



TITLE: Patient-Controlled Analgesia for Pediatric Surgical or Cancer Patients: Clinical Effectiveness

DATE: 24 June 2014

RESEARCH QUESTION

What is the clinical effectiveness of patient-controlled analgesia, specifically hydromorphone and morphine, for pediatric surgical or cancer patients?

KEY MESSAGE

One randomized controlled trial and two non-randomized studies were identified regarding the clinical effectiveness of patient-controlled analgesia, specifically hydromorphone and morphine, for pediatric surgical or cancer patients.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2014, Issue 6), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2009 and June 12, 2014. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials and non-randomized studies.

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One randomized controlled trial and two non-randomized studies were identified regarding the clinical effectiveness of patient-controlled analgesia, specifically hydromorphone and morphine, for pediatric surgical or cancer patients. No relevant health technology assessments, systematic reviews, or meta-analyses were identified.

Additional references of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

One randomized controlled trial¹ compared the effectiveness of hydromorphone plus bupivacaine administered via patient-controlled epidural analgesia (PCEA) with hydromorphone patient-controlled intravenous analgesia (IV-PCA) for pediatric patients undergoing posterior spinal fusion. Moderate to severe spasms were more common in the IV-PCA group. Diazepam was required significantly more often by patients in the IV-PCA group. One non-randomized study³ compared the effectiveness of patient-controlled analgesia (PCA) with morphine alone with a single preoperative intrathecal morphine injection and PCA and epidural catheter infusion without PCA for pain control following spinal fusion. Postoperative pain scores were lowest in the epidural infusion group. Total morphine use was significantly lower in the intrathecal plus PCA group when compared to the PCA group at 12 and 24 hours after surgery.

One non-randomized study² compared the effectiveness of morphine PCA and morphine continuous infusion for pain relief following minimally invasive pectus excavatum repair in pediatric patients. Median morphine doses were similar between groups at days one and two; however, additional oxygen therapy was required more often in the continuous infusion group. The authors determined both methods were effective for pain control.

REFERENCES SUMMARIZED

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

1. Gauger VT, Voepel-Lewis TD, Burke CN, Kostrzewa AJ, Caird MS, Wagner DS, et al. Epidural analgesia compared with intravenous analgesia after pediatric posterior spinal fusion. *J Pediatr Orthop*. 2009 Sep;29(6):588-93.
[PubMed: PM19700988](#)

Non-Randomized Studies

2. Rugeyte DC, Kilda A, Karbonskiene A, Barauskas V. Systemic postoperative pain management following minimally invasive pectus excavatum repair in children and adolescents: a retrospective comparison of intravenous patient-controlled analgesia and continuous infusion with morphine. *Pediatr Surg Int*. 2010 Jul;26(7):665-9.
[PubMed: PM20490811](#)
3. Milbrandt TA, Singhal M, Minter C, McClung A, Talwalkar VR, Iwinski HJ, et al. A comparison of three methods of pain control for posterior spinal fusions in adolescent idiopathic scoliosis. *Spine (Phila Pa 1976)*. 2009 Jun 15;34(14):1499-503.
[PubMed: PM19525843](#)

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APPENDIX – FURTHER INFORMATION:

Randomized Controlled Trials – Morphine as Comparator

4. Oudot C, Laplanche A, Orbach D, Pein F, Michon J, Raimondo G, et al. PCA analgesia for children with chemotherapy-related mucositis: a double-blind randomized comparison of morphine and pethidine. *Bull Cancer*. 2011 Feb;98(2):E11-E18.
[PubMed: PM21339093](#)

Non-Randomized Studies – Specific Type of Analgesic Not Specified

5. Liu Y, Seipel C, Lopez ME, Nuchtern JG, Brandt ML, Fallon SC, et al. A retrospective study of multimodal analgesic treatment after laparoscopic appendectomy in children. *Paediatr Anaesth*. 2013 Dec;23(12):1187-92.
[PubMed: PM24112856](#)
6. Ravish M, Muldowney B, Becker A, Hetzel S, McCarthy JJ, Nemeth BA, et al. Pain management in patients with adolescent idiopathic scoliosis undergoing posterior spinal fusion: combined intrathecal morphine and continuous epidural versus PCA. *J Pediatr Orthop*. 2012 Dec;32(8):799-804.
[PubMed: PM23147623](#)

Review Articles

7. Franson HE. Postoperative patient-controlled analgesia in the pediatric population: a literature review. *AANA J*. 2010 Oct;78(5):374-8.
[PubMed: PM21067084](#)

Additional References

8. Friedrichsdorf SJ, Postier A. Management of breakthrough pain in children with cancer. *J Pain Res* [Internet]. 2014 [cited 2014 Jun 23];7:117-23. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3953108/pdf/jpr-7-117.pdf>
[PubMed: PM24639603](#)
9. Plate J, Goldstein LB. Post-operative patient-controlled analgesia in pediatric patients. *Practical Pain Management* [Internet]. 2011 Mar 1 [cited 2014 Jun 23];11(2). Available from: <http://www.practicalpainmanagement.com/pain/acute/post-surgical/post-operative-patient-controlled-analgesia-pediatric-patients?page=0.1>
10. International Association for the Study of Pain. Cancer pain in children [Internet]. Washington: IASP; 2009. [cited 2014 Jun 23]. (Global year against cancer pain 2008-2009). Available from: http://www.iasp-pain.org/files/Content/ContentFolders/GlobalYearAgainstPain2/CancerPainFactSheets/Children_Final.pdf