

## Post operative pain control in percutaneous nephrolithotomy

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### Abstract

**Objective:** To evaluate post-surgery pain relief in percutaneous nephrolithotomy cases.

**Methods:** The case-control study was conducted at Indus Hospital, Karachi, from July 2014 to July 2015, and comprised patients undergoing percutaneous nephrolithotomy. The patients were randomized by snose protocol into two equal groups of cases and controls. The cases were given peri-tubal local anaesthetic infiltration of 0.25% bupivacaine, while the controls were given 10ml 0.9% normal saline infiltration. Post-operative pain was assessed using visual analogue scale.

**Result:** Of the 68 patients, there were 34(50) in each of the two groups. Pain score was significantly less in the intervention group post-operatively at 6th and 12th hours ( $p < 0.05$ ). Also, total consumption of analgesics and demand of analgesic medication were also significantly low among the cases ( $p < 0.05$ ).

**Conclusion:** Bupivacaine infiltration into the peri-tubal track significantly reduced post-operative pain.

**Keywords:** Post PCNL Pain relief. (JPMA 68: 702; 2018)

### Introduction

Percutaneous nephrolithotomy (PCNL) is the gold standard endourologic procedure for patients with renal calculi more than 2cm in size.<sup>1</sup> It is less invasive, less painful, with shorter hospital stay compared to open pyelolithotomy and it is also associated with lower morbidity and early recovery.<sup>2-4</sup> Percutaneous nephrostomy (PCN) tube is inserted into the collecting system at the conclusion of surgery. This causes post-operative pain and discomfort, therefore administration of parenteral analgesia is required.<sup>2,5</sup>

Inadequate analgesia leads to delayed mobilisation, impaired ventilation and prolonged hospitalisation. Infiltration of 0.25% bupivacaine into renal capsule along the nephrostomy track reduces post-operative pain.<sup>3</sup> In post-operative period, use of different analgesics, non-steroidal anti-inflammatory drug (NSAID) or opioids in the form of enteral and parenteral have side effects and it is suggested that their use should be limited. As an alternative, infiltration 0.25% bupivacaine (local anaesthetic agent) during surgery along the tract reduces post-operative pain and subsequently limits the use of NSAIDs or opioids as rescue analgesics. The current study was planned to determine the efficacy of 0.25% bupivacaine into renal capsule along the nephrostomy tract.

### Patients and Methods

The randomized control trial was conducted at the

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Indus Hospital, Karachi, from July 2014 to July 2015, and comprised patients undergoing PCNL. After taking approval from the institutional review board, sample size was calculated using open Epi software based on literature.<sup>6</sup> Level of significance was kept at 0.01 to maximise our sample size with power of 0.90. Patients aged 18-60 years with single PCNL track were included. Patients who had history of spinal disc prolapse, previous open renal surgery, and post-operative complication like hydrothorax that required intervention, pneumothorax, massive haemorrhage that required more than 1 U transfusion and conversion to open procedure were excluded. Patients who met the inclusion criteria were randomised using sequentially numbered, opaque sealed envelopes (SNOSE).<sup>7</sup> After giving general anaesthesia to patients in lithotomy position, retrograde pyelogram (RGP) was done and ureteric catheter was inserted. Then in prone position calyceal puncture was done with spinal needle 18G, 0.35 inch guide wire was placed through spinal needle and serial metallic dilatation up to 30F was done. Then 26F nephroscope was introduced and stones were fragmented with lithoclast and taken out with forceps. At the end of procedure 22F PCN tube was placed in the tract and secured. Patients who were allocated to intervention group received 10ml 0.25% bupivacaine from renal capsule to skin with 23G spinal along the PCN tube. Those allocated to the control group received 10ml normal saline.

Post-operatively patients were given diclofenac 50mg rectal suppository three times a day. Patients who

complained of further pain were assessed by doctors using visual analogue scale (VAS). Score and time of demand was noted and Inj nalbuphine 5 mg intravenous (IV) was given as rescue analgesic. Pain was also assessed at 6th and 12th hour postoperatively with VAS.

Data was analysed using SPSS 21. Shapiro Wilk's test was used to check the normality of continuous variables. Mean or Median were computed for continuous variables as appropriate. Frequency and percentage were computed for categorical variables. Independent sample t-test or Mann-Whitney U test was applied as appropriate to check significant difference in the age, weight and time for demand of rescue analgesic between the groups.  $P < 0.05$  was considered significant.

**Result**

Of the 68 patients, there were 34(50%) each in the two groups. The overall mean age was  $37.57 \pm 12.87$  years. In intervention group, 20(60.0%) patients requested rescue analgesic compared to 30(87.5%) in the control group ( $p = 0.013$ ). The difference in pain at 6th and 12th hour was also significant between the groups ( $p = 0.001$ ). There was significant difference in total consumption of rescue medication between the groups (4.1mg vs. 16.25mg;  $p = 0.001$ ) (Table).

The mean duration of first rescue analgesic requirement was 5.1 hours in the intervention group and 6.8 hours in the control group ( $p = 0.332$ ).

**Table:** Comparison between intervention and control group.

|  | Intervention group<br>N=34 | Control group<br>N=34 | P value |
|--|----------------------------|-----------------------|---------|
| VAS at 6th hour                                  |                            |                       |         |
| ≤4   | 76.70%                     | 32.30%                | 0.001   |
| ≥4   | 23.30%                     | 67.7                  |         |
| VAS at 12th hour                                 |                            |                       |         |
| ≤4   | 73.30%                     | 23.30%                | 0.001   |
| ≥4   | 26.70%                     | 76.70%                |         |
| Total consumption of rescue analgesic            | 4.1±4.37gm                 | 16.25±8.98gm          | 0.001   |
| Patient requested for rescue analgesic           |                            |                       |         |
| Yes  | 60%                        | 87.50%                | 0.013   |
| No   | 40%                        | 12.50%                |         |
| Mean duration of first rescue analgesia in hours | 6.83±4.74                  | 5.14±6.23             | 0.332   |

VAS: Visual Analogue Scale.

**Discussion**

There is a dramatic shift in the management of urinary calculus over the last few decades from open to percutaneous approaches.<sup>8</sup> In post-operative period pain is the most bothersome problem for patients. There are different ways to keep the patient pain-free after post-operative period such as subcutaneous infiltration, tract infiltration with local anaesthetic agents, and systemic analgesics enteral or parenteral. Enteral and parenteral analgesic causes systemic side effects. Simple skin infiltration with local anaesthetic around the nephrostomy tube doesn't significantly reduce pain. Infiltration into renal capsule along the nephrostomy tract reduces pain and limits the use of enteral or parenteral analgesic medication in post-operative period. A prospective randomised study showed local anaesthetic infiltration along the PCN tube as effective in managing pain immediately after surgery and in dealing with pain that occurs late in the recovery period.<sup>9</sup> Another prospective randomised control trial found prilocaine 2% infiltration into peri-tubal track to be effective in post-operative pain management.<sup>10</sup>

A randomised control trial was conducted to determine the efficacy of levo-bupivacaine infiltration to nephrostomy tract in combination with IV paracetamol on post-operative period for pain management.<sup>11</sup> It found fewer requirements of opioids medication as rescue analgesic which is comparable to our study.

Another study showed opioids as analgesic could further decrease pain with the infiltration of a local anaesthetic.<sup>12</sup>

In a prospective randomised double blind study, the first demand of analgesia in the study group was delayed and total rescue analgesic consumption were decreased.<sup>13</sup>

The small sample size was a limitation of the current study.

**Conclusion**

The study found that 0.25% bupivacaine infiltration into the peritubal track statistically reduced the demand of rescue analgesia in post-operative period and decreased pain intensity on VAS at 6th and 12th hours.

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**Conflict of Interest:** None.

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**References**

- Zanetti SP, Boeri L, Catellani M, Gallioli A, Trinchieri A, Sarica K, et al. Retrograde intrarenal surgery (RIRS), regular and small sized percutaneous nephrolithotomy (PCNL) in daily practice: European

- Association of Urology Section of Urolithiasis (EULIS) Survey. Arch Ital Urol Androl. 2016; 88:212-6.
2. Akbay EK, Koç G, Filiz ND, Ün S, Akdeniz F, Y?lmaz Y. Does a prilocaine 2% injection into the nephrostomy tract have a role in acute pain management after a lower caliceal puncture during a percutaneous nephrolithotomy? A prospective randomized study with 100 patients. Turk J Urol. 2012; 38: 70-3.
  3. Gokten OE, Kilicarslan H, Dogan HS, Turker G, Kordan Y. Efficacy of levobupivacaine infiltration to nephrostomy tract in combination with intravenous paracetamol on postoperative analgesia in percutaneous nephrolithotomy patients. J Endourol. 2011; 25: 35-9.
  4. Haleblian GE, Sur RL, Albala DM, Preminger GM. Subcutaneous bupivacaine infiltration and postoperative pain perception after percutaneous nephrolithotomy. J Urol. 2007; 178:925-8.
  5. Murthy P, Nirmala J, Reddy KB, Ramreddy C, Devraj R, Vidyasagar S, et al. 274: Role of Peritubal Bupivacaine Infiltration in Alleviating Post operative Pain: After Percutaneous Nephrolithotomy. Indian J Urol. 2008; 24:s139.
  6. Jonnavithula N, Pisapati MV, Durga P, Krishnamurthy V, Chilumu R, Reddy B. Efficacy of peritubal local nephrolithotomy (PCNL). Urolithiasis Springer; 2012,pp 417-26.
  9. Shim M, Park M, Park HK. Effects of Continuous Peritubal Local Anesthetic Instillation on Postoperative Pain After Percutaneous Nephrolithotomy: A Prospective, Randomized Three-Arm Study. J Endo. 2016; 30: 504-9.
  10. Akbay EK, Koç G, Filiz ND, Ün S, Akdeniz F, Y?lmaz Y, et al. Does a prilocaine 2% injection into the nephrostomy tract have a role in acute pain management after a lower caliceal puncture during a percutaneous nephrolithotomy? A prospective randomized study with 100 patients. Turk J Urology. 2012; 38:70-3.
  11. Gokten OE, Kilicarslan H, Dogan HS, Turker G, Kordan Y. Efficacy of levobupivacaine infiltration to nephrostomy tract in combination with intravenous paracetamol on postoperative analgesia in percutaneous nephrolithotomy patients. J Endo. 2011; 25:35-9.
  12. Haleblian GE, Sur RL, Albala DM, Preminger GM. Subcutaneous bupivacaine infiltration and postoperative pain perception after percutaneous nephrolithotomy. J Urol. 2007; 178:925-8.
  13. Parikh GP, Shah VR, Modi MP, Chauhan NC. The analgesic efficacy of peritubal infiltration of 0.25% bupivacaine in percutaneous nephrolithotomy-A prospective randomized study. J Anaesthesiol Clin Pharmacol. 2011; 27:481-4.
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