

Do Opioids Affect the Clinical Evaluation of Patients With Acute Abdominal Pain?

EBEM Commentator Contact

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RATIONAL CLINICAL EXAMINATION REVIEW SOURCE

This is a rational clinical examination abstract, a regular feature of the *Annals'* Evidence-Based Emergency Medicine (EBEM) series. Each features an abstract of a rational clinical examination review from the *Journal of the American Medical Association* and a commentary by an emergency physician knowledgeable in the subject area.

The source for this rational clinical examination review abstract is: Ranji SR, Goldman LE, Simel DL, et al. Do opioids affect the clinical evaluation of patients with acute abdominal pain? *JAMA*. 2006;296:1764-1774. The *Annals'* EBEM editors assisted in the preparation of the abstract of this rational clinical examination review, as well as selection of the Evidence-Based Medicine Teaching Points.

OBJECTIVE

To determine the effect of opiate administration on the clinical examination and the decision to operate in patients with acute abdominal pain.

DATA SOURCES

A structured search of MEDLINE (through May 2006) and EMBASE was performed. Additional articles were identified by a hand search of selected article bibliographies.

STUDY SELECTION

Two reviewers independently reviewed the studies, abstracted data, and classified the studies. Discrepancies were resolved by a third reviewer. Studies were included if they were placebo controlled, with a randomized or quasi-randomized design. Articles that provided data on changes in history, physical examination, or clinical management were included.

DATA EXTRACTION AND ANALYSIS

Raw data were used to construct 2×2 tables to calculate risk ratios for history and physical examination. Risk differences

were calculated for management accuracy. A random-effects model was used to generate conservative estimates. The number needed to harm was calculated.

MAIN RESULTS

Twelve studies (9 adult and 3 pediatric) were found. None evaluated the effect of opioids on patient history. Tables 1 and 2 describe the effect of opioids on physical examination and surgical management.

CONCLUSIONS

Opiate administration may alter the physical examination findings, but these changes result in no significant increase in management errors. The existing literature does not rule out a small increase in errors, but this error rate reflects a conservative definition in which surgeries labeled as either delayed or unnecessary may have met appropriate standards of care. In published research reports, no patient experienced major morbidity or mortality attributable to opiate administration.

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COMMENTARY: CLINICAL IMPLICATION

The diagnosis and management of acute abdominal pain is a common and important presenting complaint for emergency

Table 1. Physical examination changes.

Population type	Risk Ratio	95% CI
Adult	1.51	0.85–2.69
Pediatric	2.11	0.60–7.35
Combined (adult+pediatric)	1.55	1.02–2.36
Combined (adult+pediatric) in studies with adequate analgesia	2.13	1.14–3.98

Table 2. Management error.

Population type	Risk Difference	95% CI	NNH/NNT*
Adult	+0.3% (absolute increase)	-4.1 to +4.7	NNH=333
Pediatric	-0.8% (absolute decrease)	-8.6 to +6.9	NNT=125
Combined (adult+pediatric)	+0.1% (absolute increase)	-3.6 to +3.8	NNH=909
Combined (adult+pediatric) in studies with adequate analgesia	-0.2% (absolute decrease)	-4.0 to +3.6	NNT=500

NNH, Number needed to harm; NNT, number needed to treat.

*NNT represents a potential benefit of opiate administration in avoiding delay to operative management.

physicians. Up to 47% of patients admitted to hospitals with abdominal pain may require surgical treatment.¹ Analgesia before surgical consultation has traditionally been an area of controversy. With current delays in emergency departments (EDs), patients may wait hours before surgical evaluation. It would seem prudent and humane to provide analgesia for patients before surgical evaluation, but will opioids negatively affect outcomes or care? Using a systematic review of the literature, the authors attempt to provide an evidence-based evaluation of this question.

Unsurprisingly, opiate analgesia did have a statistically significant effect on changes in physical examination findings when adult and pediatric trial data were pooled. When studies that used inadequate analgesia were removed, the effect also increased in magnitude. These data suggest that opiate administration is indeed effective in reducing tenderness and discomfort in abdominal pain. Most important, however, is that opioids did not have a meaningful influence on surgical management or outcome. In the 4 adult and 3 pediatric studies (816 total patients) that provided data, there was no decrease or increase in delayed or unnecessary surgery in patients receiving opiate analgesia, and no identifiable morbidity or mortality. Although a true difference between groups was not identified in this review, assuming that the reported 0.1% risk difference of these combined studies had achieved statistical significance, more than 900 patients would need to receive opiate analgesia before 1 experienced a delayed or unnecessary surgery. Conversely, assuming that the reported 0.2% risk difference in the combined studies using adequate analgesia had achieved significance, approximately 500 patients would require analgesia before 1 *avoided* a delay or unnecessary surgery.

TAKE-HOME MESSAGE

Although opiate analgesia for ED patients with abdominal pain may affect physical examination findings, the practice has no negative influence on surgical management or outcomes. Opiate analgesia for ED abdominal pain at doses used in existing studies appears to be safe, effective, and humane.

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EBEM TEACHING POINT

Number needed to harm. The authors of this article used a statistic—number needed to harm—to communicate the potential harm of using opiate analgesia before surgical consultation. The number needed to harm is a close relative of the number needed to treat and indicates the number of patients who would be expected to receive opioids for 1 additional management error to be made. Mathematically, number needed to harm is the inverse of the absolute risk increase. Absolute risk increase is the difference between the experimental harm rate and the control harm rate. Consider the following example: If in a hypothetical experiment 2 per 100 patients receiving opioids and 1 per 100 patients receiving placebo had delayed surgical management, the risk difference would be: $(2/100) - (1/100) = (1/100) = 0.01$. Therefore, 0.01 is the absolute risk increase. The number needed to harm = $1/\text{absolute risk increase} = 1/0.01 = 100$. Therefore, from this hypothetical experiment 100 patients would need to receive opioids for harm to occur (surgical management delayed) to 1 patient. If, conversely, the hypothetical experiment demonstrated an *improvement* in the ability to make an expedient diagnosis in 1 per 100 subjects because of the use of opioids, then this would be considered a number needed to treat, rather than a number needed to harm, although the value would be identical (100).

Finally, when there is no statistical significance to the absolute risk increase, as occurred in this article, it is not appropriate to calculate number needed to harm (or number needed to treat).

REFERENCE

1. Irvin TT. Abdominal pain: a surgical audit of 1190 emergency admissions. *Br J Surg.* 1989;76:1121-1125.