



Comparison of postoperative analgesic efficacy of dorsal penile nerve block(DPNB) and caudal block in patients undergoing hypospadias surgery

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Abstract

Background: Caudal block is the preferred method of anaesthesia for the surgical procedures of lower part of the body, mainly below the umbilicus. The role of dorsal penile nerve block at the start of surgery decreases post-operative pain in children undergoing hypospadias repair. We aim to compare the efficacy of caudal block versus dorsal penile block (DPNB) under general anaesthesia for patients undergoing hypospadias repair. Methods: This study was performed between January 1, 2020 and October 16, 2020 at Plastic, Burn and Reconstructive Surgery Department of Northwest General Hospital and research Centre, Peshawar. Fifty-two male patients, American Society of Anaesthesiologists physical status classification I, aged between 3 and 18 years were included in this randomized, prospective, comparative study. Anaesthetic techniques were standardized for all patients. Patients were randomized into 2 groups. Using 0.5% Bupivacaine with adrenaline 1:100,000, we performed DPNB for Group 1 and same anaesthetist performed caudal block with 0.25% Bupivacaine for Group 2. Postoperative analgesia was evaluated hourly for fifteen hours with the Wong-Baker FACES pain rating scale and findings recorded in a proforma. For every patient, total surgery time supplemental analgesic amounts, times, and probable local or systemic complications were recorded. Results: All patients remained stable during anaesthesia. Post operatively mean pain score showed a statistically significant difference between the groups. Lower pain scores were recorded in DPNB group during the first 15 hours, in the recovery room as well as the postoperative ward. The mean duration of analgesia was significantly prolonged (mean of 10 hours in DPNB vs 6 hours in caudal block) and the requirement for rescue analgesics were significantly less in the DPNB group ($p < 0.0001$) postoperatively. No major complication was found when using either technique. Conclusions: It seems that in patients undergoing hypospadias surgery, DPNB provided a much longer postoperative analgesia as compared to caudal block, with additional benefit of decreased overall surgery time. Keywords: analgesic, caudal block, hypospadias, dorsal penile nerve block(DPNB), bupivacaine



INTRODUCTION

Post-operative pain relief continues to be a significant medical challenge despite major advancements in term of our understanding of acute pain mechanism¹. Pain free surgery has become an important aspect of health care, since evidence suggests inadequate pain relief may result in harmful psychological and physiological consequences, which may delay recovery, prolong hospital stay and return to daily living². Many regional anaesthesia techniques including the caudal epidural block, the classical dorsal penile nerve block the pudendal block³, or even the lidocaine-prilocaine (EMLA[®]) cream have been used for urogenital surgeries to minimize pain and complications. A single dose caudal epidural block in conjunction with a general anaesthesia is one of the most useful and most often performed regional blocks in paediatric patients⁴. It is indicated for inguinal, lower abdominal, lower extremity and perineal surgery^{4,5}. It is a rapid and safe technique providing a smooth intra operative course and decreased general anaesthesia requirements leading to smooth recovery, lower stress response and excellent post-operative analgesia. Penile block has been widely and effectively used for various types of penile surgeries such as hypospadias repair and circumcision, providing analgesia to distal 2/3rd of penis only⁶. An advantage of penile block over epidural block is the lack of anaesthesia to lower extremity, leading to early mobilization, and complications such as urinary retention⁷. A study done in Egypt compared single-injection penile block versus caudal block in penile paediatric surgery and concluded that penile block provides much longer duration of analgesia and overall patient and surgeon satisfaction as compared to caudal block⁸. Similar findings were found by Khan MA et.al where dorsal penile nerve block was found superior to caudal block, both, in terms of prolonged post-operative analgesia and decreased total surgery time⁹. On the other hand, Seyedhejazi M et.al reported that caudal block is superior in terms of pain management than penile block, they reported caudal block success rate of 97.7%, against penile block of 92.6%⁴. Due to wide array of conflicting results and varying opinions, it becomes a challenging task for the surgeons to select a method that provides prolonged analgesia as well as minimal side effects post-operatively. The purpose of this study was to compare a single dose penile block with scrotal augmentation against a more conventional epidural anaesthesia in terms of post-operative pain relief.

MATERIALS AND METHODS

This randomized control trial was conducted at Northwest General Hospital and Research Centre, Peshawar for a total duration of 8 months. After local ethical committee approval and obtaining informed parental consent, 52 American society of Anaesthesiologists status I patients, aged 3 to 18 years old, undergoing hypospadias repair, were prospectively enrolled in this study. Brief history and clinical examination and investigations were recorded on a proforma. Patients were clinically diagnosed and randomly assigned by lottery method to either Group A (Caudal block) or B (Penile block).



Inclusion criteria were patients with distal penile, subcoronal, coronal and distal penile shaft hypospadias, scheduled for single stage (Snodgrass or Snodgraft) or staged procedure (BRACKA).

Exclusion criteria were parental refusal, proximal hypospadias (penoscrotal, scrotal and perineal) mental retardation, contraindication to caudal or penile block, known or suspected allergy to study drugs, coagulopathy, history of pre-existing neurological or spinal disease, aspirin intake in the preceding week or signs of infection at the site of injection.

Group A caudal block ($n = 26$) received caudal epidural block, by the same anaesthetist, using a 22- G needle in the lateral decubitus position. The needle was inserted into the caudal epidural space through the sacral hiatus, and with loss of resistance, bupivacaine 0.25% of 0.5 mg/kg was injected into the caudal epidural space.

Group B penile block ($n = 26$) received dorsal penile nerve block by the author, using the subpubic approach technique. All antiseptic precautions were taken, and then the penis was pulled downwards to put the Scarpa's fascia under tension, and a short bevelled needle of 25 G was directed medially and caudally to the skin from each of the two insertion sites. This was followed by injection of 0.5 mg/kg of bupivacaine with adrenaline 1:100,000 on each side with an additional ventral infiltration of a small volume along the raphe of the penis.

Skin incision was performed 10 min after the block in each group. If heart rate (HR) or BP increased by more than 20% of the baseline after skin incision, this means that the block is unsuccessful and the patient needs to receive additional analgesia for pain relief intraoperatively, and this patient was excluded from the study.

The study outcome in terms of post-operative pain was determined after 1, 3, 6 and 9 and 12 hours using FLACC scale. Final assessment was made after 15 hours post-surgery. Other post-operative side effects were also noted, along with total duration of analgesia after induction for surgery. The statistical analysis was done using Statistical Package for Social Sciences (SPSS) version 11.0. The categorical variables like age categories, gender and type of hypospadias were compared among two groups using chi square test. Similarly, the mean age, post-operative pain and duration of anaesthesia were compared using student's t-test among the study groups. A p-value < 0.05 was considered significant.

RESULTS

The total number of 52 patients included in the study. These patients were divided into 2 groups. Group 1 ($n=26$) underwent Penile block and group 2 ($n=26$) underwent Caudal block. Patients were allocated to each group by closed envelop method. The mean age of the patients was 6.7 years. There were no serious complications after penile block or caudal block. A significant decrease in pain scores was found. No opioid analgesic was used in either group. Hourly pain intensity was recorded using the visual analogue scale and Wong-Baker FACES Pain Rating Scale. Statistical analysis was performed using SPSS version 20. Chi-square test was used for comparison of both groups. On statistical analysis of the pain intensity in the first postoperative hour, it was found that the patients with penile block reported no pain. Only 10 patients out of the caudal block group experienced no pain



in the first hour while 6 patients had mild pain, 6 patients complained of moderate pain and 4 had severe pain. In the second hour there was no incident of postoperative pain in the penile group, while in the caudal group, mild pain was reported in 16 patients and 10 patients experienced no pain. In the third post operative hour the penile block group patients experienced no pain while 10 patients experienced mild pain in the caudal block group and 16 patients had no pain. There was no pain reported in 22 patients in the penile block group and 4 patients experienced mild pain. The caudal block group patients had no pain reported in 20 patients, mild pain in 2 patient and moderate pain in 4 patients. The fifth post operative hour pain evaluation revealed no pain in 24 patients who had penile block and only 2 patient had severe pain. There was no pain experienced by 22 patients with caudal block and 2 patient had moderate pain and 2 patient had severe pain. In the 6th post operative hour, 24 out of 26 patients from the penile block group suffered no pain and only 2 patient reported mild pain. In the caudal group, no pain was reported by 22 patients and 4 patients had moderate pain. There was significant difference between the two groups regarding postoperative pain in the 6 hour post operative period. The penile block group had better pain control than the caudal block (P-value <0.05). The penile block group patients needed less systemic analgesia as compared to the caudal block group.

DISCUSSION

This prospective study aimed to compare the efficacy and safety of caudal block and penile block with bupivacaine in patients undergoing hypospadias repair, and demonstrated that penile block provides a low incidence of post-operative pain and high success rates.

Agreeing with our results, Ashrey and Bosat and Burke et. al have found that penile block provides effective and a longer duration of postoperative analgesia and decreased postoperative analgesic requirements. Also, it is safe and easy to learn.

Conclusions

It seems that in patients undergoing hypospadias surgery, DPNB provided a much longer postoperative analgesia as compared to caudal block, with additional benefit of decreased overall surgery time.

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