Spinal Anaesthesia In Lumbar Spinal Surgery In Abuja, Nigeria

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ABSTRACT

Study design: Retrospective study

Objective: The study is to highlight the importance spinal anaesthesia in elective lumbar spine surgery in a resource challenge country like Nigeria.

Background: There is a paucity of information on the use of spinal anaesthesia in elective lumbar spine surgery in Nigeria. The need to explore technique with high safety margin resulting in good outcome in resource challenge country provides the template for this study. This study was done mainly in the University of Abuja Teaching Hospital Gwagwalada, Spinecare Hospital Gwagwalada and Trust Charitos Hospital Jabi all in Abuja Nigeria.

Method: All patients who had elective spinal surgery using spinal anaesthesia were retrospectively studied. All the patients had spinal infiltration at Level L3/L4, L4/L5 using heavy Marcaine and with or without Fentanyl. The outcome parameter studied were intra operative cardiovascular status, intra-operative blood loss, hospitalization stay, post-operative VAS and PONV. Follow-up was for an average of 3 months. The results were analysed using SPSS 18.0.

Result: There were 242 patients in this study with male preponderance. The parameters (surgical and anaesthesia time, intra-operative cardiovascular status, intra-operative blood loss, hospitalization stay, pre- and post-operative VAS scores, and POVN) studied shows good outcome in the short-term evaluation with patients who had spinal anaesthesia.

Conclusion: Spinal anaesthesia provides good post operative outcome in patients who underwent elective lumbar spinal surgery in a resource challenge country like Nigeria.

Key-words: Bupivacaine, Spinal anaesthesia, elective lumbar spine surgery, Nigeria

INTRODUCTION

Lumbar spine surgery has become popular in Nigeria, a resource challenge country since 2004.[1-4] This surgery is facilitated by surgeons returning from abroad after training. This was also encouraged by the availability of low-priced instrumentation and implants from India and China and the concomitant improvement in funding of healthcare system from oil boom.

Spinal anaesthesia can be used in surgeries of the lumbar spine.[5-19] Spinal anaesthesia has several benefits noted in the literatures, including rapid onset, less intraoperative blood loss, thrombotic events, pulmonary complications, and postoperative cognitive dysfunction.[6-12, 14-19] It also allows the patient to breathe spontaneously and reposition themselves to avoid compression injuries during the course of the procedure.[6]

There is paucity of study on the use of spinal anaesthesia in lumbar surgeries in Nigeria.[5] This retrospective study is therefore an assessment of the short term outcome of the use of spinal anaesthesia in patients undergoing lumbar spine surgery with emphasis on surgical time, anaesthesia time, intra-operative cardiovascular status, intra-operative blood loss, hospitalization stay, pre- and post-operative VAS and POVN.

MATERIALS AND METHODS

Patient Selection

All the case notes of patients who had elective lumbar spinal surgeries were retrospectively reviewed. Patients who had spinal anaesthesia for all types of elective lumbar spine surgeries were included. The patients were selected from patients operated on by the first author at the University of Abuja Teaching Hospital Gwagwalada, Spinecare Hospital Gwagwalada and Trust Charitos Hospital Jabi all in Abuja Nigeria over the last 10years.

The exclusion criteria were:

1. All patients who has had previous lumbar spinal surgery
2. Patients who had tumour surgery
3. Patients who had emergency lumbar spine surgery
4. More than 2 segments lumbar spine surgery

Procedure

All the patients were preloaded with 500 mls of normal saline before the spinal anaesthesia. The spinal block for patient were done in the seated position with the neck flex and holding a pillow. The lower back of the patient was prepared using Povidone Iodine solution 7.5% and 10% before being draped in a sterile fashion.

The lumbar interspace of L3-4 or 4-5, is identified and 2-4 ml of 1% lidocaine is injected to anesthetize the area where the spinal needle will be inserted. A 24G pencil-point spinal needle is then placed through an introducer and advanced until free flow of CSF is observed from the hub of the needle. 1.5-2 ml of 0.75% hyperbaric bupivacaine is injected into the subarachnoid space and sometimes Fentanyl is added. The patient is returned to the supine position and anaesthesia level determine with methylated spirit soaked cotton wool till a T8-10 level is obtained. The patient is then rolled into the prone position and placed on chest rolls.

Patient Assessment

Pain was assessed using VAS before surgery and at discharge on day 5 post operatively. Intra-operative blood loss, Intraoperative cardiovascular status (Bradycardia, Hypotension, Tachycardia, and Hypertension), hospitalization stay, Post Operative Nausea and Vomiting (PONV) and Patient Satisfaction Score were used to evaluate subjectively the outcome of the spinal anaesthesia procedure.

The results were analysed by means, standard deviation, simple percentages and Chi-square as appropriate using Statistical Package for Social Science (SPSS) 18.0; a p-value of <0.05 is significant.

RESULT

This retrospective review consists of 242 patients in this study sample with 158 male and 84 female (M:F=2.9:1). The mean age respectively is 64.4±3.6. All patients had spinal anaesthesia. One hundred and ninety-five patients had only Bupivacaine and 47(19.4%) patients had additional Fentanyl. Demographic characteristic of the study population stratified by the surgical procedure received is summarized in Table 1.

Table 1: Profile of Patients

Type of Surgery	Male	Female
Discectomy	41	18
Laminectomy	77	41
One level fusion surgery	36	25
Total	154	84

Table 2 summarized the perioperative and physiological characteristics of the study population. There is a significant change in the VAS score following surgery (p<0.001). The mean duration of anaesthesia is 110 minutes (range 45 to 168 minutes). The average surgical time was 91 minutes (range 53 to 141 minutes). The average intravenous fluid use was 1350mL (range 1220mls to 3100mL). The average blood loss was 148mL (range 125-720mL).

The intra- operative cardiac monitoring parameter assesses were blood pressure, heart rate and the mean arterial pressure (MAP). Bradycardia and hypotension is established when there is a decreases in heart rate (HR) and mean arterial pressure (MAP) to less than 80% of baseline values; while tachycardia and hypertension is an increase in HR and MAP greater than 120% of baseline values. The values found are shown in Table 2.

Table 2: Outcome measure

Outcome Parameter	Values
Pre-op VAS	6±2.1
Post-op VAS	2±1.1
Total anaesthesia time (min)	110.4±4.1
Surgical time (min)	91.2±3.6
IV fluid use (mls)	1350±68
Blood loss	148±16
Hypertension	10(4.1%)
Hypotension	125(51.6%)
Tachycardia	28(11.6%)
Bradycadia	39(16.1%)
Mean Arterial Pressure (MAP) mmHg	72±2.9
Post Operative Nausea and Vomiting (PONV)	21(8.6%)
Urinary retention	32(13.2%)
Ephedrine require	54(22.3%)
Hospitalization stay	3±2.7

Numerical data expressed as mean±SEM

Bradycardia and hypotension= decreases in heart rate (HR) and mean arterial pressure (MAP) to less than 80% of baseline values

Tachycardia and hypertension= HR and MAP greater than 120% of baseline values.

Post-operative parameter studied were Post-operative nausea and vomiting (PONV), Urinary retention, use of vasopressor (Ephedrine) and length of hospital stay. PONV were seen in 21patients and 14 of these patients are those who had additional Fentanyl. Urinary retention occurs in 13.2% of the patients. Vasopressor (Ephedrine) was given to 22.3% of the patients to augment the MAP while the average hospital stay was 3days.

DISCUSSION

Spine surgery is a relatively new practice in Nigeria. General anaesthesia has been used in lumbar surgery and other surgeries with preference by most anaesthetists. Spinal anaesthesia use in spinal surgery has been reported in many literatures[5-22]. In general, spinal anaesthesia has been shown to carry a very low risk of serious complications.[15,21] This has also been shown in our results above.

Pain was studied using the VAS score pre and post operatively. This study shows similar pain reduction to other studies[20,]. Spinal anaesthesia attenuates pain by inhibiting afferent nociceptive pathways. It has also been speculated that since sensory sensation recovery lags behind motor sensation; patients with spinal anaesthesia will likely

have residual sensory blockage even when motor function had returned.[20]

The advantage of spinal anaesthesia is not limited to patients' self-positioning. Self-positioning helps patient to regulate and improve on respiratory function.[20-21] This improved respiratory function helps to lower intra-abdominal pressure with less distension of the epidural veins from lower intra thoracic pressure.[15,20-22,24] This makes the surgical operative field cleaner.[15] The attendant consequence is less bleeding and decrease operative time. Decrease surgical time was noted in our study and similar to the findings in the study by Jellish et al[20].

Shorter anaesthesia time is reported in this study. This is in agreement with the findings of other studies[14,24]. The reason stated by Pierce et al[24] , patient is not required to recover before leaving the operating room where there is no ceremony of extubating.

Reduced blood loss in spinal anaesthesia has been attributed to reduce MAP facilitated by reduced preload. Reduction in MAP produced decrease intra osseous blood pressure with subsequent reduction in blood loss. Our study shows similar blood loss with that in the study of Pierce et al[24].

Patient following surgery using spinal experienced less POVN. This has been attributed to improve gastric emptying.[15] Many studies have attributed this to reduced narcotic use in spinal anaesthesia. This may be true because the incidence of PONV was higher in patients who had additional Fentanyl compare to the group who had only Bupivacaine.

Patient undergoing spinal anaesthesia for lumbar procedure has a better haemodynamic variables than those under general anaesthesia. This was reported by Jellish et al, Benyahia et al and Babu Kumar et al. This is also the findings in our study. Tetzloff et al[22] demonstrated preservation of low frequency heart rate variation that reflect better presentation of cardiac sympathetic activity with spinal anaesthesia.

The decrease MAP noted also results in significant decrease in coronary blood flow. This may be a problem for patient with co-existing morbidity like hypertension. What has been noted is that in spinal anaesthesia, there is a concomitant decrease in myocardial oxygen requirement even when the myocardial supply is low.[23]

As noted in the study by Pierce et al, spinal anaesthesia results in overall short hospital stay. The importance of this is decrease risks of hospital acquired infection, increase hospital cost, pressure ulcers leading to further prolong hospital stay. This study reports similar findings.

CONCLUSION

This retrospective study of 242 patients that had spinal surgery over a period of 10years shows good clinical outcome though limited study population. The clinical parameter studied shows safe profile of spinal anaesthesia use in spinal surgery.

Short hospitalization was also noted with minimal PONV. Spinal anaesthesia provides good post-operative outcome in patients who underwent elective lumbar spinal surgery in a resource challenge country like Nigeria

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