Transurethral resection of the prostate (TURP) with low dose spinal anesthesia in outpatients: a 5 year review

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Introduction: *Spinal anesthesia for ambulatory transurethral resection of the prostate (TURP) is a well established technique. The following study examines data over a 5 year period at a major Canadian tertiary academic center. The purpose of the study is to review our experience and complications associated with spinal anesthesia using combined low dose local anesthetic + narcotic for ambulatory TURP procedures.*

Methods: *Medical records were reviewed retrospectively on all ambulatory TURP patients over a 5 year period between January 2000 and September 2005 in our Surgical Day Care Center. All spinal anesthetics were reviewed and based on dosage, classified into low dose bupivacaine (< 10 mg; Group LD-B), conventional dose lidocaine (> 35 mg; Group CD-L) or low dose lidocaine (≤ 35 mg; Group LD-L). Primary end points of interest were duration of spinal block and duration of postanesthesia care unit (PACU) stay.*

Results: *A total of 1064 TURPs were performed during the study period. Within this cohort of 334 spinal anesthetics administered, 27 were excluded for lack of data leaving 307 cases for analysis. Patient demographics were normally distributed. Mean doses of spinal local anesthetics administered were: Group LD-B 7.3 ± 2 mg, Group CD-L 52.2 ± 13 mg and Group LD-L 29 ± 5.2 mg. Intrathecal fentanyl was often added to the local anesthetic as an adjunct. Block regression times (Group LD-B 273 ± 98 mins, Group CD-L 174 ± 47 mins and Group LD-L 159 ± 45 mins) and discharge times (Group LD-B 309 ± 94 mins, Group CD-L 230 ± 71 mins and Group LD-L 227 ± 75 mins) were significantly lesser in both lidocaine groups compared to Group LD-B ($p < 0.05$). The frequency of prolonged spinal blocks (> 3 hr) in Groups LD-L, CD-L and LD-B was 23%, 43% and 83% respectively ($p < 0.05$).*

Conclusion: *Low dose spinal anesthesia with bupivacaine and lidocaine were well tolerated for short duration TURP. Low dose bupivacaine and conventional dose lidocaine were associated with significantly longer block duration, longer PACU stay and higher frequency of prolonged blocks compared with low dose lidocaine for spinal anesthesia*

Key Words: transurethral resection of the prostate, spinal anesthesia, procedures

Introduction

Over the last three decades, transurethral resection of the prostate (TURP) has become well established as an outpatient procedure as its surgical complications are relatively low and well understood.[1,2] Spinal anesthesia is sometimes administered for TURP because some patients presenting for this operation are elderly and it also allows earlier detection of hyponatremia due to absorption of bladder irrigation fluids. Over the last two decades traditional techniques of spinal anesthesia utilizing conventional doses of local anesthetics have been replaced by combination techniques which rely on the synergistic relationship between an opioid and a low dose of local anesthetic in the intrathecal space.[3-5] In spite of these changes in spinal anesthetic practice there is very little detailed information on the use of low dose techniques for ambulatory TURP and their effect on postoperative recovery. The purpose of this report is to describe our 5 year experience with low

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dose spinal anesthesia for TURP in a major Canadian tertiary care center and identify potential perioperative complications.

Methods

After institutional ethics board approval, the hospital records of all patients who received spinal anesthesia for TURP at the Surgical Daycare Center (SDC) of Vancouver General Hospital from January 2000 to September 2005 were retrospectively reviewed. Data from the anesthetic records, pathology reports and postanesthesia care unit (PACU) records were collected by a single reviewer and entered into a spreadsheet program (Microsoft Excel). Demographic data collected were: patient's medical record number, age, weight and ASA status. Procedural data collected were: anesthesia start and end times, surgery start and end times, PACU entry and exit times, weight of prostate tissue resected, spinal anesthetic agents administered and dose. The primary end points of interest were duration of spinal block and duration of PACU stay. Spinal block height was documented by nursing staff in the PACU records at regular intervals (15 min) until resolution of the spinal anesthetic. Secondary end points of interest were complications such as conversion to GA, hypotension, bradycardia and pain. Patients were classified into three groups based on the dose of spinal local anesthetic administered and, in accordance with published studies:[4-9] low dose bupivacaine (< 10 mg; LD-B) group, conventional dose lidocaine (> 35 mg; CD-L) group and low dose lidocaine (≤ 35 mg; LD-L) group. Spinal block was initiated at L2-3, L3-4, L4-5 or L5-S1 based on patient characteristics and anesthesiologist's preference. Spinal needles used ranged from 27-22 Gauge and were either Quincke or Whitacre type (BD Medical, Franklin Lakes, New Jersey, USA). The choice of spinal anesthetic agent and additive medication was at the discretion of the attending anesthesiologist and is summarized in Table 1. Criteria for discharge from the PACU were:[7-8] orientation to person, time and place; stable vital signs for > 30 min; hemostasis of surgical area; absence of side effects; adequate pain control with oral analgesia; resolution of motor and sensory block; and able to ambulate and change clothes without assistance.

Statistical comparison among the three groups was performed using one way analysis of variance (ANOVA) followed by post-hoc two-group comparisons if the ANOVA was statistically significant. Post-hoc comparison was performed with Dunnett's C test. Data is expressed as mean ± standard deviation. A p value < 0.05 was considered statistically significant.

Results

During a 5 year period, 1064 patients underwent TURP in the SDC. Of these, 340 patients (32%) received spinal anesthesia and the rest received general anesthesia. We reviewed records for all spinal anesthesia patients and 33 cases were excluded due to incomplete data, leaving 307 cases that were suitable for analysis. Basic demographic data (age, weight, ASA class) were comparable in all three groups as were anesthesia preparation time and duration of surgery, Table 1. Weight of prostate tissue resected was significantly larger in Group LD-B versus Group CD-L ($p = 0.018$).

Of all the spinal anesthetics, six were converted to general anesthesia (1 in Group LD-B, 2 in Group CD-L

TABLE 1. **Patient demographics, procedural times and intrathecal agents (mean ± SD)**

	LD-B (n = 71)	**CD-L (n = 173)**	**LD-L (n = 63)**
Age (yrs)	71 ± 6	71 ± 7	72 ± 8
Wt (kg)	73 + 12	75 ± 13	75 ± 11
ASA class mean (range)	2 (1-3)	2 (1-4)	2 (1-4)
Anesthesia prep time (min)	14 ± 4	12 ± 4	12 ± 4
Surgery duration (min)	31 ± 14	28 ± 13	31 ± 20
Weight of prostate tissue resected (gm)	16 ± 27*	7 ± 14*	13 ± 60
Dose of local anesthetic (mg)	7.3 ± 2	52.2 ± 13	29 ± 5
Dose of intrathecal fentanyl (mcg)	23 ± 7	22 ± 5	21 ± 4

*p = 0.018 Group LD-B versus Group CD-L

TABLE 2. **Spinal recovery times, PACU duration, and admission for bleeding**

	Group LD-B (n = 71)	Group CD-L (n = 173)	Group LD-L (n = 63)
Block duration (min)* Mean ± SD	273.4 ± 98.5†	174.1 ± 47.6	159.5 ± 45.0
PACU stay (min)* Mean +SD	309.8 ± 94.8†	230.2 ± 71.9	227.9 ± 75.5
Spinal block > 3hr* N (%)	59 (83.1%)‡	75 (43.4%)§	15 (23.8%)§
Admission for bleeding N (%)	5 (7)	13 (7.5)	6 (9.5)

*p < 0.0005 Group LD-B versus Group CD-L versus Group LD-L
†p < 0.05 Group LD-B versus Group CD-L and Group LD-B versus Group LD-L
‡p < 0.0001 Group LD-B versus Group CD-L and Group LD-B versus Group LD-L
§p = 0.02 Group CD-L versus Group LD-L

and 3 in Group LD-L) due to inadequate block. Problems encountered in the operating room were hypotension (systolic blood pressure (SBP) < 90 mm Hg) requiring treatment with ephedrine in 22 patients (12 were in Group CD-L, 8 in Group LD-B and 2 in Group LD-L). Eleven patients experienced intraoperative bradycardia (HR < 50 bpm) requiring treatment with either atropine or glycopyrrolate (7 were in Group CD-L, 3 were in Group LD-B and 1 was in Group LD-L). One patient in Group LD-B developed a supraventricular tachycardia that was successfully treated with IV esmolol.

In the PACU, mean block height was T7-8 in all three groups on arrival. Data on the end points of interest, namely, duration of spinal block, duration of PACU stay and frequency of prolonged blocks is summarized in Table 2. Block duration was significantly longer in Group LD-B compared to Groups CD-L and LD-L ($p < 0.05$). Duration of PACU stay was also significantly longer in Group LD-B compared to Groups CD-L and LD-L ($p < 0.05$). The frequency of prolonged blocks (> 3 hr) was significantly more common in Group LD-B compared to Groups CD-L and LD-L ($p < 0.0001$), and in Group CD-L compared to Group LD-L ($p < 0.02$). Three patients in Group LD-B but none in Groups CD-L or LD-L were admitted for prolonged spinal blocks. Postoperatively, hypotension requiring treatment was seen in nine patients, bradycardia requiring treatment was seen in four patients and, hypertension requiring treatment was observed in seven patients. Excessive pain in the PACU requiring systemic opioid therapy was observed in 16 out of 307 (5%) patients. Twenty-four patients were admitted for surgical bleeding, Table 2, one for urethral false passage and one for dyspnea.

Discussion

This five-year review of spinal anesthesia demonstrated that low dose spinal anesthesia with bupivacaine or lidocaine mixed with low dose fentanyl was well tolerated and provided acceptable conditions for short duration TURP. Low dose bupivacaine was associated with significantly longer block duration, longer PACU stay and higher frequency of prolonged blocks (> 3 hr) compared with both lidocaine groups.

One of the concerns with the use of spinal anesthesia in outpatients is that compared to general anesthesia a prolonged block would delay time to discharge. Pavlin et al have shown that conventional dose spinal anesthesia is not as efficient as GA in terms of discharge planning in outpatients.[6] This may explain why spinal anesthesia was used in only 32% of patients in our series. In an attempt to improve the efficiency of spinal anesthesia, investigators have attempted to use lower doses of spinal local anesthetics in conjunction with intrathecal opioids.[3,5] In our institution we have demonstrated that, with low dose lidocaine spinal anesthesia, the recovery profile is comparable to GA with propofol or desflurane in patients undergoing short duration outpatient laparoscopic procedures.[7,8] Korhonen used low dose bupivacaine spinal anesthesia for outpatient knee arthroscopy with good success and demonstrated that it had a recovery profile comparable to GA with Desflurane.[9] More recently, Chen et al have demonstrated in 45 patients undergoing TURP that, low dose tetracaine spinal anesthesia was associated with fewer complications and a faster recovery compared with conventional dose spinal tetracaine.[5]

However, there are no large studies on low dose spinal techniques for outpatient TURP.

For TURP, it is customary to use conventional dose spinal anesthesia to provide good surgical conditions and avoid block failure. Our study demonstrated that 56% of the cases were managed with conventional dose lidocaine and the remainder with either low dose lidocaine or bupivacaine. This shift in clinical practice towards low dose techniques in combination with low dose opioids may be a reflection of a change in practice as more anesthesiologists are employing this technique. This study suggests that if low dose spinal anesthesia is employed for outpatient TURP, care should be taken to ensure that the anticipated duration of the procedure will be comparable to that seen in our institution (30 min). For TURP, lowering the dose of spinal local anesthetic can result in breakthrough sensation of bladder fullness and surgeons may have to accept lower bladder distension pressures.[10] Three patients in Group LD-L and one patient in Group LD-B were converted to GA due to bladder discomfort which would indicate a block failing to reach the T10 dermatome. In institutions where the duration of surgery is longer, low dose spinal anesthesia may not be a suitable technique and it may be necessary to consider conventional dose spinal anesthesia. Both urologists and anesthesiologists need to communicate effectively with respect to gland size and anticipated duration of surgery, thereby allowing selection of a spinal technique most likely to result in an optimal intraoperative and postoperative profile. An interesting finding of our series is that only 5% of cases required systemic opioids for postoperative pain. This beneficial effect of spinal anesthesia on postoperative analgesia warrants a randomized comparison with GA in future studies.

With respect to limitations of this study, this was a single center, retrospective review therefore results should be applied and interpreted with caution. The data was acquired through a chart review and therefore little information if any, was available in terms of postoperative complications after discharge from PACU. The choice of local anesthetic agent may also be dictated by considerations such as incidence of post discharge transient neurological symptoms (TRI) seen more often with lidocaine than with bupivacaine. Unfortunately, the design of this review did not afford us any mechanism to investigate this problem. Due to its retrospective nature, our study does not provide a rationale for selection of spinal anesthetic agent or dose. It is possible that patient comorbidities, surgery duration and extent of surgery as well as anesthesiologists preference may have had an influence on this decision. In addition, it is possible that our surgeons selected patients who required limited surgery. Hence, unrecognized confounders may be present and relevant. Other limitations such as selection bias were minimized by including all patients who had complete records. Although there are limitations with our study, this data can, be useful in the planning of future, prospective randomized trials which may help to validate our findings.

In conclusion, low dose spinal anesthesia with either bupivacaine or lidocaine was found to be an effective method of anesthesia for short duration outpatient TURP. Low dose bupivacaine and conventional dose lidocaine, however, appear to be associated with prolonged spinal blocks and longer recovery times in the PACU. Improved communication between urologists and anesthesiologists would facilitate rational selection of spinal techniques. □

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EDITORIAL COMMENT

This is a useful paper evaluating three types of spinal anesthetics used in patients undergoing TURP. This is a retrospective paper and the authors chose to look at specific parameters related to the procedure, recovery from anesthetic time and PACU duration. The patients received one of three anesthetic agents: low dose bupivicaine, continuous dose lidocaine or low dose lidocaine. Patients in the low dose lidocaine group had significantly shorter PACU stays when compared to the other two groups. There were no differences in readmission rates for bleeding in any of the groups.

This paper brings out an important point which the authors also acknowledge. Anesthesiologists and Urologists need to communicate effectively preoperatively, intraoperatively and postoperatively in the care of patients undergoing TURP. The surgeon must inform the anesthesiologist how large the gland is and how much resection time is needed. In this way, the best anesthetic agent, with the appropriate duration of action is given which will expedite the patient through the postoperative area to their discharge home. The authors have effectively shown that either low or continuous dose lidocaine is associated with shorter PACU stays when compared with bupivicaine.

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