

Analgesia for Children with Acute Abdominal Pain in the Emergency Department

Adi Klein-Kremer MD^a, Ran D. Goldman MD^a

^a *Pediatric Research in Emergency Therapeutics (PRETx) Program, Division of Pediatric Emergency Medicine, and Division of Clinical Pharmacology and Toxicology, The Hospital for Sick Children, Department of Pediatrics, University of Toronto, Toronto, Canada*

Abstract

One of the most common complaints in the pediatric emergency department is acute abdominal pain and 15% of school aged children are brought to a physician with a chief complaint of abdominal pain [1]. Appendicitis is a common, serious pediatric abdominal emergency and is diagnosed in 7% of children during their lifetime [2,3]. In the past, recommendations were to suspend analgesia in children suspected of having surgical emergencies in order to avoid masking physical signs prior to surgical evaluation [4,5]. These recommendations had been recently challenged and current evidence does not support withholding analgesia in these children. This review discusses the effects of opioid analgesia administration on children with acute abdominal pain on the pain relief, and on the diagnostic accuracy of their illness.

MeSH Words: Opioids, Children; Abdominal Pain, Emergency Department

Pharmacologic Analgesia

Pain is an important symptom that deserves treatment in order to relieve suffering. There is current evidence that treatment with opioid analgesia affects pain perception in children [4-9]. Green and colleagues [6] demonstrated a clinical, statistically significant difference in pain perception between children treated with opioid analgesia compared to placebo in children 5-16 years old who presented to the emergency department with a chief complaint of acute abdominal pain. Pain was assessed with a color

analog scale before and after study medication administration in this double-blind, placebo-controlled trial.

In another prospective randomized double blind placebo controlled trial [7], 104 children were randomized to receive either buccal oxycodone or normal saline, and the pain assessment was made by a visual analog scale. Pain relief was significantly better in the oxycodone group (mean difference 13 cm), even though the placebo effect was also significant compared to baseline at 30 minutes after administration. At

60 minutes, oxycodone performed significantly better than placebo which is consistent with pharmacokinetics of buccal oxycodone. [8]

In our group's previous study [9], we retrospectively collected data on children 0-16 years old and information on analgesia administration in the pediatric ED, and the physician's suspected probability of appendicitis. Analgesia was given significantly more often to children with high probability of appendicitis, yet only in half of the cases, and only 15 % received opioids.

Safety of opioids for acute abdominal pain

The adverse events associated with opioids in acute abdominal pain merits further investigation. In a study by Koki et al. [7], there were only two adverse events to buccal oxycodone (one child had a headache and one had urticaria) but the sample size was small (32 children). Porter et al. [11] studied analgesic efficacy and the incidence of clinically significant adverse drug reaction in 110 pediatric patients receiving continuous intravenous morphine infusions for acute postoperative pain [10]. The most common adverse drug reactions associated with morphine infusions were inadequate analgesia in the first 24 hours (65.5%) and nausea/vomiting (42.5%). There were no cases of respiratory depression (CI= 0-3.3). Other adverse reactions included urinary retention (13.5%), pruritus (12.7%), dysphoria (7.3%), hypoxemia (4.5%), and difficulty in arousal (0.9%). Discontinuation of the morphine treatment for adverse drug reaction was recorded in 3.6% of the children [10].

We are unaware of any multicenter trial with a very large sample size that has evaluated the adverse outcomes of patient who receive opioids for acute abdominal pain. However, a significant body of evidence exists on the lack of addiction to morphine. Among more than 11,000 patients from Boston, given narcotics during a hospital stay, only 4 had developed an opioid dependence providing sufficient evidence on lack of addiction to morphine [11].

Diagnostic accuracy after opioid administration

Green and colleagues [6] examined whether early treatment with analgesia would result in

missed diagnosis, delayed treatment or increase diverse outcomes (such as: laparotomy, admission for observation, discharge home) in children presenting to the ED with acute abdominal pain. Early administration of opioids resulted in no difference in detection of appendicitis when compared with placebo, nor did children treated with opioid analgesia differ in their outcomes after surgery. These results challenge the long held assumptions of some pediatric surgeons that analgesia will significantly mask crucial symptoms associated with acute abdominal pain.

Koki's trial [7] showed that early administration of buccal oxycodone did not adversely alter the clinical signs or obscure the surgical diagnosis, although the study was not powered to detect differences in sensitivity, specificity or diagnostic accuracy between the two treatment arms. Adequately powered studies are needed to examine the affects of analgesia on clinical outcomes in children with acute abdominal pain.

In a randomized double blind placebo controlled trial among 60 children aged 5-18 years old, administration of morphine did not change the areas of tenderness. There was no significant change in the diagnostic accuracy between the study groups. All patients requiring laparotomy were identified and no significant complications were noted in the morphine group [4].

Conclusion

Early analgesia for children with acute abdominal pain reduces the intensity of pain and does not seem to impede the diagnosis of appendicitis. Further studies required to examine the most appropriate analgesic agents, dose of medication and route of administration.

References

1. Reynolds SL, Jaffe DM. children with abdominal pain: evaluation in the pediatric emergency department. *Pediatr Emerg Care*, 1990; 6:8-12.

2. Boenning DA, Klein BL. Gastrointestinal disorders. In: Barkin RM, ed. *Pediatric Emergency Medicine*. 2nd ed. St. Louis, MO: Mosby; 1997:795-864.
 3. Shelton T, MCKinlay R, Schwartz RW. Acute appendicitis: current diagnosis and treatment. *Curr Surg*, 2003; 60:502-505.
 4. Kim Mk, Strait RT, Sato TT, Hennes HM. A randomized clinical trial of analgesia in children with acute abdominal pain. *Acad Emerg Med*, 2002; 9:281-287.
 5. Wolf JM, Lein DY, Lenkoski K, et al. Analgesic administration to patients with an acute abdomen: a survey of emergency physicians. *Am J Emerg Med*, 2000; 18:250-253.
 6. Green R, Bulloch B, Kabani A et al.: Early analgesia for children with acute abdominal pain. *Pediatrics*, 2005; 116(4):978-983.
 7. Kokki H, Lintula H, Vanamo K, et al. Oxycodone vs placebo in Children with undifferentiated abdominal pain: a randomized, double-blind trial of the effect of analgesia on diagnostic accuracy. *Arch Pediatr Adolesc Med*, 2005; 159(4):320-325.
 8. Bowen ME, Poehling KA, Gunn VL, et al. Does the use of oxycodone affect diagnostic accuracy in children with acute abdominal pain? *Arch Pediatr Adolesc Med*, 2005; 159(4):326-328.
 9. Goldman RG, Crum D, Bromberg R et al.: Analgesia administration for acute abdominal pain in the pediatric emergency department. *Pediatr emerg care*. 2006; 22(1):18-21.
 10. Esmail Z, Montgomery C, Courtrn C, et al. Efficacy and complications of morphine infusions in postoperative pediatric patients. *Pead. Anaes*, 1999; 9(4):321-327.
 11. Porter J, Jick H. Addiction rare in patients treated with narcotics. *NEJM*, 1980; 302(2):123.
 12. Attard AR, Corlett MJ, Kinder NJ, et al. Safety of early pain relief for acute abdominal pain. *BMJ*, 1992; 305:554-556.
 13. Mahadevan M, Graff L. Prospective randomized study of analgesic use for ED Patients with right lower quadrant abdominal pain. *Am J Emerg Med*, 2000; 18:753-756.
 14. Armstrong FD. Analgesia for children with acute abdominal pain: a cautious move to improved pain management. *Pediatrics*, 2005; 116(4):1018-1019.
 15. Vane DW. Efficacy and concerns regarding early analgesia in children with acute abdominal pain. *Pediatrics*, 2005; 116(4):1018.
 16. Christakis DA, Lehmann HP. Does the use of Oxycodone affect diagnostic accuracy in children with acute abdominal pain? *Arch Pediatr Adolesc Med*, 2005; 159(4):326-328.
 17. Ducharme J. Acute pain and pain control: state of the art. *Ann Emerg Med*, 2000; 35(6):592-603.
 18. Bulloch B, Tenenbein M. Validation of tow pain scales for use in the pediatric emergency department. *Pediatrics*, 2002; 110(3):33e.
 19. Garyfallou GT, Grillo A, O'Connor RE et al. A controlled trial of fentanyl analgesia in emergency department patients with abdominal pain: can treatment obscure the diagnosis? *Acad Emerg Med*, 1996; 4:424.
 20. Silvasti M, Rosenberg P, Seppala T, et al. Comparison of analgesic efficacy of oxycodone and morphine in postoperative intravenous patient controlled analgesia. *Acta Anaesthesiol Scand*, 1998; 42:576-580.
 21. Zoltie N, Cust MP. Analgesia in the acute abdomen. *Ann R Coll Surg Engl*, 1986; 68:209-210.
 22. Pace S, Burke TF. Intravenous morphine for early pain relief in patients with acute abdominal pain. *Acad Emerg Med*, 1996; 3:1086-1092.
 23. Lovecchio F, Oster N, Sturmman K, et al. The use of analgesics in patients with acute abdominal pain. *J Emerg Med*, 1997; 15:775-779.
- Competing Interests:** None declared

This manuscript has been peer reviewed

Correspondence:

Ran D. Goldman, MD
Division of Pediatric Emergency Medicine
The Hospital for Sick Children
555 University Avenue, Toronto, ON M5G 1X8
Tel : 416-813 5418 Fax : 416-813 5043
Email : rangold99@hotmail.com