Spinal versus epidural anesthesia for transurethral resection of the prostate

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ABSTRACT

Objective: To compare spinal versus epidural anesthesia for transurethral resection of the prostate.

Methods: A total of 65 patients undergoing transurethral resection of the prostate between September 1996 and March 1997, from the King Hussein Medical Centre, Amman, Jordan, were enrolled in this study.

Results: Epidural anesthesia was successful in 30 patients using an initial dose of 15 ml of 0.5% bupivicaine; whereas spinal anesthesia was successful in 32, using 2.5 ml of 0.5% bupivicaine. Sensory blockade at the level of T8 was similar in both techniques as were hypotension and postoperative hemorrhage. Differences occurred in the degree of motor blockade with a mean Bromage of 1 in the spinal group versus 3.8 in the epidural group ($p < 0.05$). Maximum cephalic spread was achieved in 13 minutes in the spinal group versus 21 minutes in the epidural group ($p<0.05$), and the dose of propofol required to produce adequate hypnosis was 1.95 mg/kg/hour in the spinal group versus 2.8 mg/kg/hour in the epidural group ($p<0.05$).

Conclusion: Spinal anesthesia proved to be superior to epidural anesthesia by providing lower incidence of patient movement.

Keywords: Spinal anesthesia, epidural anesthesia, transurethral resection of the prostate.

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Regional anesthesia, in the form of spinal and epidural anesthesia, has been extensively scrutinized.[1,2] Their complications as well as relative advantages have been compared in numerous studies.[1,2] The choice between techniques has also been the subject of the late eighties.[3] Although both techniques are widely used to provide anesthesia for transurethral resection of the prostate (TURP), no controlled trials conferring their merits have been carried out to evaluate efficacy, cardiovascular effect acceptability and complications.

Methods. Sixty-five patients listed for TURP were enrolled to the study. Patients with fixed cardiac output state, bleeding disorders, skeletal abnormalities of the spine or neurological disease were excluded.

The usual procedure at our hospital is to obtain a written consent from all patients upon admission to hospital after explaining the procedure to them. There is no ethical committee at our institution. The sample was chosen by enrolment of two cases of TURP per week through a simple random sampling method from the operating list. All patients were premedicated with oral diazepam 0.15 mg/kg, two hours preoperatively. One litre of Ringer lactate was given preoperatively. Baseline blood pressure was recorded using a non-invasive blood pressure monitor, followed by preparing for the anesthetic procedures, under aseptic technique, in the sitting position.

Using military identification numbers, patients with an odd identification number were allocated to the spinal group, while patients with an even identification number were allocated to the epidural group.

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In the epidural group, the epidural space was located at L3-4. Using an 18-gauge Tuohy needle and loss of resistance device (Portex), 15 ml of bupivicaine was injected through the Tuohy needle as two increments; a 5 ml test dose followed, four minutes later, by 10 ml injected over 60 seconds. A catheter was then introduced into the epidural space for supplementary Bupivicaine if required.

In the spinal group, lumber puncture was performed in the L3-4 interspace. Using a 25 gauge spinal needle, 2.5 ml of 0.5% isobaric Bupivicaine was injected over 10 seconds. The Dinamap was set to measure blood pressure at one-minute intervals. Following the injection, the patients were placed in the supine position and, 15 minutes later, the Dinamap was reset to record at five minutes intervals, which was continued throughout the duration of the procedure. The level of cephalic spread of anesthesia was measured using pinpricks at five-minute intervals until a maximum height was reached. The degree of motor blockade of the lower limbs was measured at five minute intervals using Bromage score[4] or until complete paralysis occurred (Table 1).

In the epidural group injection of the test dose was taken as time Zero. Hypnosis was achieved using Propofol 2 mg/kg/hour, and adjusted according to individual response. Intraoperative fluid therapy consisted of Ringer lactate for intraoperative hypotension, which is defined as systolic blood pressure less than 76% of baseline.

Continuous intraoperative monitoring was carried out by measuring oxygen saturation, ECG and non-invasive blood pressure monitoring. Results were analyzed using Student's t or Fischer's exact when appropriate. $P<0.05$ was considered statistically significant.

Results. Thirty-two patients were randomized to the epidural and 33 to the spinal group. The groups were similar with regard to age and weight (Table 2). One patient in the spinal group and two in the epidural group had an unsatisfactory level of sensory blockade and, following the institution of general anesthesia, were not subjected to further investigations. While the degree and duration of sensory blockade were similar (Table 3), there was a marked difference in the degree of motor blockade as indicated by the Bromage score. All patients in the spinal group had a Bromage score of 1 and all but one patient in the epidural group had a score of four, with the one exception having a score of 3. Two patients in the spinal and 9 in the epidural group ($p<0.05$) exhibited an acceptable degree of lower limb movement intraoperatively. There was no difference in the degree of hypotension, intraoperative or postoperative blood loss (Table 4). The Propofol required by the epidural group 2.89±1.5

Table 1 - The bromage score.

1	Complete paralysis
2	Movement of feet only
3	Slight flexion of knees
4	Full flexion of knees

Table 2 - Demographic data - spinal versus epidural anesthesia.

Demographic characteristic	Statistical measure	Spinal	Epidural	P value
Age (years)	Mean	69.4±14.8	69.7±17.3	>0.05
	Range	61-82	61-83	
Weight (kg)	Mean	77.8±14.3	77.4±8.8	>0.05
	Range	69-90	67-93	

Table 3 - Sensory blockade - spinal versus epidural anesthesia.

Variable	Statistical measure	Spinal	Epidural	P value
Mean height of sensory block	Mean	T8±2.2	T8±2.15	>0.05
	Range	T4-T12	T4-T12	
Time to maximum height (minutes)		13±7	21±4	>0.01
Time to two segment regression		3.74±0.85	3.46±1.03	>0.05

Table 4 - Degree of hypotension, intraoperative blood loss and postoperative drainage - spinal versus epidural anesthesia.

Variable	Spinal	Epidural	P value
% decrease of systolic blood pressure	18.5±11.1	20.3±9.3	>0.001
Intraoperative blood loss (ml)	320±120	390±140	>0.01
Postoperative blood loss (ml)	100±30	110±30	>0.0001

mg/kg/hour was greater than in the spinal group 1.95±0.8 mg/kg/hour ($p < 0.05$).

Discussion. The study has shown a number of advantages of spinal anesthesia over the epidural technique eg. the smaller dose of propofol required to produce hypnosis, less patient movement and the more rapid cephalic spread which enhances faster motor blockade. Furthermore, this study did not demonstrate decreased hemodynamic stability with the spinal route.

Patients in the epidural group were given an initial dose of 15 ml 0.5% bupivicaine with the facility to increase the dose via the epidural catheter. In this study, an acceptable sensory level was obtained in all but two patients. One patient developed unilateral block while the other had no appreciable loss of sensation after 40 minutes casting doubt on the site of injection. Given this, and the tendency to compartmentalization of the epidural space,[5] it appeared both futile and dangerous to increase the volume of bupivicaine via the catheter, and general anesthesia was instituted.

A major reason advanced for the preference of the extradural route is the threat of hypotension caused by the sudden and very extensive vasomotor block associated with the intrathecal route.[6] Numerous studies have demonstrated this phenomenon, but these have all been in obstetrical patients.[7,8]

The shorter time taken to achieve maximal cephalic spread in the spinal group is inconsequential when seen in the total context of rigorous preparation and draping routine for TURP in clean air enclosure. The Bromage score has been criticized as a qualitative indicator of motor blockade and does not evaluate the block quantitatively.[9] In this study however, there was good correlation between the different degrees of motor blockade, as measured by the Bromage score, and the difference in the number of patients exhibiting an unacceptable degree of movement. Two patients in the spinal group, with an initial Bromage score of 1, exhibited unacceptable lower limb movement intraoperatively in spite of adequate sensory blockade, indicating relatively brief motor blockade. The remainder of the spinal group of patients had complete relaxation throughout the procedure. A further difference between the groups was the higher dose of propofol required by patients in the epidural group. While the improved motor function produced by epidural anesthesia may be advantageous in terms of venous stasis, the absence of motor function produced by spinal anesthesia enhances better operating conditions for the surgeon. In conclusion, spinal anesthesia provided better operating conditions and required less supplemental hypnosis to produce satisfactory conditions. Whether the increased degree of motor function provided by the epidural technique imparts protection against deep vein thrombosis requires further investigations.

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