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Review of anesthesia for ENT, oral and maxillofacial surgery at the National Hospital of Niamey: situational analysis in limited resource setting

Abstract

Introduction: In otolaryngology and maxillofacial surgery, the main anesthetic problem is the management of the upper airways. The aim of this work is to take stock of anesthesiological activities in the ENT and CMF departments of the Niamey National Hospital.

Methodology: This was a prospective cross-sectional and descriptive study running from January 1 to June 30, 2020. Our study included all patients operated on in ENT and stomatology during the study period. The parameters studied were socio-demographic, the practice of anesthesia, per- and postoperative incidents and accidents, anesthesia team and equipment.

Result: During our study, 147 patients were included out of 2082 admitted to the Niamey National Hospital, accounted for 7.06% of toatal patients admitted during the study period. ENT accounted for 93 patients and CMF 54. The mean age of our patients was 22.29 years with extremes of 11 months and 85 years. The sex ratio was 0.67. Surgery was urgent in 14.29% of cases. 46.26% of the patients came from outside Niamey. Tonsillectomy was the most common indication. All patients admitted for completed surgery received CPA. Difficult intubation criteria were detected in 34 patients. The ASA 1 class was in the majority (70.07%). The mean wait time for the entire study population was 5 weeks and 5 days with extremes of 0 days and 486 days. Premedication was necessary in 38 patients. Diazepam was the drug administered. All patients had received antibiotic prophylaxis. Rocéphine was the molecule used. AG + IOT was 89.80% the anesthetic technique used. The hypnotics used were propofol, thiopental, ketamine, and halothane. Fentanyl was the only opioid drug. All our patients were extubated on a table with an average duration of anesthesia of 106 minutes with extremes of 20 minutes and 600 minutes. The incident reported intraoperatively was 11 cases of bleeding. The postoperative period was marked by the occurrence of bronchospasm during extubation in 11 patients and arterial hypotension in 3 others. No deaths have been recorded. In 97.96% of cases, the anesthetic team was made up of Senior Technicians in Anesthesia and Resuscitation alone, under the supervision of a resuscitator anesthetist.

Conclusion: This study demostrated that safe anaesthesia can be administered for ENT and maxillofacial surgeries in limited resource setting and surgical mortality and morbidity can be reduced, through judicious use of available resources, team work and vigillance.

Keywords: Anesthesia, ENT, CMF, HNN

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Introduction

Otorhinolaryngology (ENT) and maxillofacial surgery (CMF) posed a lot of challenges to anesthetists, the main anesthetic concerns includes management of the upper airways due sharing of the airway by both anesthetist and the surgeon, pathology modifying the laryngotracheal structures resulting in difficulties in exposing the glottis amongst others. Prefer and thorough evaluation of airway for early detection of difficult airway must be carried out prior to the intervention and a strategy of management established, in order to prevent accidents with rapidly serious consequences.[1] Anesthesia in ENT and CMF poses a wide variety of problems; it interests both adults and children; the acts performed are sometimes simple and very short or long and delicate.[2] In Niger, the Niamey National Hospital is the highest point in the country's health pyramid. It is the main center where ENT and maxillofacial surgery is performed. The aim of this study was to evaluate the anesthetic techniques for ENT and CMF and outcomes in our institution over the period under review.

Methodology

This was a prospective cross-sectional and descriptive study conducted over six months from January 1 to June 30, 2020. Were included in our study all patients operated on in ENT and stomatology during the study period, in emergency or in planned surgery, regardless of the diagnosis. Only patients who had been operated on but did not give their consent were not included. The variables studied were: Sociodemographic, clinical, biological, anesthesia team and equipment, types and techniques of anesthesia, intraoperative and post-operative complications and outcomes. We collected our data using a pre-established survey form. The informed consent of patients was a prerequisite and their anonymity ensured. Word and Excel software were used as tools for data entry and analysis.

Result

During the study period, we collected data from 147 procedures for ENT and CMF surgery out of 2082 surgical procedures performed

at the Niamey National Hospital. The overall frequency for ENT and CMF was 7.06%. Among these 147 procedures, 93 were performed in ENT service, frequency of 63.26% while CMF accounted for 54, 36.73%.

The mean age of the patients was 22.29 years with extremes of 11 months and 85 years. The age group of 1 to 5 years consisted of 36 patients, or 24.49%. In ENT specialties out of 93 patients, 60 were female, 64.52% with a sex ratio of 0.55 (Table 1).

Table 1 Represents the distribution of patients according to origin

Origine	ORL	Stomatology	Percentage
Niamey	60	19	53.74%
Dosso	13	8	14.28%
Tillabéri	0	13	8.04%
Zinder	4	7	7.48%
Tahoua	6	4	6.80%
Maradi	8	0	5.44%
Agadez	2	2	2.72%
Venus d'autres pays	0	1	0.68%
Total	93	54	100%

For stomatology in 54 patients, 28 patients were female 51.85% and a sex ratio of 0.92.

Admission was urgent in 14.29%. So the surgery was settled in 85.71% of cases.

More than half of the patients (53.74%) came from the region of Niamey followed by that of Dosso with 14.28%.

ENT surgery was the most performed type of surgery (63.26%) with tonsillitis as the main operative indications (55.91%). Table 2 gives the distribution of patients according to the operative indication and according to the type of surgery.

Of the 147 patients in our sample, 25 had a medical history, 17%. Hypertension accounted for 4.76% of this medical history. A history of anesthesia was found in 12.24% of patients. Some additional examinations were systematic in all patients except in those admitted for foreign bodies. All patients were assessed for the risk of difficult intubation. The findings were as follows: jaw fracture in 16 patients, thyro-chin distance less than 6 cm in 2 patients, cervical circumference greater than 40 in 2 patients, tumors in 9 patients and a Mallampati score greater than 2 in 5 patients were. In total, a risk factor for difficult intubation was detected in 34 patients, ie 23.19%. Table 3 gives us the distribution of patients according to the Mallampati score. This score was not achieved in patients less than 10 years old.

Table 2 Distribution of patients according to the surgical indication and type of intervention

ORL			CMF		
Indications Effective operating/type of intervention		**%**	**Indications Effective operating/type of intervention**		**%**
Tonsilitis-VG/ Tonsilectomies	52	55,91	Tumor maxillary/Excision	20	37,04
Goiter/Thyroidectomy	11	11,83	Fracture de Lefort/ osteosynthesis	16	29,63
Tumor/resection	9	9,68	Osteitis/sequestrectomy	12	22,22
Nasal Polyp /exérèse	9	9,68	Cyst/resection	11	11,11
Trauma/plasty	6	6,45			
Foreign bodies/extraction	5	5,38			
Laryngeal prothesis installation	1	1,08			
Total	93	100		54	100

Table 3 Distribution of patients according to the score of Mallampati

Mallampati score	ORL		CMF		Total
	Effective	percentage	Effective	percentage	
1	50	53,76	14	25,93	64
2	14	15,05	19	35,19	33
3	6	6,45	1	1,85	7
4	2	2,15	2	3,70	4
Not assessed	21	22,58	18	33,33	39
Total	93	100	54	100	147

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In our study, 103 patients over 147 were ranked ASA1 that is 70, 07%. Among ENT patients, 69 out of the 94 patients in the study were classified ASAI74.19%, for Stomatology, out of 54 patients 34 were classified as ASAI 62.96%.

The waiting period: The mean wait time for the entire study population was 5 weeks and 5 days with extremes of 0 days and 486 days. In the ENT department, 54 patients had been operated on after a waiting time of more than 4 weeks, or 63.44%. For the stomatology department, the waiting time interval is that between 1-2 weeks for 18 patients, 33.33%.

Anesthesia: Premedication was necessary in 38 patients. Diazepam was the drug administered. All patients had received antibiotic prophylaxis. Rocéphine was the molecule used.

En ORL, 69 sur les 94 patients que comptait le service étaient classés ASA1 soit 74,19%, pour la Stomatologie, sur 54 patients 34 étaient classés ASA1, soit 62,96%. Pre-oxygenation was performed in all patients. The anesthetic induction was intravenous and normal sequence. Among the hypnotics used, propofol comes first with 76.19%, thiopental in 21.76% of cases and ketamine with 12.24%, it should be noted that these products were sometimes associated with each other. Fentanyl was the only opioid drug used. Curarization was performed in 36% of patient the muscle relaxant used was suxamethonium. AG + IOT were 89.80% the anesthetic technique used. Halothane was the only halogenated hypnotic used for maintenanceat 1-1.5% in 100% oxygen. The parameters monitored intraoperatively were arterial blood pressure, heart rate, respiratory rate and oxygen saturation. The events notified intraoperatively were the occurrence of bleeding. All our patients were extubated on a table with an average duration of anesthesia of 106 minutes with extremes of 20 minutes and 600 minutes.

In ENT and Stomatology, the interval of [1-3h] was found in 53 and 43 cases, respectively, ie 56.99% and 79.63%.

Incidents and accidents during and after surgery: Intraoperative transfusion was necessary in 11 patients in the study population, ie 7.59% of cases due to acute anemia. The postoperative period was marked by the occurrence of bronchospasm during extubation in 11 patients and arterial hypotension in 3 others. No deaths have been recorded.

The anesthesia team: In 97.96% of cases, the anesthetic team was made up of Senior Technicians in Anesthesia and Resuscitation alone, under the supervision of a resuscitator anesthetist.

Discussion

Our study focused on the evaluation of anesthetics techniques administered in otorhinolaryngology (ENT) and stomatology at the Niamey National Hospital from January 01, 2020 to June 30, 2020 over a period of 6 months. In this study the overall ENT and CMF anesthetic frequency was 7.06% for total number of surgical anesthesia administered during the study period, with a specific frequency per department of 63.26% for ENT and 36.73% for stomatology. This frequency is lower than that of Essola.L et al. at the Libreville hospital in Gabon in 2013,[3] which had found a frequency of 15.8%. The context in which our study was conducted could justify this difference. In fact, infection with covid-19 had considerably reduced the use of health services by patients.

The mean age of patients in our overall population was 22.29 years with extremes of 11 months and 85 years; the age group of 1 to 5 years was the most common at 24.49%. In ENT service The age group of 1 to 5 years was the most represented at 32.26%. In the department of stomatology, it was the age groups of 15 to 30 years and 40 to 65 years that were the most represented with 25.93% each. Cissé B. et al. in Mali[4] had a similar average age of 25.82 years but an older age group compared to ours of 15 to 29 years to the tune of 44.1%.

On the other hand, this remarkable difference between the majority age groups of our two study sites is easily explained by the types of conditions treated in one or the other specialty. Thus, the ENT department, which has the largest number of our study subjects, generally accommodates childhood pathologies such as adenoids, bronchial foreign bodies, recurrent tonsillitis in children, malformations of the ENT sphere, etc. But also the young age of the Nigerien population, it should be noted that according to a WHO report on health and development in Niger, young people under 15 years old represent more than 50.23% of the general population.[5] While the stomatology department most often accommodates frequent defects in adults.

In our series, we noted a predominance of the female sex in ENT department as well as in stomatology with 64.52% and 51.85% respectively and respective sex ratios of 0.55 and 0.92. These results are similar to those found by Cissé B. at the Nianankoro Fomba hospital in Mali in 2008[4] and Joachim A. at the Cure hospital in Niamey in 2016,[6] with 66% and 52.50% respectively. Predominantly female, others had found different results: Mamadou B. in his study on anesthetic activities at Kati hospital in 2008 and Bawa B. et al. in Niger in 2001 found a male predominance with respectively 61.6% and 63.35%.[7,8] This predominance of the female sex in our study could be explained by the simple fact that the female sex predominates in the Nigerien population.

In our series, hypertension was the most common medical history with 4.76%. Regarding the anesthetic history, 12.24% of our patients had a history of anesthesia, of which 10.20% had general anesthesia; 1.36% spine anesthesia; 0.68% locoregional anesthesia and 87.76% had no known anesthetic history. In ENT department 11.83% had a history of GA and in stomatology 7.41% had a history of GA. These results are similar with several data from the African literature, in particular with those of Mamadou B.[7] who also found a percentage of 17.1 for the medical history and also Moussa B.M.H.[9] who found 9.9% of a surgical history. On the other hand, our results are lower than those of Abdoulaye D. et Coll. in 2006 in Mali[10] which recovered 21.77% of anesthetic antecedent with a predominance of general anesthesia at 33.76%. Study population was classified as ASA1 and 25.85 ASA2. Specifically by department, ENT counted 74.19% of patients classified ASA1 and Concerning the ASA classification at the end of the anesthesia consultation; 70.07% of our in stomatology 62.96% were classified ASA1. These results agree with those of Broulaye C. in Bamako in 2013[11] in his study which focused on the evaluation of the anesthetic management of patients operated on under perimedullary anesthesia in the district of Bamako and at the University Hospital of Kati who had found 87.5% of patients classified ASA1 and 12.5% ASA2. On the other hand, they differ from the observations of Moussa B.M.H. to NHN,[9] in which the ASA1 class is significantly lower than the ASA2 class at 9.5% and 85.9% respectively.

This disparity can be explained by the fact that our study sites (ENT and Stomatology) welcome patients with pathologies that are very rarely life-threatening. The average wait time for our entire population was 5 weeks and 5 days with extremes of 0 days and 486 days. For the ENT service in 63.44% of cases this time was greater than 4 weeks. On the other hand, for the stomatology department, the interval between one and two weeks was the most encountered

in 33.33% of cases. This observation is far superior to those of many data in African literature, in particular those of Abdoulaye D. et Coll. in 2006 in Mali[10] as well as Joachim A. at the Niamey cure hospital in 2016[6] with respectively 32.04% of cases operated on in less than one (1) week and 65% of patients operated between 7 and 9 days.

Our result does not comply with the recommendations of the various anesthesia and resuscitation companies and the WHO, which recommend a duration of at least 72 hours, or 48-72 hours otherwise. The plausible explanation for this is that our study took place while the medical world was reeling from the COVID-19 pandemic coupled with the understaffing mentioned above. As a result, many surgeries had to be postponed for several weeks.In our series for the general population, the most common intervention time interval was 1-3 hours. The average duration of anesthesia was 106 minutes with extremes of 20 minutes and 600 minutes.

The same is true for the two specialties; the interval of [1-3h] was predominant with respectively 56.99% and 79.63% in ENT and Stomatology. These results are similar to those of Joachim A. at the Niamey Cure Hospital in 2016,[6] who found an average duration of 110mn with extremes of 30mn and 300mn. However our results are superior to those found by Moussa B.M.H,[9] which reports an average anesthesia time of 73.75mn and extremes of 20mn and 275mn. This very pronounced difference between the duration of anesthesia can be explained by the wide variety of types of operations carried out in the two different specialties. The anesthetic act was performed by senior technicians alone in 97.96% of cases. It should be noted that an anesthetist-resuscitator provides supervision. Essola. L et al in their study entitled Pediatric anesthesia in an African environment at the Libreville hospital center in Gabon in 2013,[3] had found different results with 52.6% of cases where the senior technician performed anesthesia alone.These observations highlight the shortage of anesthetists and resuscitators in our health systems.All of our patients were operated on under GA, of which general anesthesia (GA) with orotracheal intubation was the most used method. More specifically for departments, GA plus Orotracheal Intubation was used 88.17% in ENT and 98.15% in Stomatology. Essola. L et al in Gabon[3] and Moussa B.M.H. in Niger[9] found respectively 98.90% and 96.6% of general anesthesia.

In contrast, Joachim A. at the Niamey cure hospital in 2016[6] reported 55.4% GA combined with ALR. Classical induction had been performed at 96.53%, with propofol as the most widely used intravenous hypnotic at 76.25%, celocurine used as curare at 76.25% and fentanyl as an opioid in 100% of cases. Abdoulaye D. and Coll. in 2006 in Mali,[10] reported results lower than ours with only 0.85% for propofol and 6.3% for fentanyl.

These observations reveal the variability between the anesthetics used in different skies. These could have several explanations; among other things the cost of drugs, availability, but also side effects which depend on the patient's medical condition. Intraoperative transfusion was required in 7.59% of patients in our study population. These blood transfusions in 55.56% of cases were indicated by acute anemia. All the patients were extubated on the table and went through the post-intervention monitoring room. Postoperatively, they had all benefited from postoperative analgesia based on paracetamol. We observed 2 adverse events in patients in the postoperative period 1.36%. It was an arterial hypotension and a case of unquantified but spontaneously favorable postoperative pain. In our study the outcome was favorable in 100% of cases, we had no deaths. Dembelé A.S et al at the Pasteur clinic in Bamako in 2013[12] also found 100% favorable progress and a mortality rate of 0.6% postoperatively.

Conclusion

Our study demonstrated that, various anesthetic techniques can be safely administered for ENT and CFM surgical procedures with satisfactory outcomes in limited resource setting. Therefore, careful patient assessment, appropriate anesthetic plan, vigilance and communication remain the key for successful conduct of anesthesia, thus results in better surgical outcomes in limited resource setting like ours. Niamey National Hospital, need to be upgraded through acquisition of modern equipment such as videos laryngoscopes, Airtrach, respirators with capnography sensor and equipment for the practice of ALR and the presence of anesthetists and resuscitators 24 hours a day. The practice of local and regional anesthesia would be of great help in being able to perform outpatient work in this context where outpatient surgery is desirable in order to reduce hospital stays and ensure good availability of hospital beds.

Conflicts of interest

The authors declare no conflicts of interest in connection with this manuscript.

Contributions from the authors

All authors participated in the development of this document.

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