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Original Research Article

Profile of Anesthetic Practices outside the Operating Room: 30-Month Experience in a University Hospital Center

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Abstract: ***Introduction*****:** Anesthesia outside the operating room develops in various areas requiring a calm, relaxed and painless patient. The anesthetist-resuscitator intervenes thus outside the block to ensure appropriate care. The main objective of this work is to analyze anesthetic practices performed outside the operating room over a period of 30 months. ***Methodology*****:** This is an observational, prospective and cross-sectional study with analytical aim, conducted over 30 months (from June 4, 2018 to November 30, 2020) in the Anesthesia-Intensive Care department of the University Hospital of Angré. It includes all patients, regardless of age or gender, who required sedation for an imaging or endoscopy procedure. ***Results*****:** The majority of out-of-block sedations involved infants, children and young adults. The sex ratio of 1.15 in favor of women. Medical imaging examinations were the main indication for sedation (60.62%). Propofol was the most used induction agent in 57.03% of cases (n = 223). Anesthetic maintenance was required in 172 patients (43.99%), with propofol also predominantly used (n = 157; 40,15 %). The majority of patients (97.67%) were able to return home after the procedure, while 0.51% (n = 2) required a transfer to intensive care. ***Conclusion*****:** Out-of-block sedation is mainly performed in children, using imaging, with propofol as the main induction agent.

Keywords: Anesthetic Practices, Outside the Operating Room, Medical Imaging, Digestive Endoscopy.

INTRODUCTION

Out-of-Theatre Anesthesia (OSU) is developing and now affects a wide range of areas where one needs to have a patient who is calm, relaxed and not in pain during the procedure. These fields start from interventional and exploration activities, to physical medicine gestures. Requests for intervention outside the block are thus on the rise. In France, in 2008, anesthesia outside the operating room accounted for 20% of overall anesthetic activity [1]. Several reasons motivate this departure of the anesthetist-resuscitator outside the operating room or intensive care for these anesthesia procedures. In general, it is a matter of discomfort or pain specific to the procedure performed, a voluntary or non-collaborative absence of the patient (child, psychiatric disorder), the existence of an unstable or precarious clinical state [2]. for procedures outside the operating room. Faced with an insistent request for sedation of a certain number of disciplines at the CHU d'Angré, out-of-block anesthesia was implemented and implemented in practices. The main objective of this work was therefore to conduct an inventory of out-of-block anesthetic practices over 30 months of activity in order to identify the patients under care as well as the different protocols implemented.

METHODOLOGY

This is an observational, prospective, cross-sectional study with analytical aims, conducted over 30 months, from June 4, 2018 to November 30, 2020, at the Anesthesia and Intensive Care department of the University Hospital of Angré.

Were included all patients, regardless of age or gender, needing diagnostic or therapeutic imaging, namely computed tomography (CT) or magnetic resonance imaging (MRI), or digestive endoscopy, and for which a request for sedation had been made by the operator. Patients already hospitalized in intensive care or in the emergency room, those intubated or under

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assisted ventilation, those under prior sedation, as well as procedures canceled or interrupted for technical or logistical reasons unrelated to anesthesia were excluded.

The collection of data was entrusted to a non-anesthetist doctor trained by a two-week immersion course in out-of-block anesthesia. This doctor, not involved in anesthetic management, was responsible for observing the procedures and completing a standardized survey form.

The variables studied included demographic data, pre-anesthetic assessment, nature, anesthetic management modalities, organizational conditions, as well as post-sedation outcomes and possible incidents or accidents.

The statistical analysis was carried out using the software Epi Info version 7. The qualitative variables were expressed in proportions, and the quantitative variables in means with standard deviation. The tables and graphs were created with Microsoft Excel 2016, and the manuscript was written in Microsoft Word 2016. A univariate analysis was performed. The threshold for statistical significance was set at $p < 0.05$. In total, 391 patients were included.

Regarding ethical considerations, an authorization was obtained from the scientific direction of the institution. Informed consent was obtained from patients, or their legal representatives for minors, during the pre-anesthetic consultation.

RESULTS

We counted 849 patients admitted during our study period.

Table I: Distribution by epidemiological characteristics.

	Staff	Percentage
Age range		
Newborn (05 to 21 days)	10	02,56 %
Infant (01 to 24 months)	90	23,02 %
Child (2.5 to 9 years old)	71	18,16 %
Adolescents (10 to 19 years)	12	03,07 %
Young (20 to 39 years old)	57	14,58 %
Adult (40 to 59 years)	86	22,00 %
Old (60 to 69 years)	41	10,49 %
Very Old (70 to 85 years)	24	06,14 %
Sex		
Feminine	209	53,45 %
Masculine	182	46,55 %
Types of examination		
Digestive endoscopy	154	39,38 %
Medical imaging	237	60,62 %
MRI	139	35,55 %
TDM	98	25,06 %

Infants, adults and children were the age groups that most frequently requested sedation for out-of-block anesthesia. In our series, patients under 5 years old were 147, or 37.6% of the patients; the total of 10 years and under was 171, or 43.73% of patients. Those under 15 years old represented 174 patients, or 44.50%. The extremes were 05 days and 85 years old.

The female sex constituted the majority of the workforce with 209 cases, or 53.45%. The sex ratio of patients was 1.15 in favor of women.

Medical imaging examinations accounted for the majority of sedation requests, or 60.62%.

Table II: Distribution by peri-anesthetic events

	Staff	Percentage
CPA realized		
Non	238	60,87%
Yes	153	39,13 %
Premedications		
Yes	165	42,20%
Non	226	57,80 %
Drugs and premedication protocols		
Midazolam	148	37,85 %
Midazolam + atropine	7	1,79 %

	Staff	Percentage
Atarax	4	1,02 %
Atropine	2	0,51 %
Midazolam + propofol	2	0,51 %
Atarax + midazolam	1	0,26 %
Diazepam	1	0,26 %
Anesthetic drugs used during induction		
Propofol	223	57,03 %
Midazolam	163	41,69 %
Ketamine	5	1,28 %
Conduct of the anesthetic interview		
Yes	172	43,99 %
Non	219	56,01 %
Maintenance drug		
Propofol	157	40,15 %
Midazolam	12	3,07 %
Ketamine	3	7,67 %
Output mode		
Distinguished student	382	97,67 %
Return to hospitalization	7	1,79 %
Transfer to intensive care	2	0,51 %

The majority of patients 238, or 60.87%, did not have a pre-anesthetic consultation (CPA) before presenting for sedation. Premedication was performed in 165 patients, or (42.20%) less than half of the patients who underwent sedation. The drug mainly used in premedication was midazolam. Propofol was mainly the anesthetic of choice in induction for out-of-block sedations for 223 patients, or 57.03%.

The interview was carried out in 172 patients, or 43.99%. The majority of patients did not need an anesthetic interview. Propofol was the hypnotic mainly used in interviews in 157 cases, or 40.15%.

The majority of patients had been returned to home at 97.67% and 02 patients, or 0.51, had been transferred to intensive care.

Table III: Distribution by peri-anesthetic events according to the type of examination.

	ENDOSCOPY (%)	MRI (%)	TDM (%)	P value
Classe ASA				
ASA 1	114 (29,16)	75 (19,18)	61 (15,61)	-
ASA 2	38 (9,72)	63 (16,11)	36 (9,21)	
ASA 3	2 (0,51)	1 (0,26)	1 (0,26)	
Programming				
Scheduled	139 (35,55)	120 (30,69)	86 (21,99)	-
Not scheduled	13 (3,32)	17 (4,35)	10 (2,56)	
Emergencies	2 (0,51)	2 (0,51)	2 (0,51)	
CPA Previous				
Non	112 (28,64)	73 (18,67)	53 (13,55)	**0.000537**
Yes	42 (10,74)	66 (16,88)	45 (11,51)	
Induction anesthetic				
Ketamine	1 (0,26)	2 (0,51)	2 (0,51)	**0.000004**
Midazolam	90 (23,02)	46 (11,76)	27 (6,91)	
Propofol	63 (16,11)	91 (23,27)	69 (17,65)	
Maintenance drugs				
Propofol	46 (11,77)	71 (18,16)	40 (10,23)	-
Midazolam	7 (1,79)13	4 (1,02)	1 (0,26)	
Ketamine	-	1 (0,26)	2 (0,51)	

In digestive endoscopy as well as in medical imaging, ASA classes were dominated by class 1. Digestive endoscopy was the main provider of ASA 1 patients.

The majority of imaging and endoscopy interventions were scheduled in 88.24% of cases, with a small proportion for emergencies, namely 1.53%. They were mostly outpatient patients.

The absence of prior CPAs was observed mostly for all types of exams.

Propofol remained overall the most used hypnotic in induction for 223, or 57.03%. Midazolam was the most commonly used induction hypnotic in digestive endoscopy and propofol remains the induction hypnotic used in imaging.

Propofol was the most used maintenance hypnotic 157 times, or 40.15%

DISCUSSION

Our study differs from previous work mainly by the specificity of its population and its field of investigation. Unlike the majority of studies on anesthesia outside the operating room (AHBO) which group a wide range of procedures including interventional radiology, interventional cardiology, heavy care such as complex dressings or rehabilitation under analgesia, our work focused exclusively on diagnostic imaging procedures (computed tomography - CT, magnetic resonance imaging - MRI) and digestive endoscopies. This restriction to two types of specific examinations, both performed in a programmed framework, allows for better data homogeneity and targeted interpretation in the context of procedural sedation. Moreover, our analysis focused on the CHU of Angré, spread over two distinct sites, reflects a particular hospital organization, which can influence anesthetic practices based on the accessibility of technical platforms.

The study population reveals a high prevalence of paediatric patients, with 37.6% of patients under 5 years old, 43.7% under 10 years old, and 44.50% being 15 years old or younger. This data is particularly significant, as it confirms a trend already observed in the regional work. For example, in the study by Pété YD in Cocody on pediatric CT, the average age was 22.2 months, with extremes of 7 days to 10 years [3]. The similarity of age ranges and pediatric profiles suggests that in West African hospitals, children represent a substantial part of patients requiring sedation for diagnostic imaging.

This high pediatric demand can be explained by several factors such as the low rate of cooperation in children, especially at an early age, during prolonged examinations or requiring absolute immobility (MRI, CT), as well as the increase in access to specialized examinations in tertiary hospitals. It should also be emphasized the importance of specific expertise in pediatric anesthesia to ensure the safety and effectiveness of management in this context.

Unlike previous studies conducted in reference hospitals such as Ossey BD [4], at the University Hospital of Serviceville or Pété YD [3], at the University Hospital of Cocody where a male predominance was reported, our study highlights a female majority (53.45%). This difference could result from multiple factors, including a variation in the type of exams performed, such as higher demand for pelvic or abdominal MRI in women, differences in healthcare utilization habits, or even recruitment biases related to the availability of services.

It is also possible that this inversion reflects increased patient access to diagnostic care through increasing awareness of gynecological or digestive pathologies, often explored by endoscopy or MRI.

The anesthetic solicitations mainly concerned medical imaging (60.62%), with a higher frequency of MRI compared to CT. Digestive endoscopy accounted for 39.38% of the acts. This distribution differs from that observed in some African centers, such as Libreville, where digestive endoscopy predominated among the AHBO [5].

Several factors can explain these regional disparities such as the availability of equipment, the cost of examinations, institutional priorities, clinician prescribing habits or patient selection criteria. MRI, more sensitive to movements, requires strict immobility, making deep sedation often essential, especially in children. Moreover, the gradual rise of sectional imaging in urban centres in West Africa has changed the diagnostic landscape, increasing the use of techniques requiring anesthetic support.

The majority of patients were classified as ASA I (63.94%) and no ASA IV or V patients were treated in our series. ASA classes I and II together represented almost the entire population. This finding corroborates the data from regional and international literature according to which patients treated in AHBO are generally in good general condition [5]. This feature is an asset in anesthetic safety, as it reduces the risk of intraoperative complications. However, it must be qualified by the fact that some ASA III patients may have an underestimated fragility if a complete pre-anesthetic evaluation has not been carried out beforehand.

A concerning fact highlighted in our study is that 60.87% of patients had not benefited from a pre-anesthetic consultation (CPA) performed remotely, while in the comparative studies, the CPA is often performed well before, except in case of emergency [3]. The majority of CPAs were performed on the day of the procedure, which limits the anesthetist's ability to identify comorbidities, optimize preoperative preparation, and plan the anesthetic strategy in a personalized manner. This practice, although common in resource-limited settings, may expose patients to avoidable risks. Our study has also led to a reform of the procedures in our establishment, making CPA systematic before any imaging or endoscopy sedation, except in case of emergency. This initiative is part of a dynamic to

improve anesthetic safety, in accordance with the recommendations of learned societies.

Premedication, performed in 42.20% of patients, was mainly based on the administration of midazolam, in line with the literature that reports midazolam as a frequent premedication agent in out-of-block sedation [3]. The choice of midazolam, an agent with a short half-life and good tolerance profile, is justified in the context of out-of-block sedations.

In the induction phase, propofol was the most used agent for imaging, while midazolam predominated for digestive endoscopies. This pharmacological distinction is explained by the specific characteristics of each examination. The MRI requires perfect immobility and a quick awakening, objectives that propofol allows to achieve thanks to its ultra-fast kinetics. In endoscopy, the duration and comfort of the procedure can justify a shallower hypnotic, with lighter and more prolonged sedation.

Anesthetic maintenance was required in 43.99% of patients, with propofol as the primary agent in 40.15% of cases. This moderate use of the interview indicates that a single induction is often sufficient, particularly for short examinations or in children. It remains essential, however, to ensure that the anesthesia remains appropriate throughout the procedure, especially during long MRIs or complex endoscopies.

Discharge was possible in 99.49% of cases, including ASA III patients. Two patients (0.51%) had to be transferred to intensive care following serious incidents that occurred in ASA II. This incidence, although low, recalls the imperative of maintaining rigorous monitoring, with trained personnel and adapted equipment, even in a context of sedation considered minor. In African studies, serious incidents are rare but often related to inadequate monitoring or insufficient equipment or personnel [6].

CONCLUSION

Our study highlights particular characteristics of sedation outside the operating room in West Africa, particularly in urban teaching hospitals with limited technical facilities. The predominance of pediatric patients, the high frequency of MRI examinations compared to CT, as well as the variability in the use of pre-anesthetic consultation (PAC) and premedication highlight the need to adapt anaesthetic protocols to contextual realities. To optimize the safety and quality of care, it appears essential to further formalize preoperative pathways, to systematize CPA prior to procedures, and to strengthen staff skills in pediatric and procedural sedation.

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Koffi Loes, Kouakou Cédric Marcel, Achio Donald: research work design, critical reading and final version approval.

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