Assessing the Adequacy of Post-Operative Analgesia in Pediatric Patients Undergoing Ureteroneocystostomy – A Retrospective Review

Author(s): Gatha N, Ehlers M, Kogan B

Affiliation(s): Albany Medical Center, Albany, NY

Introduction: Ureteroneocystostomy is a procedure that is commonly done in children who experience vesicoureteral reflux. Minimizing pain post-operatively is obviously a major priority in these patients. A literature review of current anesthetic practice indicates that most institutions provide pain control for these patients with either one-shot caudal blockade with the addition of high dose narcotics, or continuous epidural analgesia.[1] In our institution, pain control is achieved almost exclusively with caudal blockade and ketorolac around the clock (ATC) for 24 hours (unless there are contraindications to either), with minimal use of narcotics. The aim of this study was to determine if the pain control is adequate in our center in these patients. The importance of this study is to establish whether or not invasive, and expensive, measures such as an epidural,[2] or stronger medications with known side effects, such as narcotics, are necessary for this set of pediatric patients.

Methods: An institutional retrospective review was performed during a 21-month period in which 81 patients underwent ureteroneocystostomy by the same surgeon (intravesical if bilateral, extravesical if one-sided). The primary outcome measure was pain control, which was measured objectively using the FLACC scale for patients unable to report pain or follow instructions for use of assessment tools, or the FACES scale for patients able to utilize this tool. Average pain scales were measured for patients who received caudal block, with and without minimal narcotics. Eight patients, who were given high-dose narcotics, or not receiving caudal block, were not included in the primary analysis. We also compared whether patients receiving even minimal narcotics vs no narcotics had a difference in post-operative pain ratings. Secondary variables included lateralization of procedure, length of anesthesia, surgical complications, as well as age and sex of patients. Regression analysis was performed to identify whether any of these variables were correlated with post-operative pain scales.

Results: Pain management in our group of patients, who received only a caudal block and Ketorolac prn, with occasional use of low-dose narcotics, was determined to be effective. Average pain ratings (on a scale of 0-10 via either the FLACC or FACES scale) were 0.42 and 1.5 immediately post-op and 30 minutes post-op respectively. Average pain ratings were 1.65, 1.03, 0.26, 0.16, and 0.1 for 1, 4, 8, 12, and 24 hours post-op, respectively. This shows that post-operative pain control is adequate in our institution with this less invasive technique. There was no statistically significant (95% confidence interval) intergroup variability in pain between the groups receiving none vs. minimal narcotics, nor was there any association between higher pain and age, sex, bilateral vs. unilateral procedure, or length of anesthesia. There was however a statistically significant difference in pain noted in those patients who had complications during their surgery.

Discussion: Although analgesia should be tailored to each patient individually, we concluded that caudal block with ketorolac ATC, with or without minimal narcotics, does provide adequate pain relief for pediatric patients undergoing ureteroneocystostomy overall. This is important because many other institutions currently use epidural catheters, or higher dose narcotics for pain control in these patients, which both have significant problems. Epidural pain control in this same group of patients has been shown to provide adequate pain management, and allow patients to tolerate a regular diet faster than just a caudal block,[3] but the complications and cost outweigh these things. The cost of an epidural is $708, vs $122 for a standard regimen of pain control post operatively.[4] Epidurals have also been shown to

lead to increased incidence of fever,[2] or other complications such as intolerance or malpositioning, which lead to the catheter having to be removed.[2] In addition, the use of Ketorolac has proven benefit in pediatric patients undergoing ureteroneocystostomy. In a study by Gonzalez et al, Ketorolac was shown to lead to shorter lengths of stay than narcotics alone,[5] partly due to the decreased need for narcotics. Ketorolac has also been proven to lead to decreased post-operative bladder spasm in these patients, which is a desirable effect for this procedure as increased bladder spasm can lead to post-operative complicataions.[1] While there have been some reports of Ketorolac causing bleeding and renal insufficiency, it has been proven in pediatric patients undergoing ureteroneocystostomy that this risk is insignificant.[6] Therefore, based on our findings, in addition to previous literature, we conclude that properly administered caudal blocks with prn Ketorolac, is a safe, effective form of analgesia for this patient set. The increased risks and costs of other, more widely used techniques are not warranted in the majority of these patients.

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