Original Article

Spinal anesthesia for ureterorenoscopy and in situ lithotripsy for upper ureteric solitary pelvic calculi: An experience at POF hospital, Wah Cantt

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Objective
To evaluate the possibility of performing ureterorenoscopy and insitu lithotripsy for upper ureteric and solitary pelvic calculi under spinal anesthesia.
Methods
This descriptive study was conducted at POF Hospital, Wah Cant from June 2008 to December 2008. A total of 125 ASA-I patients, 75 male and 50 female, age ranging from 18 to 70 years, having upper ureteric or solitary pelvic calculi, were enrolled for the study. All received spinal anesthesia with 25G spinal needle at L3-4 interspace using 0.75% bupivacaine 15 mg and underwent ureterorenoscopy or insitu lithotripsy. Intraoperative and postoperative complications including hypotension, vomiting, pain on visual analgesia scale and duration of hospital stay were noted.
Results
All patients had a successful motor block of hip and knee and sensory block up to T8. All with the exception of 3 patients achieved adequate anesthesia for the procedures. Ten patients had hypotension and 4 had bradycardia intraoperatively. Vomiting occurred in 3 patients and PDPH in two. All patients were shifted to ward 4 hours post operatively after confirmation of complete reversal of block and hemodynamic stability. The average stay of all patients in the hospital was 36 hours.
Conclusions
Spinal anesthesia can be safely used for insitu lithotripsy of upper ureteric calculi and solitary renal pelvic calculi with decreased hospital stay and minimal post operative complications. (Rawal Med J 2009;34:210-212).
Keywords
Spinal anesthesia, ureteric calculi, ureterorenoscopy, insitu lithotripsy.

INTRODUCTION

Since its introduction in 1980, ureterorenoscopy (URS) and in situ lithotripsy are routine urological procedures. In modern urology, URS has become a successful technique in the management of ureteral stones.[1] Use of advanced technology and modern equipment has not only increased the success rate of this procedure but also widened its indications.[2] Spinal Anesthesia has recently been widely used for urologic operations.[3] It permits early recognition of complications like perforation, and helps to prevent complications associated with delayed immobilization. The height of anesthesia can be tailored along the natural curve of spinal cord by adjusting the patient position after administration of drug.[3] The aim of this study was to evaluate the usefulness and success of use of spinal anesthesia for upper urological procedures.

PATIENTS AND METHODS

This study was conducted at POF Hospital, Wah Cant from June 2008 to December 2008. 125 patients including 75 male and 50 female, ages ranging between 18 to 70 years, who were to undergo ureterorenoscopy or insitu lithotripsy for upper ureteric or solitary pelvic calculi and belonged to ASA 1 to III class were included in the study. Obese patients, any spinal deformity, mental disturbance and neurological disorder, and patients with multiple renal calculi or calculi accompanied with pelvic-ureteric junction calculi were excluded from the study. All patients were premedicated with Diazepam 5 mg orally on the night before surgery. Drug therapy for concomitant medical problems was continued as deemed appropriate. All patients were preloaded with 1 litre of fluid. All were monitored every 5 minutes for pulse, blood pressure, SpO_2 and ECG.

Subarachnoid block was performed with 25G Witacre needle at L3-4 interspace with patient in sitting position. Free flow of CSF was verified before and after the administration of 15 mg of

bupivacaine 0.75%. The direction of needle aperture was cranial during the injection. Immediately after the injection, all patients were kept in 15 trendelenberg position for 3 minute and then returned to supine lithotomy position. All subarachnoid blocks were performed by the same anesthesiologist. Hypotension (systolic BP <90 mmHg or 50 mmHg decrease from baseline) was treated with IV fluids and/or plasma expanders. Bradycardia (HR<50 bpm or decreased more than 20% from initial value) was treated with IV atropine 0.5mg. Other adverse effects like vomiting were recorded and treated accordingly. The level of sensory block defined by loss of sharp sensations using pinprick test was recorded at mid-clavicular line bilaterally. Motor block was assessed by testing the power of specific joints, L2 hip fexion and L3 knee extension. The sensory block was assessed at 5, 10, 20 and 30 minutes, end of operation and 2 hour after the injection. Pain was assessed by VAS.

All procedures were performed by the same urologist. The average time for the procedure ranged 30-45 minutes. Post operative pain was treated with inj nalbuphane 0.1 mg/kg IV body weight at the end of operation and inj ketorolac 100 mg IM 8 hourly. Headache was classified as PDPH if aggravated by erect or sitting position, relieved by lying flat, mainly occipital/frontal and increased on coughing, sneezing or lying flat. To prevent it, all patients were well hydrated post operatively, foot end elevated, advised to lay supine and tab paracetamol 2 tab TDS. The patients were discharged from recovery when resolution of motor block was complete. The discharge criteria from the ward were stable vital signs, no nausea or vomiting, and no severe pain or bleeding and motor block completely recovered.

RESULTS

All patients had a successful motor block of hip and knee after 3 minutes. The average level sensory block achieved was T8. Adequate sensory block was established within 5 minutes after the injection. The time of injection to start of procedure was 10 minutes. All patients with the exception of 3 achieved adequate anesthesia for the procedures. These three patients were supplemented with inj ketamine 2 mg/kg body weight to start the procedure. The duration of surgery ranged from 30 to 45 minutes. During the procedure, anxious patients were reassured and if needed were given inj dormicum 2 mg as anxiolytic. 10 patients had hypotension needing plasma expanders and vigorous fluid treatment. 4 patients had bradycardia intraoperatively which was treated with in atropine 0.5mg IV.

Complications like vomiting were encountered in 3 patients who were treated with an anti-emetic IV. The average time for total regression of block was 2.5 hours. 2 patients suffered from PDPH and were treated accordingly. All patients were shifted to ward 4 hours post operatively after confirmation of complete reversal of block and hemodynamic stability. The average stay of all patients in the hospital was 72 hours.

DISCUSSION

Spinal anaesthesia is unparalleled in the way, a small mass of drug, virtually devoid of systemic pharmacological effect, can produce profound, reproducible, surgical anesthesia.[3] The advantages include the ability to perform surgery on awake patient with decreased post operative somnolence and less risk of pulmonary aspiration. Initially spinal anesthesia was used only for mid to lower abdominal surgery but with recent research on change of patient posture after injection of drug has helped using spinal anesthesia for upper abdominal surgeries including laproscopic cholecystectomy, and upper renal surgery.[4,5] Spinal anesthesia has been associated with minimal post operative pain in these cases.

The treatment of kidney stones has changed significantly over the past two decades from primarily open surgical procedures to less invasive or completely non-invasive techniques.[6] URS is a vital procedure in the armamentarium of the modern day urologist for the management of ureteral and renal pathology.[7] Ureterorenoscopy has been most often used for the distal ureteral calculi. However advances in equipment have facilitated access to the proximal urinary tract and have broadened the indications for ureteroscopy.[8] The renal innervation is derived from T10 to L2 and, therefore, our level of

anesthesia ranging up to a maximum of T8 provided successful pain-free state for almost all of our patients.[9]

The change in posture immediately after the injection helped in achieving the adequate level of anesthesia. The natural curve of spinal cord not only helps us determine the approximate level of block achieved but also serves as a protection against the respiratory distress that might occur due to higher up spread of the drug.[10] Several studies have been previously done to study the effect of patient positioning on spinal anesthesia using hyperbaric local anaesthetic.[10] This effect of posture on the spread of local anesthetic has been in spinal anesthesia for laproscopic cholecystectomy.[11] Since all patients were preloaded with 1 litre of fluid, intra operative hypotension was minimal and easily manageable. This finding is supported by Corke *et al*. in their study who proposed that the hypotensive episodes after spinal anesthesia are shorter and easier to treat if the patients are pre-loaded with 1 litre or more of pre-anesthetic fluid.[12-14] Post operative complications like PDPH were almost negligible in our study due to the use of 25G spinal needle reducing to minimum the leak of spinal fluid from dural puncture.[15,16] The use of fine needle in conjunction with the intravenous administration of fluids, rest, elevation of foot end of bed reduced the spinal headache to minimal. All patients were comfortable with the procedure as they remained pain-free intra and post operatively and were satisfied with the outcome. Since they were shown their stone being fragmented and removed on endovision camera monitor, it advanced their confidence in their stone management. This resulted in few if any post operative complaints and reduced hospital stay.[17,18]

CONCLUSIONS

We used spinal anesthesia safely for insitu lithotripsy of upper ureteric calculi and solitary renal pelvic calculi with decreased hospital stay and minimal post operative complications.

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