	Number (N=48)	Percentage (%)
Surgery	13	27,1
Medical treatment	35	72,9

Figure 1 : Cerebral CT without injection showing a left subarachnoid hemorrhage modified Fisher grade 2 with hydrocephalus

Post clinical evolution was evaluated by Glasgow Outcome Scale (GOS) after 28 day post rupture; we found that most of the Evolution using Glasgow Outcome Scale (GOS) was GOS I (11%), GOS III (2%), GOS IV (7%), GOS V (31%) (Fig 2.).

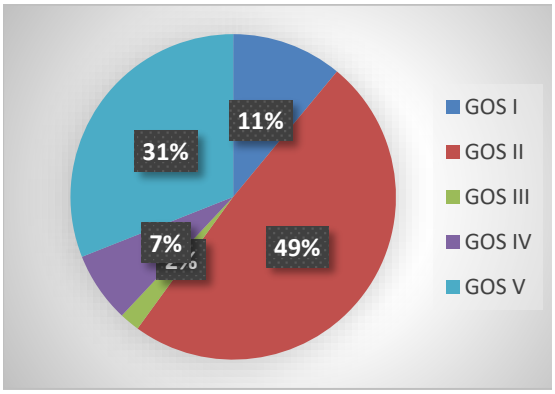

Figure 2 : Evolution using Glasgow Outcome Scale

Death occurred much between the 2nd and the 14th day.

DISCUSSION

The rational of this study was to describe the orientation, the pathway and the management of patients with SAH in Yaounde. For these reasons, both qualified and unqualified hospitals for management of SAH were selected in this study. The ECH and Yaounde University hospital (YUH) are not provided with a neurosurgery department. This study showed that only 90 patients were oriented to the university hospital. Amongst these, only 73 patients were addressed to the appropriated hospital endowed with a neurosurgical and ICU. Then, after the admission to the appropriate hospital, only 48% of patients was admitted in the adequate units, the other patient were admitted at the internal medicine department. The standard intra-hospital pathways of patients presenting with SAH was the transfer from the emergency units to the ICU, no matter the level of consciousness, before or after the exclusion of the aneurysms (surgical or endovascular approach) (Susan). Our results and the literature review showed that management of SAH and the screening for aneurysms are not well codified in SSA countries and does not follow the standard process (Akıncı, Molyneux, Lafuente, Britz, and Yao). This may bias the intra-hospital incidence of rupture aneurysms.

The intrahospital incidence of SAH is estimated to 9-10 cases/100.000 peoples/year. The population of Yaounde is estimated to 4.000.000 of people, this means that about 400 cases should be diagnosed per year instead of 90 cases collected in the period of 06 years. Tokpa and al. reported, during a period of 06years a series of 112 cases of aneurysms treated in Abidjan (5 years), Ivory Coast, with 4.000.000 inhabitants. The situation is comparable in Dakar, where Thioub et al reported a series of 102 consecutively treated aneurysms in Senegal (12.000.000 peoples) in 5 years.

SAH is probably underdiagnosed or underestimated, the estimation is probably biased by the mis-overtaking of patients in inadequate Centers on the one hand, the disorientation of patients in inadequate units on the other hand. Many of them may be unrecognized, may die or may be lost follow up. A study in Yaoundé showed that the knowledge, attitude and practice of the health workers is not guaranteed.

The positive diagnosis was based on CT scan (90%) but in 10% of cases, lumbar puncture was helpful. The CT Angiograph is coupled to CT scan in about 30%. The conventional angiograph was not available in our environment. Similar conditions were reported Abidjan and Dakar (TOKPA, Thioub). The standard process required to perform conventional angiography and to repeat after 01 month in patient with rupture aneurysmal like SAH (Akıncı, Molyneux, Lafuente) The clinical and paraclinical underdiagnoses of SAH due to rupture aneurysms, may be due to poor knowledge, attitude and practice of the health practitioners on the management of SAH. This explains why only few cases are treated in the main surgical center in SSA countries. The timing of the treatment of aneurysm has an impact on the outcome.

The treatment of the aneurysmal bag in SSA is surgical in Cameroon and other sub-Saharan centers (Thioub, Mudjir, Tokpa, Masson); this is due to the lack of technologies for arterial catheterization, the high cost of endovascular equipment. Few neurovascular activities are reported in other SSC.

CONCLUSION

According to the knowledge and the literature review, SAH and rupture aneurysms are rarely reported pathologies in Cameroon and in SSA countries in general. Many cases may be unrecognized or misdirected to inappropriate centers or units. Only few cases are operated, endovascular treatment techniques are not available nor accessible in SSA. The reinforcement of the knowledge, attitudes and practices of health personnel as well as the revision of the cost of the endovascular equipment is necessary to improve the management of SAH and rupture aneurysms in developing countries. An international cooperation is mandatory for a better management of vascular pathologies in our environment.

DECLARATIONS

- Ethics approval and consent to participate: Not applicable
- Consent for publication: Not applicable
- Competing interests: The authors declare that they have no competing interests
- Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
- Authors' contributions:
    - DVP: Surgeries and critical revision of the content
    - HNO and DA: Concept and writing,
    - BF: reading and data interpretation
    - NFEJ and NTL: Data analysis,
    - BYA, BMM and PT: Data collection,
    - All authors read and approved the final manuscript.

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