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Assessment of the Use of Spinal Anesthesia for laparotomy: A Survey among French-speaking anesthetists

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Abstract

Introduction. The aim of this survey was to assess the use of spinal anesthesia for abdominal surgery among anesthesia practitioners in sub-Saharan Africa. **Methods.** A questionnaire was distributed among the participants at the 37th Congress of the Society of Anesthesia-intensive Care Medicine of French-Speaking Africa held in Cotonou, Benin from November 23 to 25, 2022. Participants working in abdominal surgery anesthesia were selected randomly. The most relevant variables for evaluation were the use of spinal anesthesia, type of abdominal surgery, the type of local anesthetic, the additive of anesthetic, the satisfaction of the patients, the acceptance of this anesthesia by the surgeon and the reasons of switching from spinal to general anesthesia. **Results.** The study included forty-eight anesthesiologists from different nationalities in French-speaking Africa. Most of those practitioners were Anesthetist-Intensive Care Doctors (71%), 44% had between 10 and 15 years of professional experience. Spinal anesthesia is used for laparotomies by 83% of anesthetists. According to the type of surgery, inguinal hernia (85%), hysterectomy (69%) and myomectomy (75%) were found to be the most indications. Participants reported that 79% of the surgeons readily accept performing a laparotomy under spinal anesthesia, and patients are satisfied in 86% of cases. Bupivacaine and Fentanyl are the most local anesthetic used (79%). As adjuvants Morphine and Clonidine were used in 58% and 40% of cases, respectively. The main reasons for switching from spinal anesthesia to general anesthesia (GA) was the failure of spinal anesthesia (48%), followed by long duration of the intervention (19%). **Conclusion.** The use of spinal anesthesia is reserved mostly by anesthesiologists for lower laparotomies and never for upper laparotomies. There is not enough data to support the evidence that spinal anesthesia can used safely in emergencies situations for supra-mesocolic laparotomies, especially for peritonitis. This call clinical studies which can demonstrate the feasibility, security et safety of laparotomy performed under spinal anesthesia in limited resources settings..

Keywords: Spinal anesthesia, laparotomy, abdominal surgery, French-speaking Africa

Introduction

Emergency laparotomy is a surgical procedure widely used for many intra-abdominal pathologies. It's a very complex situation that involves time of practitioners, great socio-economic cost and has a high morbidity and mortality rate[1–3]. Eighty-five percent of patients who undergo emergency laparotomy have an acute, life-threatening condition while the laparotomy itself is a high-risk surgical procedure[2]. Around 175,000 laparotomies are performed annually in the USA and around 30,000 to 50,000 emergency laparotomies are performed annually in the UK with a variety of surgical etiologies[4,5]. The laparotomy is also a frequent

intervention in limited resources countries in sub-Saharan Africa, where more than half of the surgical procedures performed are emergency laparotomies with high perioperative mortality rates[6]. More often laparotomy is the only way to determine the underlying pathology, the anatomical site of the perforation and eliminate foci of infection.[7]

The care of patients undergoing emergency laparotomy in Sub-Saharan Africa often involves several specialties, but especially surgery and anesthesiology. Emergency laparotomy is a great challenge for anesthesiologists in terms of first, providing care to those patients who are eligible of undergoing a high-risk procedure such as laparotomy and then to choose peri-anesthetic management strategies and optimal operating conditions.[8] In this context, the anesthesia is an essential process before any laparotomy in order to eliminate pain and facilitate the surgical process[9].

Indeed, it is established that spinal anesthesia (SA) is performed by injecting insignificant amounts of local anesthetic agent into the cerebrospinal fluid (CSF). Spinal anesthesia is easy to perform and offers excellent operating conditions for most lower abdominal and lower limb surgeries. Traditionally, emergency laparotomy for upper abdominal surgery including peritonitis should be performed under general anesthesia [10]. In the context of limited resources, where skills and basic equipment are lacking, associated with inconsistency in the supply of drugs and the precariousness of patients, the possibility and safety of general anesthesia may have limits [10,11].

SA can be an alternative to general anesthesia in the presence of some contraindications, constraints and it has been used successfully for abdominal surgery [12]. The possibility of SA to allow laparotomy for upper abdominal surgery has been reported in some studies [11,13–15], however in practice there is still doubt, refusal or hesitation to use spinal anesthesia as the only technique for the management of a laparotomy for upper abdominal surgery. The aim of this survey was to assess the use of spinal anesthesia in laparotomies indicated for abdominal surgeries in limited resources countries.

Materials and Methods

This is a descriptive study in the form of a survey during the 37th Congress of the Africa Frenc-speaking Society of anesthesiology which was held in Cotonou, Benin from November 23 to 25, 2022.

The study population consisted of 48 anesthesia practitioners: doctors, anesthesia technicians or nurses selected at random and who gave their consent to participate in the survey and responded anonymously.

A pre-established anonymous questionnaire with eleven items on the practice of spinal anesthesia was used for the collection of data which were encoded and analyzed using Microsoft Excel 2016 software. The results were presented in the form of figures.

Results

Forty-eight participants responded to the questionnaire. They were from thirteen countries, but it was noted that Burkinans and Togolese were more numerous among respondents [Figure 1]. The most of respondents were physician anesthetists [Figure 2].

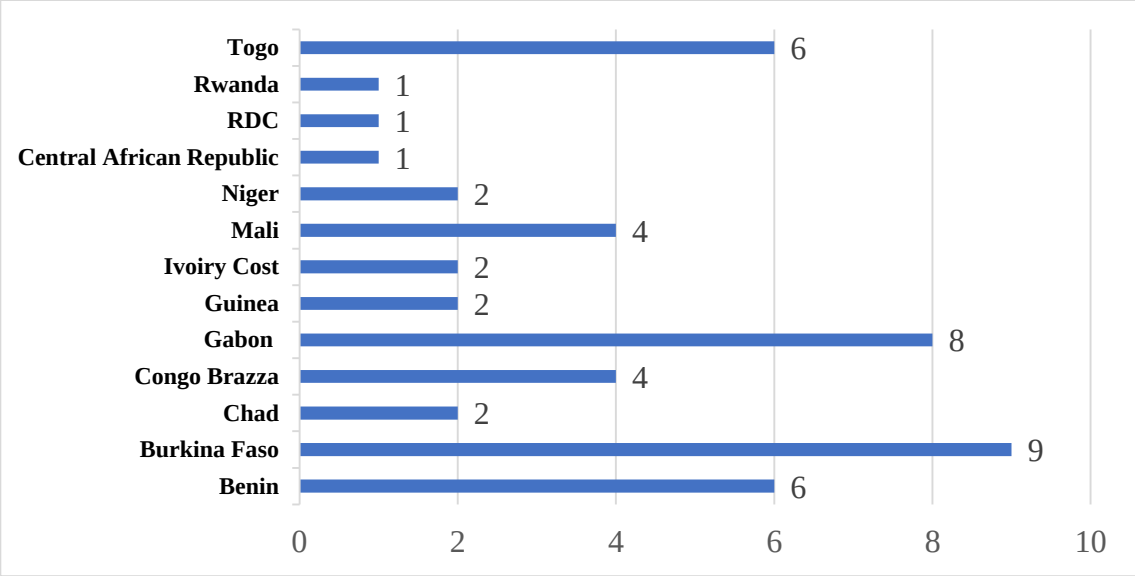


Figure 1. Distribution of respondents by country. Burkinans and Togolese were more numerous among respondents.

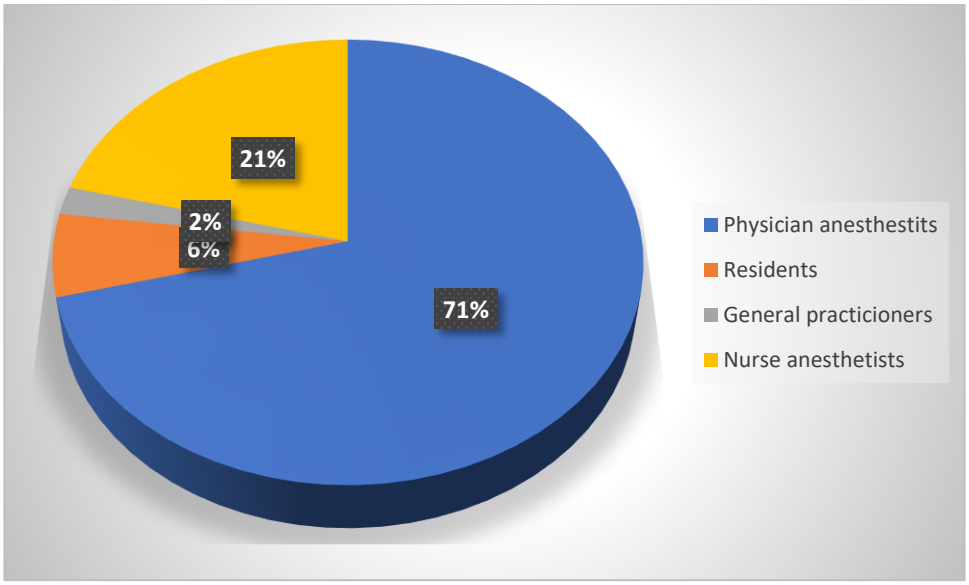


Figure 2. Distribution of respondents according to their quality. The most of respondents were anesthesiologists.

The number of years of professional experience varied from less than 5 to more than 20 years with an average of 10.6±4.3 years. Most respondents had between 10 and 20 years of professional experience [Figure 3]. More than half of the respondents were polyvalent anesthesiologists in 79% of cases [Table 1].

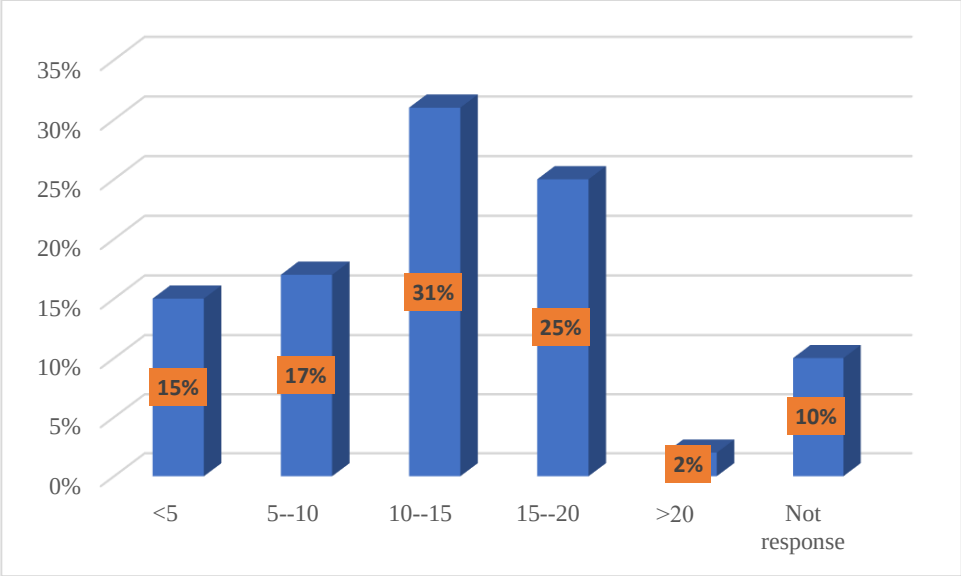


Figure 3. Number of years of practice

Table 1. Specialty of respondents

Speciality	**Effective**	**%**
Gyneco-Obstetrics (GO)	4	8
Neurology	1	2
Pediatrics+GO	2	4
Pediatrics	3	6
Polyvalent	38	79
Total	**48**	**100**

Eighty-three percent (83.3%) of anesthetists reported to use SA for laparotomies [Figure 4]. Among the surgical indications, inguinal hernia (85%), hysterectomy (69%) and myomectomy (75%) are the most frequent surgical indications in which spinal anesthesia is resorted to and there is almost no resort to spinal anesthesia for cholecystectomy and even less for generalized peritonitis in which the laparotomy must concern the upper part of the abdomen [Figure 6].

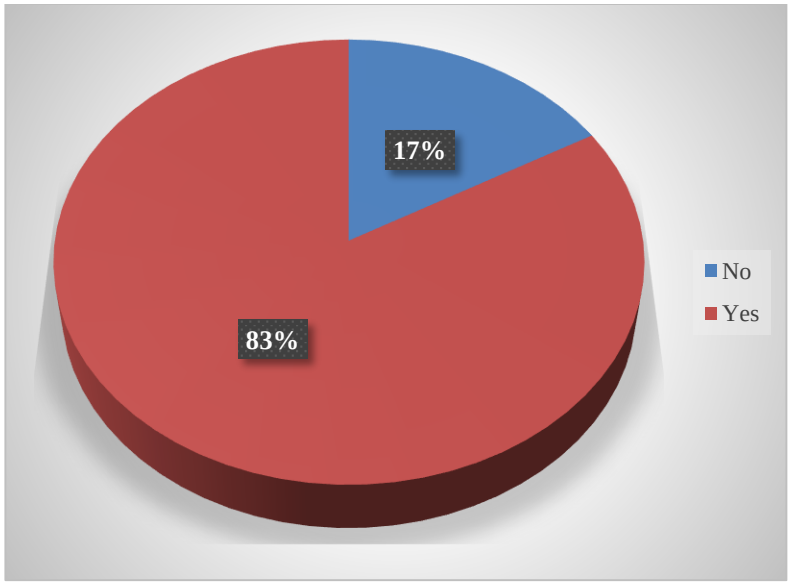


Figure 5. Use of spinal anesthesia

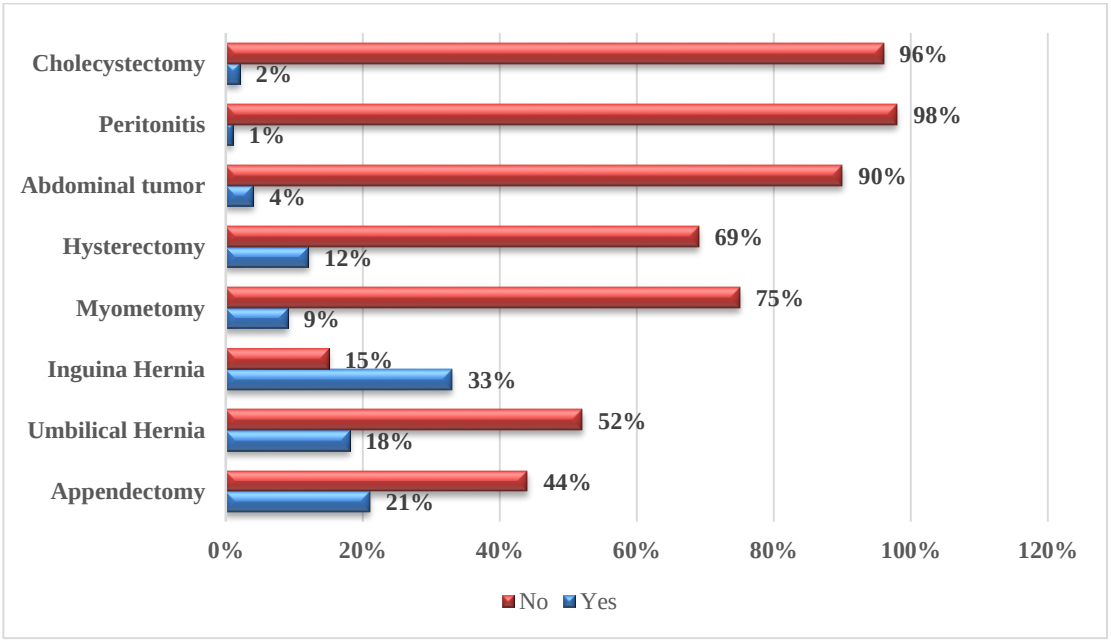
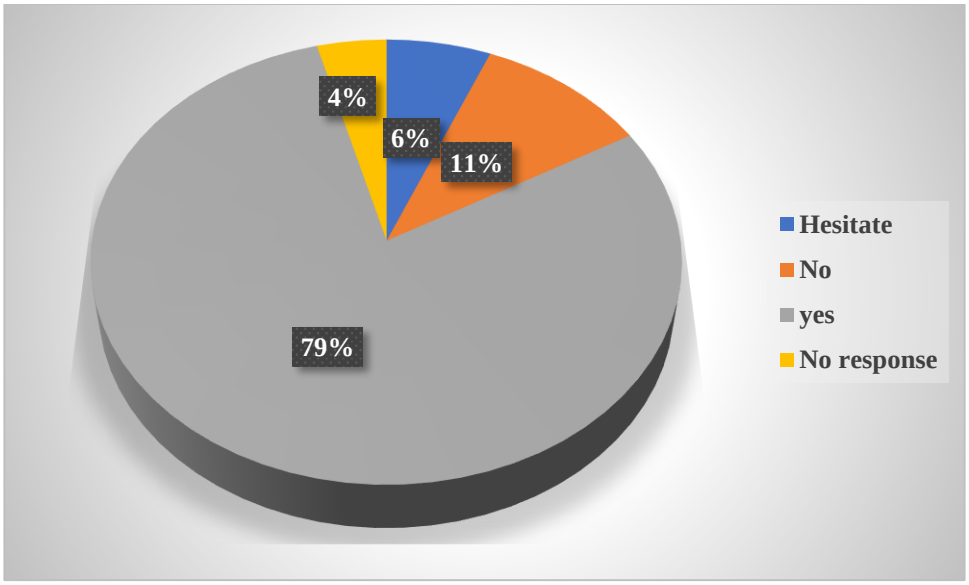


Figure 6. Indications for surgery

In this study, it has been noted that surgeons agree to perform a laparotomy under spinal anesthesia in 79% of cases [Figure 7]. It was also noted that patients are satisfied after to be undergoing a laparotomy under spinal anesthesia in 86% of cases [Figure 8]. According to the responses collected, the most used local anesthetic agent in SA remains Bupivacaine (84%) [Figure 9].



Picture 7. Acceptance of surgeons

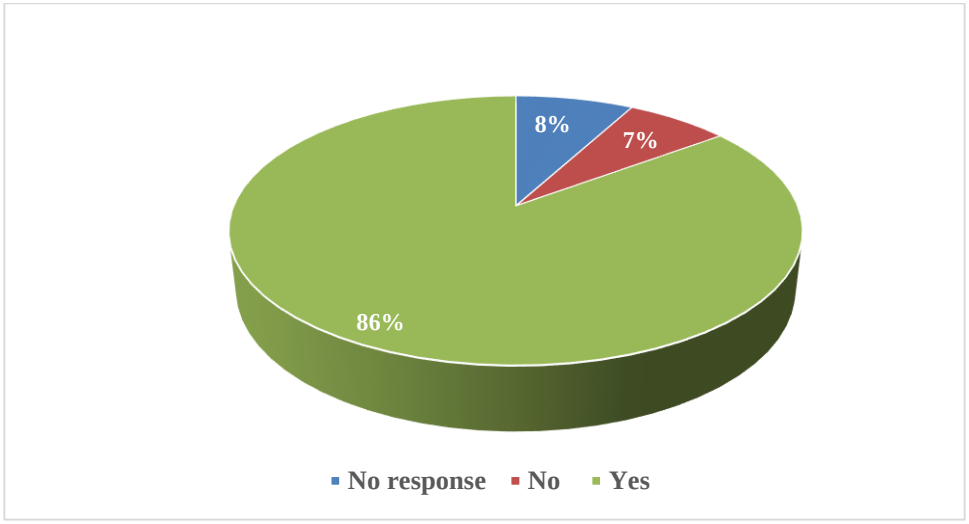


Figure 8. Patient satisfaction.

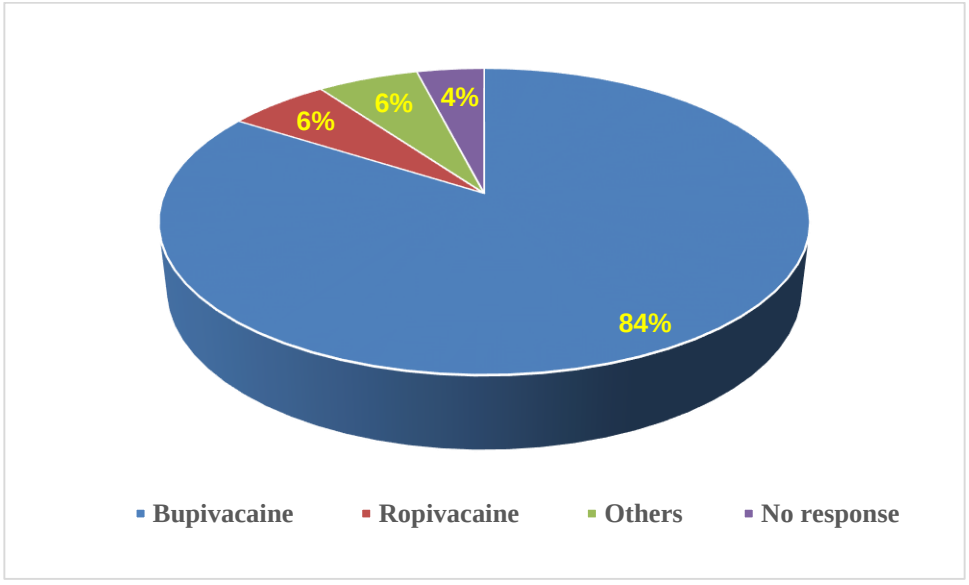


Figure 9. Local anesthetics

The additive drugs associated with the local anesthetic agent used in spinal anesthesia are much more Fentanyl (79%), Morphine (58%), Clonidine (40%) [Figure 10]. When spinal anesthesia is used for laparotomy the reasons for conversion to general anesthesia (GA) are numerous but in large part it was reported that, it is the failure of spinal anesthesia (48%) [Figure 11].

%), Clonidine (40%) [Figure 10].

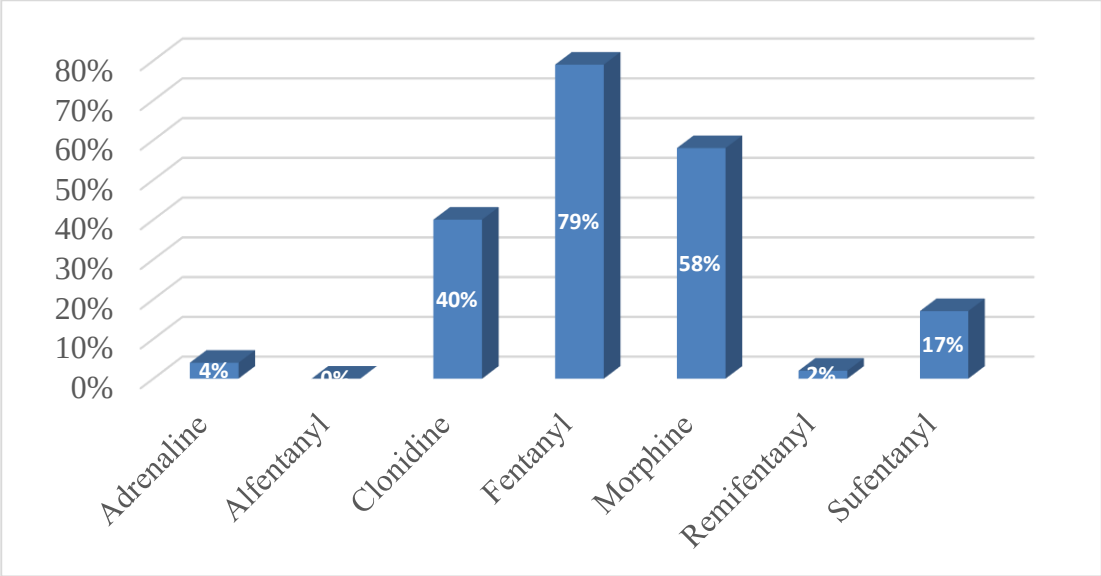


Figure 10. Additives

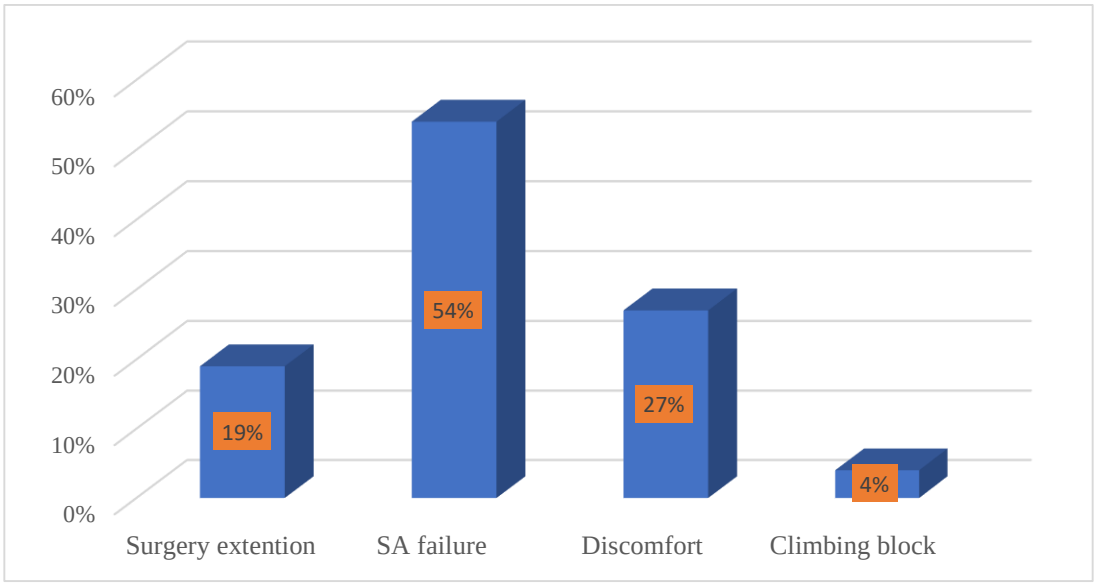


Figure 11. Reasons for conversion to general anesthesia

Discussion

It was about of a survey by a self-administered questionnaire with active collection distribution which made it possible to collect forty-eight answers by different categories of anesthetists participating in the 37th congress of the Africa Franch-speaking Society of Anesthesiology.

Most respondents were physician anesthetists (71%). This is explained by the fact that, with the development of training which has significantly increased the number of anesthesiologists in many Africa French-speaking countries who become the majority as participants in congresses. Unlike some time ago, nurse anesthetist or anesthesia technicians outnumbered physicians, more than ten years now[16].

Most respondents indicated that they use spinal anesthesia for lower abdominal surgeries such as inguinal hernia, hysterectomy, and myomectomy and appendectomy. This is confirmed by several studies that spinal anesthesia is used for interventions such as appendectomy, inguinal herniorrhaphy, caesarean section, hysterectomy or even myomectomy.[17]. So far, we generally consider that an emergency laparotomy for supra-mesocolic abdominal surgery should be performed under general anesthesia and is often marked by a very high morbidity and mortality rate because often fragile patients and those with comorbidities, classified ASA III or IV[15,18,19].

According to the responses collected, the most used local anesthetic agent in SA remains Bupivacaine. It has been reported in several studies that bupivacaine is a powerful local anesthetic with a long duration of action, the most widely used in SA all over the world.[17]. Since it offers many advantages such as long onset of action and low rate of symptoms of neurological disorders. Due to its pharmacological profile, recovery from motor and sensory block is delayed[20,21]. Bupivacaine, can be formulated as an isobaric or hyperbaric solution[17].

The additive drugs associated with the anesthetic agent, used in spinal anesthesia are much more Fentanyl, Morphine (58%) and Clonidine (40%). Local anesthetics may be combined with other drugs to prolong the duration of sensory, motor block, increase the level or intensity of sensory analgesia. It also makes it possible to reduce the dose of local anesthetic without shortening the duration of the block but with a more favorable recovery profile.[20]. Opioids associated with SA have a quality enhancing effect and prolong the duration of sensory analgesia after spinal anesthesia. The effect is direct after binding to the opioid receptors present in the spinal cord. Some opioids such as fentanyl are thought to prolong analgesia and have an anti-nausea effect[22]. As regards Clonidine, it makes it possible to shorten the time of action of Bupivacaine by reducing the baricity of the latter. Clonidine also has analgesic effects, especially intraoperative visceral, mediated by Alpha 2 receptors, which improves sensory block and reduces the need for intraoperative and postoperative analgesia in spinal anesthesia.[23]. It was also noted that in most cases surgeons ccept that a laparotomy can be performed under SA. It depends on the confidence and assurance they have in the anesthetic team in front.

The type of anesthesia should meet patients' satisfaction. The respondents in this study reported in their majority (86%) that patients who undergo laparotomy under SA express their satisfaction with this type of anesthesia. The explanations during the pre-anesthetic consultation and the use of adequate medication to reduce discomfort, pain and chills are the basis of patient satisfaction as is the case for other types of procedures performed under spinal anesthesia[24]. The patient satisfaction is described as a subjective evaluation of the service obtained considering the individual's expectations and a crucial component in determining the quality of healthcare. It is a major component of quality of health care[24,25] Patients receiving SA has been demonstrated a high rate of patient satisfaction. Ideally, preoperative patient education, intraoperative care and rational drug choice should improve the quality of care and bring the full acceptability[24].

When SA is used for laparotomy the reasons for conversion from spinal to general anesthesia (GA) are numerous, but it has been reported that, it is failure of spinal anesthesia (48%), followed by prolongation of time of the surgery. Failure of SA can occur by different mechanisms, for example when the subarachnoid space is not reached or the analgesia is not sufficient for surgery after drug injection[26].

This study had limitations. First, the fact that the questionnaire was self-administered all at once and in the middle of the conference did not allow some delegates to participate in the survey. Second, the acceptance and satisfaction of the use of spinal anesthesia by surgeons and patients undergoing laparotomy is the opinion of the respondents.

Conclusions

It therefore emerges from this study that many anesthesiologists only resort to spinal anesthesia for sub-mesocolic laparotomies and not for supra-mesocolic laparotomies. There is a lack of enough data to support

the evidence that spinal anesthesia can be used for supra-mesocolic laparotomies in emergencies, especially for peritonitis, in complete safety. This study will provide a basis to assess the safety and feasibility of emergency laparotomy under spinal anesthesia in the resource-limited setting and that it may be useful in specific circumstances depending on indications, terrain, and titration techniques.

Ethics approval and consent to participate.
Consent to participate in the survey was obtained and responses were anonymous.

List of abbreviations
SA: Spinal Anesthesia; SSA: Sub-Saharan Africa

Conflicts of Interest
The authors declare no conflict of interest in the design and conduct of this survey.

Funding Statement
None

Authors' contributions
All the authors mentioned above participated in the conduct of the survey and in the final reading of the study.

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