Scientific Research Publishing

Neuroscience & Medicine, 2017, 8, 77-86
http://www.scirp.org/journal/nm
ISSN Online: 2158-2947
ISSN Print: 2158-2912

Anesthetic Practice in Neurosurgery at University Hospital of Brazzaville (Congo)

Marie Elombila[1,2*], Hugues Brieux Ekouele Mbaki[2,3], Gilbert Fabrice Otiobanda[1,2], Gilles Niengo Outsouta[1]

[1]Department of Intensive Care, University Hospital of Brazzaville, Brazzaville, Congo
[2]Faculty of Health Sciences, Marien N'GOUABI University of Brazzaville, Brazzaville, Congo
[3]Department of Surgery, University Hospital of Brazzaville, Brazzaville, Congo
Email: *elombila@gmail.com, *marieelombila@yahoo.fr

How to cite this paper: Elombila, M., Mbaki, H.B.E., Otiobanda, G.F. and Outsouta, G.N. (2017) Anesthetic Practice in Neurosurgery at University Hospital of Brazzaville (Congo). *Neuroscience & Medicine*, **8**, 77-86.
https://doi.org/10.4236/nm.2017.84010

Received: October 30, 2017
Accepted: December 9, 2017
Published: December 12, 2017

Abstract

Aim: To evaluate the anesthetic management of neurosurgical patients in University Hospital of Brazzaville. ***Materials and methods***: We performed a transversal and descriptive study during the period from January to June 2015 into operating room of the University Hospital of Brazzaville. 60 cases of anesthesia have been analyzed. ***Results***: The neurosurgery represented 2.88% of the activity of the operating room in University Hospital of Brazzaville. The average age was 44.7 ± 18.36 years old. The sex ratio was 1.07. The scheduled interventions have concerned 83.4% of cases. Surgical indications were concerned the spine degenerative disease and spinal trauma in 40% and 18.3% of cases respectively. The patients classified ASA I and II were most represented in 40% and 46.7% of cases respectively. General anesthesia was used in 98.4% of cases. The peroperative complications were represented by arterial hypotension (31.7%), hemorrhage (11.7%), bradycardia (5%), difficult intubation (3.3%) and one case of peroperative cardiac arrest. The blood transfusion rate was 18.7%. The stay in ICU concerned 8.3% of the cases. We recorded three cases (5%) of death in our series. ***Conclusion***: The neuroanesthesia knows an evolution in our country because of increasing number of neurosurgeons; it's necessary to train medical staff in her practice.

Keywords

Anesthesia, Neurosurgery, Perioperative Period

1. Introduction

The development of neurosurgery in developing countries representing 5 billion

inhabitants is greatly hampered by the lack of financial and technical resources [1]. The gap is growing more and more between North and South. The number of neurosurgeons per capita in Sub-Saharan Africa is 1:6,400,000, whereas a ratio of 1:200,000 inhabitants is admitted [1] [2].

Neurosurgery has grown significantly in recent years, especially in Maghreb and in West Africa [1]. It's growing especially in Sub-Saharan Africa. In Congo, for a population of 4,716,473 inhabitants, the only University Hospital is located in Brazzaville (the capital), with a capacity of 809 beds and four neurosurgeons working in a surgical unit. Neurosurgery in our country is recent with still a reduced activity [3].

The anesthesia of neurosurgical patients must adapt to the site of intervention and the pathology of the patient, as in any surgery, this specificity is related to the anesthetic agents, the techniques and also the monitoring used [4]. The practice of neurosurgery without a team of neuroanesthesia-resuscitation, without CT, MRI, neuronavigation and appropriate materials is difficult. These means are expensive and often inaccessible for some countries [1] [2] [3].

Few studies have been carried out on the practice of anesthesia in neurosurgery in Africa, particularly in Congo. Our study aim is to evaluate the perioperative management of neurosurgical patients at University Hospital of Brazzaville in order to improve current practice.

2. Materials and Methods

We performed a descriptive and retrospective study, during period from January to June 2015 (6 months), into the operating room of University Hospital of Brazzaville. We included all patients who benefited from a scheduled or emergency neurosurgery. Data were collected from anesthesia record of operated patients. We have excluded anesthesia records whose data were absent.

The parameters evaluated were epidemiological (age, sex), anesthetic (American Society of Anesthesiologists "ASA" score, type of anesthesia, monitoring and anesthetic drugs used, complications observed), surgical indications and duration of surgery. Collection of data was performed from anesthesia record and treated in Excel 14.6.6 (160626).

The neurosurgical team in University Hospital of Brazzaville is composed of four neurosurgeons. The neurosurgical interventions are carried out in an operating room of its own. This room is equipped with an anesthesia respirator, a basic monitoring (electrocardiogram, intermittent non-invasive measurements of systemic blood pressure, pulse oximetry) and capnography, mucus suction pumps, a brightness amplifier and a single vision microscope. All patients were seen in pre anesthetic consultation a few weeks before surgery, while an anesthetic and blood transfusion strategy was specified. The anesthesia carried out by the nurse anesthetist, supervised by physician anesthetist. The perioperative protocol is under the responsibility of neurosurgeon with multidisciplinary consultation (anesthetist, radiologist). The corticosteroids are initiated in preo-

perative for the patients with intracranial hypertension and continued in post-operative with the relay per os these accompanying by inhibitor of proton pomp, potassium, calcium and diet without salt. Antibioprophylaxis was systematic at induction and continued by surgeon in postoperative period for 48 hours. The postoperative pain is treated with paracetamol and chlorhydrate of tramadol, in severe cases morphine is administered.

3. Results

During the study period, 76 patients were operated in neurosurgery on a total of 2634 patients, which made a prevalence of 2.88%. Sixteen patients were excluded because of data were absent. Finally, 60 cases representing 78.9% of patients operated on neurosurgery were recorded for this study. The average age was 44.7 ± 18.36 years, with extremes ranging from 6 months to 79 years. Figure 1 below indicates the distribution of patients by age group in our study. Table 1 shows the epidemiological and perioperative data of the patients.

Table 1. Epidemiological and intraoperative data of patients in our study.

	n (%)
Sex	
Male	31 (51.6)
Female	29 (48.4)
Adults	55 (91.7)
Children	5 (8.3)
Interventions	
Schedulded	50 (83.3)
Emergency	10 (16.7)
Antecedents	
Arterial hypertension	16 (26.6)
Alcohol and tobacco	5 (8.3)
Diabetes mellitus	4 (6.4)
Intracranial hypertension	4 (6.4)
ASA* score	
I	24 (40)
II	28 (46.7)
III	8 (13.3)
Peroperatives complications	32 (53.3)
Blood tansfusion	11 (18.3)
Admission in intensive care unit	5 (8.3)
Death	3 (5)

*ASA: American Society of Anesthesiologists.

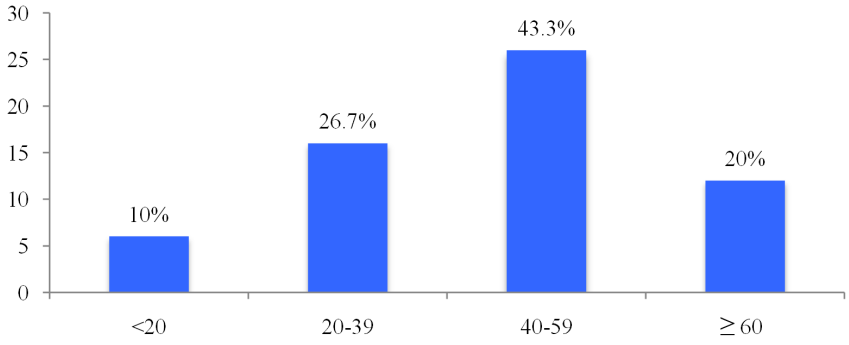

Figure 1. Distribution of patients by age group.

The spine degenerative diseases were the most frequent surgical indication with 40% of cases. **Table 2** shows the different neurosurgical indications in our study. Antibioprophylaxis was based on cefuroxime in 48.3%, oxacillin in 35%, ceftriaxon in 5%, amoxicillin/clavulanic acid in 3.3%, ceftazidim in 1.7% and none antibiotic in 6.7% of cases. General anesthesia was used in 98.4% of cases. We had a patient operated under local anesthesia for chronic subdural hematoma. **Table 3** indicates the anesthetics drugs used in our series.

All patients with intracranial hypertension (11.6% of cases) benefited from brain relaxation (methylprednisolone 1 mg/kg, mannitol 0.5 - 1 g/kg) and propofol-based anesthesia. All patients benefited basic monitoring and only 2 patients (3.3%) were used capnography. We recorded 53.3% of intraoperative complications. **Figure 2** below indicates the different intraoperative complications occurring in our series. The blood transfusion was used in 18.3% of cases. **Table 4** shows the characteristics of patients were used blood transfusion. Five patients (8.3%) were transferred to intensive care unit. Three cases (5%) of death were recorded in our series, including two patients who died after intra-operative bleeding following an uncontrolled brain hemorrhage and one patient who died in intensive care unit at 7 days after ventilator-associated pneumonia.

4. Discussion

This was a retrospective study, limited in followed in postoperative data collection. Prospective and analytical studies would be desirable for to obtain more information on the causes of perioperative adverse events as well as the evolution of patients.

During the study period 2634 anesthesia was performed, the prevalence of neurosurgical activity was 2.88%. Our data are similar to Sabate *et al.* in Catalonia [5]. In a Malagasy study the neurosurgical activity had represented 0.05%, had explained by lack of staff, the lack of adequate materials and the shortage of certain anesthetic drugs in this study [6]. Neurosurgical activity at University Hospital of Brazzaville is increasing, due to growing numbers of neurosurgeons and also to the accessibility of computer tomography and magnetic resonance imaging [3].

Table 2. Different surgical indications in our series.

	n (%)
Spine degenerative diseases	24 (40)
Spinal trauma	11 (18.3)
Brain tumors	6 (10)
Subdural hematoma	5 (8.2)
Scalp tumors	4 (6.7)
Brain trauma	3 (5)
Hydrocephalus	2 (3.3)
Epidural hematoma	1 (1.7)
Parenchymal hematoma	1 (1.7)
Spinal malformations	1 (1.7)
Infectious deseases	1 (1.7)
Hardware removal	1 (1.7)

Table 3. Different anesthetic drugs used in our series.

	n (%)
Sedatives	
Propofol	30 (50)
Thiopental	28 (46.7)
Ketamine	2 (3.3)
Neuromuscular blocking drugs	
Rocuronium	24 (40)
Vecuronium	20 (33.3)
Suxamethonium	13 (21.7)
None	2 (5)
Opiates	
Fentanyl	59 (98.3)
None	1 (1.7)
Maintenance	
Halothane	49 (81.7)
Isoflurane	1 (1.7)
Propofol	7 (11.6)
None	3 (5)

The average age of our patients was 44.7 years and male sex was most predominantly. These findings are similar to several African studies [7] [8]. Spine degenerative diseases were more frequent (40%), followed by spinal trauma (18.3%), brain tumors (10%) and subdural hematomas (8.2%) in our series. Babo *et al.* [7] in their series of intraoperative management in spinal surgery, found degenerative disc diseases in 56.25% and spinal trauma in 21.25%.

Table 4. Characteristics of patients for blood transfusion.

	n (%)
Sex	
Male	7 (63.6)
Female	4 (36.4)
Interventions	
Schedulded	9 (81.8)
Emergency	2 (18.2)
Antecedents	
Arterial hypertension	2 (18.2)
Diabetes mellitus	1 (9.1)
Pneumonia	1 (9.1)
Thoracic trauma	1 (9.1)
ASA* score	
I	4 (36.4)
II	4 (36.4)
III	3 (27.2)
Surgical indication	
Brain tumors	4 (36.4)
Subdural hematoma	3 (27.2)
Spinal trauma	2 (18.2)
Scalp tumors	2 (18.2)
Peroperatives complications	
Bleeding	7 (63.7)
Arterial hypotension	3 (27.2)
Admission in intensive care unit	4 (36.4)
Death	2 (18.2)

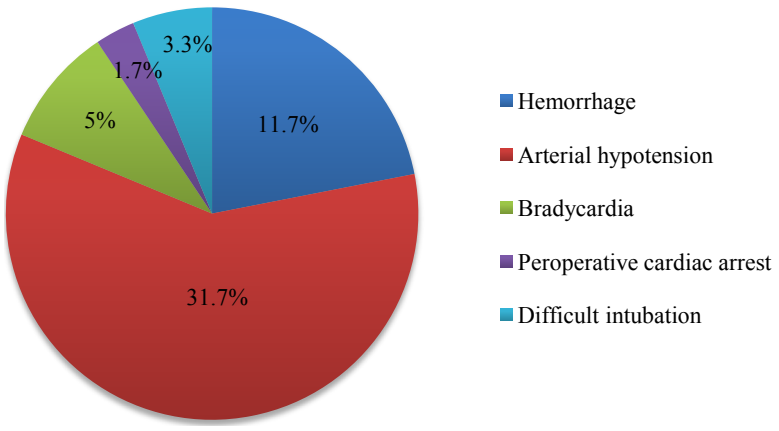

Figure 2. Distribution of intraoperative complications.

Quenume *et al.* in Benin found spine degenerative diseases in 34.5% of cases [9]. In Sub-Saharan Africa, the trend is towards the earlier onset of these conditions than in other series [10] [11]. Brains tumors come second in our series explained by availability of cerebral imaging allowing better diagnostic conditions.

Preanesthetic consultation is mandatory for any patient; it allows risk assessment, patient preparation and information [12]. In our series, the history were dominated by arterial hypertension in 26.7% of cases and the patients were classified ASA I in 40% and ASA II in 46.7% of cases. Anesthesia in neurosurgery is essentially general although some interventions can be performed under local anesthesia [4]. Neuroanesthesia is mainly aimed at obtained better operating conditions for neurosurgeons: easy access to lesion and thus obtain optimal brain relaxation while preserving the cerebral hemodynamics [13]. Our series showed that propofol and thiopental were used in the same proportion in 50% and 46% of cases respectively. Thiopental is main hypnotic in anesthesia in Africa [6] [14] [15] [16], because of its cost affordability, easy of conservation and his availability; its use is decreasing with the advent others hypnotics such as propofol [6] [7] [17]. All hypnotics are usable in neurosurgery [18], the choice depends on these pharmacological properties and hemodynamic state of the patient. The use of propofol has advantage particularly in the intravenous anesthesia with objective of concentration, permitted to provide quick wake up, low incidence of postoperative vomiting, but it has disadvantages such as cardiovascular depression and its high cost [17] [19]. For all patients we used fentanyl for induction and maintenance because it is the only opiates available in our country. In maintenance, halothane was used mainly in 81.7% of cases. It the only volatile agent has availability. The propofol-based anesthesia was performed in patients with intracranial hypertension. The some halogens have some beneficial effects on the cerebral nervous system such as decreased intracranial pressure and cerebral perfusion [20] [21] [22] [23], but isoflurane, sevoflurane and desflurane, which have excellent pharmacological properties are not available in our country.

All of our patients benefited basic monitoring. That in two patients the capnography was used. Our data was similar with Touré *et al.* in Mali [24]. The technical platform in most African countries remains precarious. Also the knowledge of the staff islacking on the importance of capnography in neuroanesthesia. In our series, in 11 patients we had used the blood transfusion, involved for tumors and traumatic affections which provided important peroperative bleeding.

The peroperative complication rate is 53.3% dominated by arterial hypotension and hemorrhage in 31.7% and 11.7% of cases respectively. Our results explained by the predominace of spine degenerative diseases wich requires specific positioning (genu-pectoral or ventral position). The hemodymamics effects of positioning could be prevented by to giving fluid such as cristalloids or colloids before turning patient [25].

The mortality rate was 5% in our series. Our results were similar with Touré *et al.* [24]. Sakho and Ratovondrainy *et al.* [26] [27] reported a mortality rate of 12% and 18.19% respectively. All of our deaths involved those who intracranial surgery. The optimal managment of this group of patients requires a suitable technical platform in order to improve surgeries conditions.

5. Conclusion

The neurosurgery is growing in Congo, in proportion to the development of human and material resources in this discipline. Our series has evaluated the anesthetic practice in neurosurgery in Congo. The choice of anesthetics drugs is not varied. They are used according to the availability of the pharmacy of the city. For safe anesthesia, some measures have to be taken into account due to the intraoperative complications such as arterial hypotension related to positioning and bleeding. Training in neuroanesthesia should be considered for more appropriate care for patients and an investment would be desirable for the optimization of surgical equipment, availability of anesthetics drugs in our country.

References

[1] Dechambenoit, G. (2002) Development Strategy for Neurosurgery in Africa. Editorial. *African Journal of Neurological Sciences*, **21**, 3.

[2] El Khamlichi, A. (1998). African Neurosurgery-Part II. Current State and Future Prospects. *Surgical Neurology*, **49**, 342-347.

[3] Ekouele M'Baki, H.B., Boukassa, L., Ngakosso, O.B., *et al.* (2016) Neurosurgery Practice at the University Hospital of Brazzaville (Congo): 21 Months of Activity. *African Journal of Neurological Sciences*, **35**, 47-54.

[4] Melon, E. (1995) General Information on Anesthesia-Resuscitation. In Neurochirurgie, 63-70.

[5] Sabaté, S., Canet, J., Gomar, C., *et al.* (2008) Cross-Sectional Survey of Anaesthetic Practices in Catalonia, Spain. *Annales Françaises d'Anesthésie et de Réanimation*, **27**, 371-383. https://doi.org/10.1016/j.annfar.2008.03.010

[6] Rasamoalina, N., Rasataharifetra, H., Rajaobelison, T., *et al.* (2010) Preliminary Survey on the Practice of Anaesthesias in Adult Patients at the Teaching Hospital of Toamasina. *Archives Revue d'Anesthésie-Réanimation et de Médecine d'Urgence*, **2**, 21-24.

[7] Babo, C.J., Yéo, T.L.P., Ayé, Y.D., *et al.* (2015) Peroperative Managment of Spinal Pathologies in Neurosurgery Operationg Room of Yopougon University Hospital. *Revue Africaine d'Anesthésiologie et de Médecine d'Urgence*, **20**, 39-44.

[8] Ghannane, H., Ait Benali, S., Naji, R., *et al.* (2007) Neurosurgical Management of Brain Tumors: Experience of 6 Years of Activity of Neurosurgery Department of Mohammed VI University Hospital of Marrakech: About 396 Cases. *Neurochirurgie*, **53**, 435-449.

[9] Quenum, K., Quenum, B., Fanou, L., *et al.* (2012) Exercise of Neurosurgery in the Republic of Benin: Two Years of Experience. *Neurochirurgie*, **58**, 409-450.

[10] Djientcheu, V. de P. (2010) Lumbar Spinal Stenosis: Epidemiological, Etiological,

Clinical, Radiological and Surgical Aspects of 102 Cases at Yaoundé Central Hospital. *Revue Africaine de Chirurgie et de Spécialités*, **4**, 8-13.

[11] Onambany, B., Esiene, A., Motah, M., *et al.* (2010) Epidemiological, Clinical and Therapeutic Aspects of the Lumbar Spinal Stenosis and Lumbar Disc Herniation Operated in the Surgical Departments and the General Hospital of Douala (HGD) and Hevecam Hospital of Niete. *Health Sciences and Diseases*, **11**, 5.

[12] Gouin, F., Guidou, C., Bonnet, M., *et al.* (2003) Consultation d'anesthésie: examens complémentaires préopératoires- Information et préparation du patient. In Traité d'anesthésie générale, partie IV, chapitre 1.

[13] Ravussin, P. and Boulard, G. (1993) Anesthésie-réanimation en neurochirurgie. *In EMC*, **10**, 1-17.

[14] Binam, F., Lemardeley, P., Blatt, A., *et al.* (1999) Anesthetic Practices in Yaoundé (Cameroon). *Annales Françaises d'Anesthésie et de Réanimation*, **18**, 647-656. https://doi.org/10.1016/S0750-7658(99)80152-X

[15] Belkerezia, R., Kabbaj, S., Ismaïli, H., *et al.* (2002) Survey on the Practice of Anesthesia in Morocco. *Annales Françaises d'Anesthésie et de Réanimation*, **21**, 20-26.

[16] Chobli, M. and Adnet, P. (1997) Anesthetic Practice in Sub-Saharan Africa. *Annales Françaises d'Anesthésie et de Réanimation*, **16**, 234-237.

[17] Andriamasy, C.M., Rakotomavo, F.A., Rakotoarison, R.C.H., *et al.* (2013) Is There Still a Place for Thiopental? *Revue d'Anesthésie-Réanimation et de Médecine d'Urgence*, **18**.

[18] Foucarde, O. and Mauline, T. (2000) Neuro-anesthésie: Acquisitions récentes. MAPAR, 457-466.

[19] Langeron, O. and Riou, B. (1995) Rachis et Anesthésie. In: Roy-Camille, R., Ed., *Le rachis*, Masson, Paris, 233-241.

[20] Djian, M.C., Joly, L., Ciolaca, S., *et al.* (2004) Comparison of Fentanyl and Sufentanil for Orotracheal Intubation without Curare. *Annales Françaises d'Anesthésie et de Réanimation*, **23**, 183-188.

[21] Tomta, K., Assenouwe, S., Mouzou, T., *et al.* (2016) Anesthesia for Intracranial Meningioma Surgery at Sylvanus Olympio Teaching Hospital of Lome (Togo). *Revue Africaine d'Anesthésiologie et de Médecine d'Urgence*, **21**, 5-10.

[22] Fraga, M., Rama-Maceiras, P., Rodino, S., *et al.* (2003) The Effects of Isoflurane and Desflurane on Intracranial Pressure, Cerebral Perfusion Pressure, and Cerebral Arteriovenous Oxygen Content Difference in Normocapnic Patients with Supratentorial Brain Tumors. *Anesthesiology*, **98**, 1085-1090. https://doi.org/10.1097/00000542-200305000-00010

[23] Dahyot-Fizelier, C., Frasca, D. and Debaene, B. (2012) For or Against Halogens in Neuroanesthesia for Intracranial Surgery. *Annales Françaises d'Anesthésie et de Réanimation*, **31**, 229-234. https://doi.org/10.1016/j.annfar.2012.08.003

[24] Touré, M.K., Koné, J., Vossah, E.D., *et al.* (2014) Constraintsrelated to the Practice of Neuroanesthesia in the Context of Mali: Case of the Mother-Child Hospital of Bamako. *Revue Africaine d'Anesthésiologie et de Médecine d'Urgence*, **19**, 17.

[25] Bruder, N. and Dufour, H. (1996) Anesthesia for Herniated Disc. Conférences d'actualisation, 59-70.

[26] Sakho, Y., Holden, F., Noyé, N., *et al.* (2005) Surgery of Intracranial Meningiomas in a Neurosurgical Unit in Dakar. *African Journal of Neurological Sciences*, **24**, 45-54.

[27] Ratovondrainy, W., Ramarolahy, A.R., Raobela, L., *et al.*(2014) Reflection on the Management of Intracranial Meningioma about 22 Cases. *Revue d'Anesthésie-Réanimation et de Médecine d'Urgence*, **6**, 25-27.