# Transurethral Resection of the Prostate: A preliminary Experience in Six Patients under Spinal Anesthesia at the University of Uyo Teaching Hospital. A Case Series

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## ABSTRACT

***Transurethral resection of the prostate (TURP) is the surgical gold standard in the management of benign prostatic hyperplasia (BPH). To evaluate the feasibility of spinal anaesthesia for TURP. This was a descriptive observational prospective study performed in six patients who underwent TURP under spinal anaesthesia between 24th-25th September 2015, at the University of Uyo Teaching Hospital, Uyo, Nigeria. All patients received spinal anaesthesia in the sitting position. Patients' variable were monitored throughout the intraoperative period and for 2 hours in the recovery room. Patients' data including age, ASA status, prostate size, intravenous and irrigating fluid volumes used were recorded. Also, doses of hyperbaric bupivacaine and opioid used, as well as complications of anaesthesia were obtained. Data analysis was done using SPSS version 16. Transurethral Resection of the Prostate under spinal anaesthesia was performed on six patients. Four patients received a combination of 0.5% hyperbaric bupivacaine and 25mcg of fentanyl, while two patients received bupivacaine plus 0.1 or 0.2mg of morphine. Intraoperatively, shivering occurred in all patients (100%), while bradycardia was observed in 3 patients(50%). Hypotension, pain and nausea/vomiting were observed in one patient only. Postoperatively, shivering and bradycardia were observed in 3 and 2 patients respectively. All complications were successfully treated. Spinal anaesthesia is adequate for TURP, however, shivering and bradycardia induced by hypothermia are common.***


***Keywords: Transurethral resection of the prostate, spinal anaesthesia, preliminary experience.***

## INTRODUCTION

Benign prostate hyperplasia (BPH) is the commonest disease of the urinary tract in ageing males, and is the commonest tumor in men over the age of 50 years[1]. Patients often present with acute urinary retention (AUR), severe lower urinary tract symptoms (LUTS), or other complications[2]. Appropriate definitive treatment of BPH symptoms may be pharmacological, open prostatectomy or transurethral resection of the prostate.

Until recently, surgical treatment of all BPH in our centre was by open prostatectomy (mainly transvesical), commonly performed under general, spinal or epidural anesthesia. Transurethral resection of the prostate is the surgical gold standard for the treatment of symptomatic BPH[3]. Approximately, 40,000 TURP are performed annually in the UK[4], however, it is still an uncommon procedure in most government hospitals in sub-Saharan Africa due mainly to lack of equipment and appropriately trained personnel conversant with the procedure[5].

In Nigeria, TURPs have been reported in some centres performed under different techniques of anaesthesia including spinal anaesthesia, however, these reports are lacking in some important anaesthetic details[5,6,7]. The first series of TURP in our centre was perfomed between 24th and 25th September 2015, during an endourology workshop. In this study, we report our preliminary experience with spinal anaesthesia.

## PATIENTS AND METHODS

This was a descriptive observational prospective study performed in six patients scheduled for elective transurethral resection of the prostate between 24th and 25th September 2015, during an endourology workshop at the University of Uyo Teaching Hospital, Uyo, Akwa Ibom State. Approval for the study was obtained from the Institution's Research Ethics Committee, as well a written informed consent from the patients.

All the patients were assessed by the anaesthetists within two days preceding [illegible]

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electrolytes, urea and creatinine, coagulation profile, blood grouping and cross-match, and ECG. All patients received spinal anaesthesia, the dose of the local anaesthetic agent and opioid used were at the discretion of the attending anaesthetist. In the theatre, a multiparameter monitor measuring blood pressure, pulse and oxygen saturation was attached to the patient and baseline values were recorded. Preloading or co-loading was achieved using approximately 10.15ml/kg of room-temperature 0.9% normal saline. Spinal anaesthesia was performed in the sitting position using size 25 gauge quincke type spinal needle. A mixture of 0.5% hyperbaric bupivacaine plus fentanly or morphine was injected into the subarachnoid space. The surgery was allowed to proceed when the sensory and motor blockades were at least T10 using pin prick and 3 on Bromage scale respectively.

Haemodynamic parameters were monitored throughout the intraoperative period and two hours in the recovery room before transfer to the ward or ICU. Intraoperative and recovery room complications were detected and treated. Hypotension was defined as systolic Bp < 90 mmHg or 20-30 mmHg lower than the baseline, and bradycardia as pulse rate below 60 beats per minute.

Information obtained were Age, ASA status, intercurrent medical diseases, preoperative and postoperative PCV, and prostate size. Other information collected included duration of surgery, volume of intravenous and irrigation fluids used, dose of bupivacaine and opioid used for spinal anaesthesia well as the intraoperative and recovery room complications. The data was analyzed using SPSS version 16.

## RESULTS

Transurethral resection of the Prostate under spinal anaesthesia was performed on six patients during the two days endourology workshop. All tables show the patients in order in which the surgeries were performed from 1-6. The mean age was 62yrs with a range of 47-78yrs. Two patients were of class III of the American Society of Anesthesiologists (ASA) physical status classification, while three were in class II, and one patient in class I. Three patients (50%) had intercurrent medical diseases [IMD], one patient had diabetes mellitus only, another had hypertension with arrhythmia, while the third patient had both hypertension and diabetes mellitus. The mean prostate size was 64.3g with a range of 31-101g, the 2nd patient had the largest prostate size (101g), and also a coexisting bladder tumor (Table 1). The mean volume of normal saline used as intravenous and irrigation fluids during the surgery were 1683.3ml and 33,416.7ml respectively. Table 1 also shows that the average duration of surgery was 98minutes, with a range of 85-135 minutes.

Table 2 shows the dose of anaesthetic drugs used for the spinal anaesthesia. Four patients had a combination of bupivacaine and 25mg of fentanly, while two patients had a combination of bupivacaine and 0.1 or 0.2mg of morpine. The dose of bupivacaine used was between 7.5mg 15mg.

The intraoperative and postoperative complications of anaesthesia are shown in tables 3 and 4. Shivering was seen in all the patients (100%) intraoperatively, followed by bradycardia (50%), while hypotension, nausea/vomiting and pain were seen in 1 (16.7%) patient. Postoperatively, shivering was seen in 3 patients and bradycardia in 2 patients.

The shivering was treated by covering the patients with drapes, intravenous paracetamol and pentazocine, while bradycardia was managed with atropine 0.6mg. Hypotension, nausea/vomiting and pain were treated with ephedrine, metochlorpramide and pentazocine respectively.

Table 5 shows an indirect estimation of blood loss using the difference between preoperative and postoperative PCV, the mean blood loss corresponds to a PCV of approximately 4% (1 unit of blood), with a range of 3-9%. The PCV of the 2nd patient was excluded since he was transfused intraoperatively.

All the patients were successfully managed and transferred to the ward, except the 2nd patient who was transferred to the ICU for close monitoring following persistent agitation, nausea/vomiting and shivering. No mortality occurred during the study.

Table 1: Patients' Characteristics

| Category | Patients 1 | 2 | 3 | 4 | 5 | 6 | Means (SD) |
|---|---|---|---|---|---|---|---|
| Age (yrs) | 47 | 78 | 51 | 75 | 74 | 47 | 62 (15.1) |
| Co-morbid Disease | - | DM | - | HTN Arrythmia | HTN DM | - | - |
| ASA Status | 1 | 2 | 2 | 3 | 2 | 3 | - |
| Prostate size (g) | 89.2 | 101 | 41.3 | 81.3 | 31 | 43 | 64.3 (29.5) |
| IVF (ml) | 1500 | 2000 | 2100 | 1500 | 1500 | 1500 | 1,683.3 (285.8) |
| Irrigation fluid (ml) | 28,000 | 28,000 | 30,000 | 32,000 | 38,500 | 44,000 | 33,416.7 (6,484) |
| Duration of Surgery (min) | 85 | 90 | 90 | 135 | 85 | 105 | 98.3 (19.4) |

SD = Standard deviation, DM = Diabetes Mellitus, HTN = Hypertension, ASA = American Society of Anesthesiologists, IVF = Intravenous fluid.

Table 2: Drugs used for Spinal Anaesthesia

| Patients | Bupivacaine mg (ml) | Morphine (mg) | Fentanyl (mcg) |
|---|---|---|---|
| 1 | 15 (3) | | 25 |
| 2 | 7.5 (1.5) | | 25 |
| 3 | 15 (3) | 0.1 | - |
| 4 | 15 (3) | 0.2 | - |
| 5 | 12.5 (2.5) | | 25 |
| 6 | 10 (2) | | 25 |

Table 3: Intraoperative Complications

| Category | Patients 1 | 2 | 3 | 4 | 5 | 6 | Percentage | Treatment |
|---|---|---|---|---|---|---|---|---|
| Hypotension | | ✓ | | | | | 16.7 | Ephedrine |
| Bradycardia | | ✓ | | ✓ | | ✓ | 50 | Atropine |
| Shivering | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 100 | Paracetamol, Pentazocine Drapes |
| Nausea/Vomiting | | ✓ | | | | | 16.7 | Metochlorpramide |
| Pain | | ✓ | | | | | 16.7 | Pentazocine |
| Others | | | | | | | | |

Table 4: Postoperative Complications

| Category | Patients 1 | 2 | 3 | 4 | 5 | 6 | Percentage | Treatment |
|---|---|---|---|---|---|---|---|---|
| Hypotension | | | | | | | | |
| Bradycardia | | ✓ | | ✓ | | | 33.3 | Atropine |
| Shivering | ✓ | ✓ | | ✓ | | | 50 | Blanket Cover |
| Nausea/Vomiting | | | | | | | | |
| Pain | | | | | | | | |
| Others | | | | | | | | |

Table 3: Estimated Blood loss from PCV difference

| Patients | Preop. PCV | Postop. PCV | Difference | Estimated Blood Loss (ml) | Blood Transfused |
|---|---|---|---|---|---|
| 1 | 38 | 30 | 8 | 1200 | - |
| 2 | 30 | - | - | - | 2 units |
| 3 | 38 | 32 | 6 | 900 | - |
| 4 | 34 | 31 | 3 | 450 | - |
| 5 | 39 | 34 | 5 | 800 | - |
| 6 | 45 | 39 | 6 | 900 | - |

## DISCUSSION

Patients presenting for prostatectomy are often elderly, and may have intercurrent medical illnesses affecting several systems. In one large series, the average age of the patient was 69 years and only 23% did not have a serious medical condition prior to surgery[9]. In our series, the mean age was 62 years, and 50% of the patients had coexisting medical diseases with hypertension and diabetes mellitus being the commonest. This is comparable to previous studies in Nigeria[5,6,7,8] although intercurrent medical diseases was higher in our study, this may be attributed to the limited sample size.

Also, patients with chronic prostatic hypertrophy are predisposed to obstructive renal insufficiency and urinary tract infection which may increase the risk of postoperative septicemia[4]. Furthermore, this group of patients who are often elderly may have osteoarthritis and prosthetic joints which may make positioning difficult and increase the risk of musculoskeletal injury and pressure sores[4]. Our patients were thoroughly evaluated and stabilized on treatment for intercurrent medical diseases before they were recruited for the study. TURP may be performed under general, epidural or spinal anaesthesia[4]. Edomwonyi and colleague[8], documented a high use of spinal anaesthesia compared to general and epidural anaesthesia for open prostatectomy and TURP. Similarly, Alhassan et al[5] and Chukwujama et al[7] reported a predominant use of spinal anaesthesia in their series. On the other hand Okeke[6] demonstrated the feasibility and safety of caudal block in a selected group of 180 patients. Spinal anaesthesia is considered as the technique of choice for TURP, although there is little evidence to show significant difference in outcomes between general and spinal anaesthesia[10]. Spinal anaesthesia offers several benefits over general anaesthesia including monitoring of the level of consciousness which makes it easier to recognise early signs of TURP syndrome. Also, early detection of capsular tear and bladder perforation is possible as the patient complains of periumbilical or shoulder pain provided the height of block is below T10[11]. However, spinal anaesthesia generally should be avoided in Ischemic heart disease patients[11]. In our series, spinal anaesthesia was used in all the patients, and they were monitored for signs of early complications and comfort throughout the procedure.

The dose of hyperbaric bupivacaine used ranged from 1.5-3ml of 0.5% plus 25mcg of fentanyl or 0.1-0.2mg of morphine. Anaesthesia was adequate in all patents, however, intraoperative recovery of motor block and pain was observed in one patient whose surgery lasted for 90 minutes. This was the 2nd patient, a 78yrs old man who had the largest prostate size (101g).

Specific patterns of spinal anaesthesia in the elderly are: reduced latency time, reduced cerebrospinal fluid (CSF) volume and increased density. These factors cause greater diffusion of local anaesthetics. Also, increased demyelinisation of nerve fibers causes wider block extension[12]. Consequently, a 40% reduction in local anaesthetic dosage has been suggested[12]. It is probable that 1.5ml of 0.5% heavy bupivacaine was inadequate for a 90 minutes procedure, perhaps, a volume of 2-2.5ml may have been more appropriate for this patient.

Intraoperative shivering was the commonest complication observed in our study (100%) compared to previous studies[5,8], this was probably induced by hypothermia as all the patients were cold to touch although temperature probe was not available. Hypothermia may be attributed to use of room temperature irrigation

fluid in our study and possibly high block height due to a relatively large volume of drugs (3ml) used for spinal in the majority of the patients. Other factors that may increase the risk of hypothermia include longer resection time, large amount of irrigating fluid absorbed, increased prostate size, small body habitus, low body weight, as well as ambient temperature in the operating room[4].

Hypothermia, defined as a core body temperature of 36°C or less has been shown to increase oxygen demand by as much as 500%[4,12]. Apart from shivering, hypothermia produces a number of cardiovascular changes such as bradycardia, reduced cardiac output, higher mean arterial pressure, increased cardiac stress and greater vascular resistance[4,12]. Our patients were treated with increased covering with drapes and increasing the temperature of the theatre air conditioner. The use of irrigating fluid warmed to body temperature, as used by previous researchers is strongly recommended[4,5,8]. Drugs such as pethidine, tramadol which are effective in treating shivering were not immediately available in the theatre. Bradycardia was also high (50%) in our study compared to previous studies[3,8]. This is attributed to high incidence of hypothermia observed in this study. All cases were successfully treated with 0.6mg of intravenous atropine.

Other complications such as hypotension, nausea, vomiting, and agitation were observed in one patient only. This was the 2nd patient, a 78yr known diabetic. He was managed with atropine, ephedrine, pentazocine, oxygen by mask, and blood transfusion. The patient remained unstable throughout the procedure and was subsequently transferred to ICU for close monitoring. It is not clear whether this was the so-called TURP syndrome since our experience was limited. TURP syndrome is basically a clinical diagnosis based on a constellation of signs and symptoms related to excessive absorption of irrigating fluid into the circulation[4]. The effect is proportional to the amount of irrigating fluid absorbed. The clinical picture is not always uniform and mild cases may be missed[13]. Features of TURP syndrome include restlessness, headache, tachypnoea, visual disturbance, hypoxia, pulmonary edema, nausea, vomiting, confusion, convulsions and coma[4]. If TURP syndrome is suspected, surgery must be suspended as soon as possible and intravenous fluid discontinued. Treatment consists of respiratory and circulatory support. Bradycardia and hypotension should be treated with atropine and adrenergic drugs. Intravenous anticonvulsant such as diazepam or lorazepam should be used to control seizures. Blood should be obtained and checked for sodium, osmolality and haemoglobin[4]. Diuretic therapy such as furosemide or mannitol may be used to treat pulmonary edema, and Hypertonic saline (3%) is indicated to correct severe hyponatremia[4].

Blood loss during TURP is difficult to estimate. Patients lose between 2.4 and 4.6ml of blood per minute of resection whichever technique of anaethesia is used[14]. In our series, blood loss estimation using the traditional volumetric method was not possible since blood mixed with irrigating fluid was collected into a bucket. In theory, blood loss can be estimated by assaying the haemoglobin concentration of the discarded irrigation fluid, by measuring the electrical conductivity of the discarded irrigation fluid etc. In practice, serial estimation of the haemoglobin is the most useful investigation[15], this was not possible during our study.

Finally, one major limitation of our study was the small sample size, which is a potential source of error in a preliminary study like ours. Thus further study in a larger population with streamlined protocols is indicated.

## CONCLUSION

Spinal anaesthesia is adequate for TURP, however, shivering and bradycardia induced by hypothermia are common.

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