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Audit of Lumbar Spine Operations Performed Under Spinal Anaesthesia

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Abstract

Introduction: Spinal and epidural anaesthesia was performed in selected patients undergoing lumbar spine surgery in a private clinic. The technique will be described in detail and the results reported.

Materials and methods: This study reports on patients admitted and operated upon from 1st May 2014 till 31st August 2015. We performed a retrospective review of all the patients operated in the hospital during the period and selected out those who had regional anaesthesia for audit.

This study reports on patients admitted and operated between 1st May 2014 and 31st August 2015. The patients were managed at Spine Fixed in Abuja, a private clinic in Abuja, Nigeria. We performed a retrospective review of all the patients operated in the clinic during the period and selected out those who had regional anaesthesia for audit. The case notes were collected and reviewed. The demographics, operation details and short term outcome at the final clinic visit were entered into a database. The medium term outcome as related to need for another operation was determined from telephone calls to the patients made in March 2016.

Results: Twenty eight out of 32 patients had simple lumbar spinal operations performed under spinal anaesthesia in the period under review. There were 12 males and 16 females with age range 24-77 years. Sixteen out of the 28 patients had one level lumbar spine decompression, while the remaining 12 had two-level spinal decompression performed. None of the patients required blood transfusion, and none of the patients had anaesthetic or surgical complications peri-operatively. There were no complications such as dural tears, nerve injuries related to the procedures though one patient vomited in the recovery room. The post-operative analgesia was maintained for over 4 hours post operatively. On review in March 2016, the patients and the surgeon were satisfied with spinal anaesthesia in all cases.

Conclusion: Lumbar surgery can be performed safely under regional anaesthesia. For patients undergoing decompressive lumbar spine surgery, regional anaesthesia is an effective technique with potential advantages. In our experience, the operations were well tolerated by patients with good recovery and minimal complications. The short term outcome was also satisfactory.

Keywords: Spinal anaesthesia; Epidural anaesthesia; Lumbar decompression; Surgery; Abuja

Introduction

Lumbar spine surgeries are common neurosurgical procedures done the world over. It is becoming popular now in Nigeria with better patient information that spine procedures can be successfully carried out in Nigeria. We previously reported on adequate outcome in patients operated in Abuja for traumatic spinal injuries [1]. Spine procedures can be done either under general or regional anaesthesia. However, general anaesthesia is the anaesthetic technique used more commonly. This is the usual technique for prolonged surgeries in the prone position. It is generally preferred for patients comfort and to prevent airway compromise.

While some think all lumbar spine surgeries should be under general anaesthesia to guarantee better outcomes, studies have shown that short procedures like simple lumbar discectomy and laminectomy can be successfully done under spinal anaesthesia with good outcomes and patient satisfaction [2].

Lumbar surgery can be performed safely under regional anaesthesia [3]. Regional anaesthesia is used for short simple procedures in carefully selected patients. For patients undergoing decompressive lumbar spine surgery, epidural anaesthesia is an effective, well tolerated technique with several potential advantages. McInain et al. in a case controlled study looked at 400 patients who underwent either spinal anaesthesia or general anaesthesia for lumbar decompression. The results showed that spinal anaesthesia was as effective as general anaesthesia, and in addition spinal anaesthesia caused reduced anaesthesia recovery duration, reduction in nausea and vomiting and analgesia needs [4].

Tetzlaff et al. also retrospectively looked into the outcomes of elective lumbar spine surgical procedures done under spinal anaesthesia or general anaesthesia. They concluded that spinal anaesthesia can be considered an effective alternative to general anaesthesia for lumbar spine surgery. They noticed reduced blood loss in the patients who had spinal anaesthesia and reduced post operative analgesic use [5].

We have regularly used regional anaesthesia in spine surgery in Abuja. Spinal and epidural anaesthesia was performed in carefully selected patients undergoing lumbar spine surgery in a private hospital. We present an audit of patients who had simple lumbar spine surgeries done under regional anaesthesia.

Materials and Methods

We conducted a retrospective review of our patients admitted for spine surgery during the study period, from 1st May 2013 to 31st August 2014. One of the nurses, P.E obtained the names of the patients following a review of the theatre log. A database was created and the patient demographics and operation was entered into a file. The case notes were then obtained and the patients who underwent regional anaesthesia identified. The notes were then passed over to the anaesthetist O.O for the audit.

The American Society of Anesthesiologists (ASA) Physical Status classification system was initially created in 1941 by the American Society of Anaesthetists, an organization that later became the ASA.

The purpose of the grading system is simply to evaluate the degree of a patients "sickness" or "physical state" before selecting the anaesthetic or before performing surgery. Describing patients' preoperative physical status is used for record keeping, for communicating between colleagues, and to create a uniform system for statistical analysis. The grading system is not intended for use as a measure to predict operative risk. ASA 1 describes a patient with no organic, physiologic, or psychiatric disturbance; excludes the very young and very old; healthy with good exercise tolerance. ASA 2 describes a patient with no functional limitations; has a well-controlled disease of one body system; controlled hypertension or diabetes without systemic effects, cigarette smoking without chronic obstructive pulmonary disease (COPD); mild obesity, pregnancy. All the 28 patients were ASA 1 or 2 patients scheduled for elective discectomy or laminectomy and nerve root decompression, who did not have any contraindication to spinal anaesthesia.

The patients were all operated upon by the same team of neurosurgeon, B.O, anaesthetist, O.O and perioperative nurse, B.C. Routine preoperative assessment was done to ascertain patients fitness and to rule out coagulopathy, hypovolaemia, infection at injection site, history of seizure and raised intra cranial pressure. An informed consent was obtained after careful explanation of the anaesthetic technique and what to expect in the perioperative period was communicated to the patients. Routine investigations were requested for and reviewed by the team. Fasting guidelines were also given. The

operations chosen for spinal anaesthesia were not to exceed 2 levels and the anticipated surgery duration should be not much more than 2 hours.

When patients were brought into the theatre, monitors were attached to them. Routine monitoring of non-invasive blood pressure, oxygen saturation, pulse, temperature and electrocardiogram was done throughout surgery and later in the recovery room. A wide bore cannula of 16 G was inserted, secured and patients preloaded with normal saline 7 mls/kg over 15 minutes.

The patients were placed in the sitting position, the back was cleaned and draping performed in an aseptic technique. The space to be used, usually L3/L4 was infiltrated with 3-4 ml of 2% Lidocaine. Then, a 25 g spinal needle was introduced into the spine to the subarachnoid space until clear cerebrospinal fluid is observed. 3 ml of heavy Marcaine plus 25 µg of fentanyl was then injected into the subarachnoid space to produce the spinal anaesthesia.

Patients were made to lie down supine for 10-15 minutes. Meanwhile, an appropriate size catheter was placed aseptically into the urinary bladder; routine prophylactic antibiotic was also given. We regularly use 1 gm Ceftriaxone given intravenously.

After establishing level of spinal block at T6–T10, patients were then turned prone on bolsters to free the stomach and chest. Soft pillows were also used to support the head, limbs and to protect the pressure points. All the surgeries were performed by the same surgeon.

Throughout the surgery, blood pressure was monitored and hypotension (systolic blood pressure less than 90 mmHg) was treated with injections of Ephedrine 5 mg intravenously. Any patient noticed to be uncomfortable or anxious was given 50 µg of fentanyl +/- midazolam 1-2 mg intravenously. This could occur occasionally after about 1 hour of lying prone. Blood loss was monitored and recorded in the anaesthetic chart. At the end of surgery, patients were turned back into the supine position, sat up about 300, taken out of theatre and monitored in the recovery room. Recovery time was documented as time of arrival at the recovery room to discharge from it.

In the recovery room, the following were assessed—Pain, nausea/vomiting, vital signs, regression of sensory block to at least 2 segments below initial level. Patients and surgeon's satisfaction was also assessed in simple Yes or No question format after the operation.

The medium term outcome was assessed in March 2016 with telephone calls to all the patients. We asked and confirmed that they still have good outcome following the operation: Satisfied or not satisfied. We also checked to see if any of the patients had required another operation.

Results

The audit showed that between May 2014 and August 2015, we had performed a total of 91 primary spine surgeries. In the total number of 91 procedures, 19 were cervical spine

operations, 71 patients had lumbar operations and one patient had a thoracic scoliosis correction surgery undertaken. Of the 71 patients operated for a variety of lumbar spinal diseases during the study period, 32 were simple lumbar spine operations as defined previously (**Table 1**). The others had complex lumbar spine procedures such as multiple level decompressions and pedicle screw fixations performed for trauma, infection and degenerative conditions.

Table 1: Total case management profile for the period May 2014 to August 2015.

Total case management profile	Number
Thoracic Scoliosis correction	1
Cervical spine operations	19
Lumbar spine operations	71
Complex lumbar spine operations	39
Simple lumbar spine operations	32
Total number of spinal operations	91

Twenty eight of the 32 simple lumbar decompression surgeries were done under spinal anaesthesia. The following is an audit of the 28 cases done under regional techniques; in this case we performed spinal anaesthesia. There were 12 males and 16 females with age range 24 to 77 years. Sixteen out of the 28 patients had one level lumbar spine decompression, while the remaining 12 had two-level spinal decompression performed (**Table 2**).

Table 2: Of 32 simple lumbar spine operations performed, 28 were under spinal anaesthesia. Sixteen of these were single level decompression while 12 had multiple levels of intervention.

Simple lumbar spine cases under Spinal	Number
Single level lumbar decompression	16
Two level lumbar decompression	12
Total number of operations	28

None of the patients required blood transfusion, and none of the patients had anaesthetic or surgical complications peri-operatively. The average duration of the procedures was 95 minutes. Blood loss was estimated between 150-250 ml for the patients and no one required a blood transfusion. There were no complications such as dural tears, nerve injuries related to the procedures and patients were able to eat and drink 2 hours after the operation. One patient vomited in the recovery room. The post operative analgesia was maintained for over 4 hours post operatively. On review, the patients and the surgeon were satisfied with spinal anaesthesia in all cases.

Discussion

Our experience suggests that patients found it difficult to believe that spine surgeries can be successfully performed in

Nigeria. Many worry about not waking up from surgery and paralysis following spine operations. When they finally make up their minds to have the operation performed, the question then arises-what form of anaesthesia will they be subjected to?

Spine surgeries have been successfully done under general anaesthesia, spinal and epidural anaesthesia. Many studies have been done to establish the feasibility and safety of regional anaesthesia in lumbar surgery [3, 6, 7]. Of course, it had long been used in obstetrics with good safety profile [8, 9]. Application of regional anesthetics is also widely preferred for lower-extremity surgery, but general anesthesia is used almost exclusively in spine surgery, despite evidence that spinal anesthesia is as safe and may offer some advantages [4, 5].

We discovered that having the operation performed under regional anaesthesia increased the take up rate for surgery in our clinic. For those we have offered the option of spinal anaesthesia for short spinal procedures, it came as a relief that they could be awake and have their procedure done safely in this way.

There needs to be careful patient selection and adequate informed consent. The patient need to be cooperative and tolerant of mild discomfort related to the prone position. The operation should also not last much more than 2 hours. The operations were performed under spinal anaesthesia though it could also be performed under epidural anaesthesia [6, 8, 9]. In fact, other authors have reported successful rates of motor and sensory blockade (over 90%) even in patients who had undergone previous spine surgery [7].

Causes for failure of extradural anaesthesia in patients who had previously undergone lumbar spine surgery included technical difficulty in three patients and inadequate spread in two patients.

The reported frequency of serious complications is low and they were usually due to the spread of anaesthesia, leading to circulatory and respiratory insufficiency [5]. It is therefore essential to be able to treat such complications rapidly [9, 10]. In our experience, the operation was well tolerated by patients with good recovery and minimal complications. We had one patient out of the 28 cases operated upon suffer episodes of vomiting following the operation.

We have not adopted spinal anaesthesia as a choice of anaesthesia for patients who will in addition to the decompression will need pedicle screw fixation. This is because pedicle screw fixation takes a longer time, and patients may not be able to stay awake in the prone position, and be comfortable for procedures longer than 2 hours. We have however done one lumbar pedicle screw fixation (4 screws) under epidural anaesthesia for a patient who insisted he did not want general anaesthesia. The procedure was well tolerated in this patient. One important point is that patients need to be warned on risk of conversion to general anaesthesia. As reported by Hassi et al. The possible risk of failure obliges to inform patients preoperatively that conversion to general anaesthesia cannot be excluded [11].

Epidural anaesthesia is advantageous for less risk of some complications compared with general anaesthesia and enables communication between the surgeon and the patient. On a long-term basis, 4-5% had further surgery for recurrent problems [2]. One other problem with regional anaesthesia is the risk of hypotension. Ephedrine is used frequently to manage the problem. Laakso et al. concluded that there was a tendency to more frequent episodes of haemodynamic deterioration in the knee-chest position than the horizontal position [12]. All our patients were operated lying in the horizontal position. Some other reported complications are the risk of hyperacute spinal subdural haematoma secondary to lumbar spinal anaesthesia, identified with MRI as reported [10] and lumbar spondylodiscitis after epidural anaesthesia at a distant site [13].

We have noticed that both surgeon and patients had a high level of satisfaction after the procedure.

Conclusion

Spinal anaesthesia is a reliable and satisfactory alternative form of anaesthesia for simple lumbar spine procedure. Spinal anaesthesia for short spinal procedures is an option that should be employed in suitable cases. The team must be aware of possible complications such as hypotension, failure of the blockade and more potentially serious complications as paraplegia Ouro-Bang'na Maman et al. [14]. Overall, in our experience, the patients and relatives were satisfied at the end of the procedures.

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