



USG GUIDED PARAVERTEBRAL BLOCK FOR SURGICAL ANAESTHESIA IN PCNL : CASE SERIES STUDY

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ABSTRACT PCNL can be performed under general or regional anesthesia, with regional anesthesia being increasingly popular due to its advantages such as better analgesic coverage, reduced postoperative pain, and fewer side effects. The case series study on USG Paravertebral Block (PVB) for Surgical Anesthesia in Percutaneous Nephrolithotomy (PCNL) offers valuable insights into its effectiveness, safety, and patient outcomes. It demonstrates the effectiveness of PVB in reducing the need for general anesthesia, enhancing patient safety, and reducing risks associated with general anesthesia. PVB also offers economic and logistical benefits, such as cost-effectiveness and resource optimization. It is suitable for high-risk patients and can be customized to individual patient needs. The study also provides insights into the accuracy and safety of USG-guided techniques, its impact on postoperative recovery, and its contribution to literature.

KEYWORDS :

Introduction:

PCNL can be done both under general anaesthesia and under regional anaesthesia.[1] Regional anaesthesia has become popular now a days due to its advantages over general anaesthesia like good analgesic coverage, less postoperative pain, patient is awake to cooperate for change in position, less hemodynamic variations, no side effects of anaesthetic drugs, avoiding airway manipulation.[2] till now regional anesthesia included spinal and epidural anesthesia which have their own disadvantages like hypotension, bradycardia, intravascular injections. Newer blocks like paravertebral blocks are in use now a days as they have least hemodynamic variations, longer post operative analgesia and also as it is done under ultrasound guidance, there is least possibility of intravascular injections. The PVB involves injecting anesthetic near the paravertebral space where the thoracic spinal nerves exit the vertebrae. The anesthetized levels can provide visceral and somatic analgesia, which is beneficial for procedures involving the kidneys and surrounding structures. So far, Paravertebral block (PVB) has been used to provide postoperative analgesia for urological procedures. With PVB, we can achieve adequate somatic and visceral sensory blockade to provide anesthetic cover for PCNL. we need to block skin and muscle innervation in 10th and 11th intercostal space and also visceral nerves for the kidney and ureter that originate from T10 to L1 (11), **Somatic pain from incision site, T8-12.** Paravertebral block given at T8, T10 and T12 can cover these dermatomes making the surgery feasible (1) In this case report, we present the use of ultrasound-guided 3-segment PVB to provide surgical anesthetic cover for PCNL in ASA I patient.

Other techniques such as spinal epidural anesthesia provides analgesia, but also has some unwanted effects that would not occur with PVB, such as prolonged motor blockade, bowel movement impairment, nausea and vomiting. These advantages of PVB make it a better analgesic and anaesthetic technique.

Case 1:

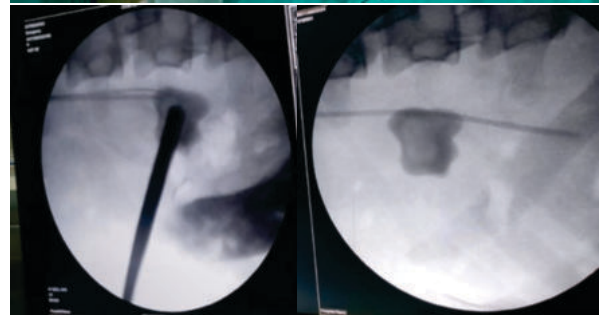
A 27-year-old man with a 3 x 3 cm calculus in the right renal pelvis was scheduled for percutaneous nephrolithotomy in gsvm medical college, Kanpur. He weighed 65 kg and was 162 cm tall. His ASA status was class 1. He was hemodynamically stable with HR : 90/min, BP: 120/70 mm hg, RR: 14/min, temp: afebrile, Spo2: 99 % room air. Systemic examination: R/S: bilateral clear, decreased air entry in base CVS: S1 S2 heard

Blood tests revealed WNL in the CBC, WNL in the Sr electrolytes, and 1.1 mg of Sr. creatinine in the ECG/ECHO.

After written, informed consent of patient and his family members and

after explaining the procedure, ultrasound-guided PVB was performed.

Patient was taken in operation theatre, Standard intraoperative monitoring was done with electrocardiography, pulse oximetry, non invasive blood pressure, temperature. 1 mg midazolam iv was given 10 minutes prior to the nerve block for patient's comfort during puncture. Oxygen was administered by facemask.



The patient was made to sit and a linear 10–18 MHz ultra sound probe was positioned paramedially over the space between two transverse processes. The transverse processes of the T8 and T9 vertebrae and the superior pleura and costo transverse ligament were visualised. 23 gauge spinal needle was inserted under ultrasonic guidance. The needle is advanced till it pops the superior costotransverse ligament. 7 mL bupivacaine hydrochloride was infiltrated into the paravertebral

space. The spread of the local anaesthetic agent over the pleura was seen, displacing it downwards. Similarly PVB was given at the level of T10/T11 and T12/L1 vertebra.

Under cystoscopic guidance, a ureteral stent was placed with use of topical anesthesia (5% lidocaine gel) in lithotomy position.

Sensory loss to pinprick from T8 to L2 was achieved 20 minutes after administration of block. Bromage scale was 1, 20 min after the block. The patient was then placed in prone position for surgery.

Patient did not complain of pain during the establishment of percutaneous tract, distension of the renal capsule and pelvic/cecal system and during placement of nephrostomy tubes. The duration of surgery was 90 min. vitals were stable through out the operation with HR: 88/min, BP: 118/72 mm Hg, RR: 14/min, Spo2: 99% oxygen by Hudson mask at 5 lit/min.

The pain scores using VAS were noted and found to be 0. The patient and surgeon satisfaction score was good. There was no nausea and vomiting and there was no need of giving medications for further pain relief.

Case 2:

A 57 year old female presented to us with bilateral flank pain diagnosed to have bilateral staghorn calculus posted for left sided PCNL. He weighed 59 kg and was 157 cm tall.

On examination: HR: 98/min regular, BP: 140/90 mm Hg, RR: 14/min, Spo2: 98% on room air.

Systemic examination: R/S: bilateral clear, decreased air entry in base
CVS: S1 S2 heard

Blood investigations:

CBC: WNL

Sr electrolytes: WNL

Sr. creatinine: 1.0 mg

ECG/ECHO: WNL

ASA status: I

Similar to case 1, we performed ultrasound guided paravertebral block at T8, T10 and T12 level.

Case 3:

A 50 year old male presented to us with right sided flank pain diagnosed to have staghorn calculus posted for right sided PCNL.

On examination: HR: 88/min regular, BP: 130/90 mm Hg, RR: 12/min, Spo2: 98% on room air.

Systemic examination: R/S: bilateral clear
CVS: S1 S2 heard

Blood investigations:

CBC: WNL

Sr electrolytes: WNL

Sr. creatinine: 1.2 mg

ECG/ECHO: WNL

ASA status: I

Similar to case 1, we performed ultrasound guided paravertebral block at T8, T10 and T12 level.



DISCUSSION:

For PCNL, we need to block somatic nerves innervating skin and muscle tissue, also visceral nerves that innervate kidney and ureters (T10 to L1). The tract for lithotripsy is made in 10th to 11th intercostal space, or in the subcostal region[3]. somatic pain from incision site occurs from T8 to L2. Sensory nerves in this area are readily blocked by thoracic PVB.[4] Based on this anatomical knowledge, complete blockade of unilateral spinal nerves from T8 to L2 can provide sufficient analgesia during PCNL. In order to ensure complete blockade from T8 to L2, we injected local anaesthetic at (T8/T9, T10/T11, and T12/L1) under ultrasound guidance. The key point in the procedure is to identify the costotransverse ligament, as the anesthetic agent is required to be injected under it. For PVB, the level of vertebrae is usually identified by palpation.[5] Every 3 to 4 mL of local anesthetic induces loss of somatic sensation in 1 dermatome on PVB.[6,7] Therefore 7 ml of 0.5% bupivacaine was injected at each segment. patient achieved sensory block from T8 to L2, which was adequate for PCNL.

Similar to our case report, Yong Liu et al performed ultrasound-guided paravertebral block. Seven to 10 mL of 0.5% ropivacaine was injected at T10/T11, T11/T12, and T12/L1 paravertebral place, respectively and found that percutaneous nephrolithotomy was performed successfully under ultrasound guided 3-segment lumbar-thoracic paravertebral block.[1]

Ferda Yaman et al also showed that Ultrasound-guided PVB using bupivacaine by in-plane technique provides effective analgesia in PCNL. It is associated with high scores on patient satisfaction and minimal complications.[8]

Yayik et al. investigated analgesia procured through PVB vs peritubal infiltration. VAS score was lower in the PVB group than the peritubal infiltration group. PVB was performed in prone position. 0.25% bupivacaine was injected at T8-9 after the surgery was over.[9]

Baldea et al. did a study in which PVB block was performed at the level of T10 by means of a single injection of 20 mL 0.5% bupivacaine. The block was performed in sitting position under ultrasound guidance. Rescue analgesia in the form of opioids was given at 120 min postoperatively.[10]

Ak K, Gursoy S et al studied that levobupivacaine used in Thoracic PVB provided a good postoperative analgesia and good patient satisfaction score for patients with percutaneous nephrolithotomy.[11]

Some limitations of our study are that Multiple punctures may lead to patient discomfort as well as increase the risk of pleural puncture. Whether 1 level or 2 levels of block is sufficient and comparable to 3 levels of block has to be clarified. If so, which level/levels is/are most suitable is another question. we did not perform continuous paravertebral nerve block for postoperative analgesia.

CONCLUSION

In conclusion, multilevel USG Guided PVB can provide anaesthetic cover for PCNL. This technique is a good alternative for patients with increased risk of postoperative complications following general or neuraxial anesthesia.

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