Analgesia in patients with acute abdominal pain (Review)

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[Intervention Review]

Analgesia in patients with acute abdominal pain

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ABSTRACT

Background

For decades, the indication of analgesia in patients with Acute Abdominal Pain (AAP) has been deferred until the definitive diagnosis has been made, for fear of masking symptoms, generating a change in the physical exploration or obstructing the diagnosis of a disease requiring surgical treatment. This strategy has been questioned by some studies that have shown that the use of analgesia in the initial evaluation of patients with AAP leads to a significant reduction in pain without affecting diagnostic accuracy.

Objectives

To determine whether the evidence available supports the use of opioid analgesics in the diagnostic process of patients with AAP.

Search strategy

Trials were identified through searches in Cochrane Controlled Trials Register (CENTRAL) (The Cochrane Library, issue 2, 2009), MEDLINE (1966 to 2009) and EMBASE (1980 to 2009). A randomised controlled trial (RCT) filter for a MEDLINE search was applied (with appropriate modification for an EMBASE search). Trials also were identified through "related articles". The search was not limited by language or publication status.

Selection criteria

All published RCTs which included adult patients with AAP, without gender restriction, comparing any opioids analgesia regimen with the non-use of analgesic before any intervention and independent of the results.

Data collection and analysis

Two independent reviewers assessed the studies identified via the electronic search. Articles that were relevant and pertinent to the aims of the study were selected and their respective full-text versions were collected for subsequent blinded evaluation. The allocation concealment was considered in particular as an option to diminish the biases.

The data collected from the studies were reviewed qualitatively and quantitatively using the Cochrane Collaboration statistical software RevMan 5.0. After performing the meta-analysis, the chi-squared test for heterogeneity was applied. In situations of significant clinical heterogeneity, statistical analyses were not applied to the pool of results. In situations of heterogeneity, the random effect model was used to perform the meta-analysis of the results. A sensitivity analysis was also applied based on the evaluation to the methodological quality of the primary studies.

Main results

Eight studies fulfilled the inclusion criteria. Differences with use of opioid analgesia were verified in variables: Change in the intensity of the pain, change in the patients comfort level.

Authors' conclusions

The use of opioid analgesics in the therapeutic diagnosis of patients with AAP does not increase the risk of diagnosis error or the risk of error in making decisions regarding treatment.

PLAIN LANGUAGE SUMMARY

The use of analgesia for acute abdominal pain (AAP) does not mask clinical findings, nor does it delay diagnosis.

The use of analgesia for AAP does not mask clinical findings nor does it delay diagnosis.

Surgeons are reluctant to use analgesics during the diagnostic process and clinical evaluation of patients with AAP where there may be the possible requirement of surgical intervention. Generally, the fear is that analgesia can mask clinical findings and cause a delay in the diagnosis. Some reports suggest that the use of opioid analgesics in patients with AAP is not associated with masking the clinical picture or delaying the diagnosis.

Hence the research question of this review is: Does available evidence support the use of opioid analgesics in patients with AAP during the diagnostic process?

The aim of this review is to determine whether the evidence available to date supports the use of opioid analgesics in patients with AAP during the diagnostic process.

Clinical trials were performed, in which the use of any analgesic regime with opioids was compared to a placebo administered in the diagnosis process prior to decision-making in adult subjects with AAP, with no limitation on gender. The valued outcomes were: change in the intensity of the pain, change in the patient's comfort level, time necessary to formulate diagnosis, time necessary to operate (in the applicable cases), rate of correct decision-making, error rate in the treatment undertaken, hospital stay and morbidity.

BACKGROUND

Acute abdominal pain (AAP) is a common cause for consultation in emergency departments (ED). It is one of the top three symptoms for which patients go to the ED, and represents between 5% and 10% of all the illnesses treated in the ED (Stone 1998). The most common causes of acute abdominal pain are appendicitis, cholecystitis, intestinal obstruction, urinary colic, gastritis, perforated peptic ulcer, gastroenteritis, pancreatitis, diverticulitis, gynaecological disorders in women and non-surgical abdominal pain (Ahn 2002). The diagnostic options that permit differentiation between serious and less serious acute abdominal problems are clinical history, physical exploration and the results of general laboratory tests (Mahler 2004).

For decades, the indication of analgesia in patients with AAP has been considered prohibited, or it has been deferred at least until establishing the definitive diagnosis for fear of masking symptoms, generating a change in the physical exploration or obstructing the diagnostic process of a surgically treatable disease.

There are several relevant obstacles to determining the appropriate use of analgesia in patients with AAP. The most important are: lack of adequate evidence-based data, contradiction between the perception of the pain on the part of the doctors and their patients, and concern over a misdiagnosis once the patients with abdominal pain receive an analgesic (Gallagher 2002; McHale 2001). Many surgeons make it standard clinical practice to not use analgesics prior to the valuation and decision regarding surgery in patients with AAP because they think the analgesia could make the evaluation and diagnostic accuracy difficult (Kim 2003).

This non-evidence-based approach has been questioned by some analgesic work groups who have shown that the use of analgesics in the diagnostic process of patients with AAP leads to a significant reduction in pain without affecting diagnostic accuracy (Kim

2003; Thomas 2003a).

Despite advances in the knowledge of physiology and progress in the treatment of pain, the use of analgesics in the diagnostic process of patients with AAP is not considered a conventional treatment. Some studies suggest a fast and effective analgesia does not interfere with the diagnosis in patients with acute abdomen; indeed, it may even facilitate the initial physical exploration. This is a matter in which, moreover, several analgesic regimes have been used (Camus-Kerebel 1996; Thomas 2003;Thomas 2003a). While this controversy surrounds the ED, only a few studies have broached the level of doctor-patient agreement regarding the intensity of the abdominal pain and the need for analgesia (Attard 1992; Kim 2003; McHale 2001;Thomas 1999).

In addition, the early administration of analgesics in patients with AAP can reduce the pain considerably; in fact, it does not interfere with the diagnosis and may even facilitate it despite the reduction in the intensity of the symptoms (Attard 1992).

This research proposes that it is humane and safe to administer pharmacological pain relief to patients who arrive at the ED with AAP as long as there are no contraindications (McHale 2001). This review examined the currently available evidence that supports opioid analgesic use or non-use in the diagnostic process of patients with AAP.

OBJECTIVES

The principal objective is to determine if the evidence currently available supports the use of opioid analgesics in the diagnostic process of patients with AAP.

The secondary objective is to evaluate the changes in the patient's comfort level while the diagnosis is established and the treatment strategy is definitively ascertained.

METHODS

Criteria for considering studies for this review

Types of studies

All published randomised controlled trials comparing any opioid analgesia regime to no analgesia administered before any intervention regardless of the outcomes examined.

Types of participants

Patients over the age of 16 with AAP, without gender restriction.

Types of interventions

Non-use versus use of any type of opioid analgesia.

Types of outcome measures

Primary measure:
Rate of accurate management decisions.
Secondary measures:
Change in the intensity of the pain
Change in the patient's comfort level
Changes in the physical exploration
Error in making decisions about treatment
Incorrect diagnosis
Morbidity
Hospital stay

Search methods for identification of studies

The Trials were identified using searches in the Cochrane Controlled Trials Register (CENTRAL) (The Cochrane Library, issue 2, 2009), MEDLINE (1966 to present) and EMBASE (1980 to present). A randomised controlled trial filter for a MEDLINE search was applied (with appropriate modification for EMBASE search).
Search Strategy:
#1: Appendicitis[MeSH]
#2: Abdominal Pain [MeSH]
#3: Abdomen, Acute [MeSH]
#4: Analgesia [MeSH]
#5: Analgesics [MeSH]
#6: Analgesics, Non-Narcotic [MeSH
#7: Analgesics, Opiod [MeSH]
#8: Anti-Inflammatory Agents, Non-Steroidal [MeSH]
#9: ("Appendicitis/diagnosis"[MeSH]) OR ("Appendicitis/surgery"[MeSH]) OR ("Abdominal Pain/diagnosis"[MeSH]) OR ("Abdominal Pain/etiology"[MeSH]) OR ("Abdominal Pain/surgery"[MeSH]) OR ("Abdomen, Acute/diagnosis"[MeSH]) OR ("Abdomen, Acute/surgery"[MeSH]) OR ("Abdomen, Acute/etiology"[MeSH])
#10: ("Appendicitis/diagnosis"[MeSH] AND "Analgesics"[MeSH]) OR ("Abdominal Pain/diagnosis"[MeSH] AND "Analgesics"[MeSH]) OR ("Abdominal Pain/etiology"[MeSH] AND "Analgesics"[MeSH]) OR ("Abdominal Pain/surgery"[MeSH] AND "Analgesics"[MeSH]) OR ("Appendicitis/surgery"[MeSH] AND "Analgesics"[MeSH]) OR ("Abdomen, Acute/diagnosis"[MeSH] AND "Analgesics"[MeSH]) OR ("Abdomen, Acute/surgery"[MeSH] AND "Analgesics"[MeSH]) OR ("Abdomen, Acute/etiology"[MeSH] AND "Analgesics"[MeSH])
#11: ("Appendicitis/diagnosis"[MeSH] AND "Analgesia"[MeSH]) OR ("Abdominal Pain/diagnosis"[MeSH] AND "Analgesia"[MeSH]) OR ("Abdominal Pain/etiology"[MeSH] AND "Analgesia"[MeSH]) OR ("Abdominal Pain/surgery"[MeSH]

AND "Analgesia"[MeSH]) OR ("Appendicitis/surgery"[MeSH] AND "Analgesia"[MeSH]) OR ("Abdomen, Acute/diagnosis"[MeSH] AND "Analgesia"[MeSH]) OR ("Abdomen, Acute/surgery"[MeSH] AND "Analgesia"[MeSH]) OR ("Abdomen, Acute/etiology"[MeSH] AND "Analgesia"[MeSH])
#12: #9 OR #10 OR #11 Limits: Clinical Trial, Humans, only items with available abstracts.
Trials were also identified using "related articles".
The search was not limited by language or publication status.

Data collection and analysis

Trial Selection
From the result of the electronic searches, two independent reviewers selected the studies with the inclusion criteria using a checklist designed in advance for that purpose. The discrepancies were solved by consensus.
Trial Identification
Two reviewers (CM, MV) independently evaluated the titles and abstracts of reports identified through the electronic search. Potentially relevant studies selected by at least one reviewer were retrieved in full text versions to be evaluated for valuation and subsequent inclusion.
Data Extraction
A specific page was generated of the data collected. Two reviewers extracted the data relating to the design type of the studies included, the participants, the analgesic regime used (drugs, dose and tracts of administration), the method of random allocation (patient characteristics and numbers), the exclusion criteria after the process of random allocation, the masking of the patients and/or the observers; and the outcome measures described previously.
Quality Assessment
The studies were blinded (the authors and institutions were deleted and the results section removed) to the reviewers. The checklist for the quality of the de randomised controlled trials included: concealment of the allocation sequence, generation of the allocation sequence, comparability between groups at the baseline and inclusion of all randomised participants in the analysis. Allocation concealment is regarded as particularly important in protecting against bias and was graded using the Cochrane approach as follows:
Grade A: Clearly adequate concealment
Grade B: Possibly adequate concealment
Grade C: Clearly inadequate concealment
Data Analysis
The data set was generated as completely as possible. The data from the primary studies included were reviewed qualitatively and quantitatively using the Cochrane Collaborations´ statistical software RevMan Analysis 5.0.
The quantitative analysis of outcomes was based on intention-to-treat results. In the case of an existing clinically significant heterogeneity, statistical analyses were not applied to the results. After to meta-analysis, a heterogeneity chi-squared test was applied. In cases of heterogeneity, the random effects model was used to meta-analyse the results.
Then a sensitivity analysis was applied based on quality assessment.

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies.
Attard 1992.
Randomised double-blind controlled trial with allocation concealment unclear, conducted at Walsgrave Hospital, Coventry. 100 consecutive patients over 16 years of age with clinically significant abdominal pain of less than 48 hours' evolution who were admitted as emergencies to a surgical firm. In the study, subjects were randomised to intramuscular injection of up to 20 mg papaveretum or an equivalent volume of saline (50 patients to each group). Outcome measures considered were pain and tenderness scores, assessment of patient comfort, accuracy of diagnosis and management decisions. Median pain and tenderness scores were lower after papaveretum. Incorrect diagnoses and management decisions applied to 2/50 patients after papaveretum compared with 9/50 patients after saline solution injection.
Pace 1996.
Randomized double-blind controlled trial with adequate allocation concealment, conducted at Madigan Army Medical Center, Fort Lewis. Seventy-one patients over 18 years of age abdominal pain for = 48 hours evolution were admitted. In the study, subjects were randomised to morphine (10 mg) or placebo (normal saline made up to an equal volume); 35 patients received morphine and 36 received placebo. Outcome measures considered were pain response using VAS and diagnosis accuracy. The VAS pain level improved more for the morphine group and there was no difference between the groups when comparing accuracy of provisional or differential diagnosis with that of final diagnosis.
LoVecchio 1997.
Randomized double-blind controlled trial with adequate allocation concealment, conducted at Good Samaritan Regional Medical Center, Phoenix, Arizona. Forty-eight patients over 18 years with acute abdominal pain were admitted to the emergency department. In study subjects were randomised to intravenous injection of morphine (5-10 mg) or placebo (normal saline made up to an equal volume). Outcome measures considered were changes in physical examination, adverse events, localization and tenderness and pain measure by visual analogue scale (VAS). A statistically significant change in physical examination was noted in both

groups receiving analgesics, but not in the placebo group. No adverse events or delays in diagnosis were attributed to the administration of analgesics.

Vermeulen 1999.

Randomized double-blind controlled trial with allocation concealment unclear, conducted at Hopitaux Universitaires de Geneve, Switzerland. 340 patients over 16 years of age who consulted the emergency department for pain in the right lower part of the abdomen were considered. In the study, subjects were randomised to morphine (10 mg) or placebo (normal saline made up to an equal volume); 175 patients received morphine and 165 received placebo. Outcome measures considered were VAS pain level, final diagnosis, diagnostic accuracy, appropriateness of the decision to operate. Pain relief was stronger in the morphine group; among female patients, the decision to operate was appropriate more often in the morphine group; and, in male patients and overall, opioid analgesia did not influence the appropriateness of the decision.

Mahadevan 2000.

Randomized double-blind controlled trial with adequate allocation concealment, conducted at National University Hospital, Singapore. Sixty-six patients over 16 years with right lower quadrant pain of less than a week's duration (non-traumatic in origin) suggestive of acute appendicitis were admitted. In the study, subjects were randomised to Tramadol (1 mg/Kg) or placebo (normal saline made up to an equal volume); 33 patients to each group. Outcome measures considered were absence or presence of seven abdominal signs (tenderness on light and deep palpation, tenderness in the right lower quadrant and elsewhere, rebound, cough, and percussion tenderness) and pain measured by VAS at 0 and 30 minutes. There was significant reduction in mean VAS in the analgesic group versus in the placebo group. The analgesic group had less normalization of signs.

Thomas 2003.

Randomized double-blind controlled trial with adequate allocation concealment, conducted at Massachusetts General Hospital, Boston. Seventy-four patients over 18 years of age with undifferentiated abdominal pain of less than 72 hours' duration were considered. In the study, subjects were randomised to receive placebo (n = 36) or morphine sulphate (n = 38). Outcome measures considered were VAS pain level, changes in diagnostic signs and diagnostic accuracy. There were no differences in physical or diagnostic accuracy between groups; and correlation with clinical course and final diagnosis revealed no instance of masking of physical examination findings.

Gallagher 2006.

Randomized double-blind controlled trial with adequate allocation concealment, conducted at Montefiore Medical Center, Bronx, New York, USA. 160 consecutive patients over 21 years of age with atraumatic abdominal pain of less than 48 hours' duration were enrolled in the study, of whom 153 were available for analysis. 78 were allocated to receive morphine and 75 to receive placebo. In the study, subjects were randomised to receive 0.1 mg/kg morphine sulphate or placebo. Outcome measure considered was clinically important diagnostic accuracy. The median decrease in VAS score at 15 minutes was 33 mm in the morphine group and 2 mm in the placebo group. There were 11 instances of diagnostic discrepancy in each group, for a clinically important diagnostic accuracy of 86% (67/78) in the morphine group and 85% (64/75) in the placebo group. The difference in clinically important diagnostic accuracy between the 2 groups was 1% (95% confidence interval [CI] -11% to 12%). Analysis by efficacy and intention to treat yielded similar results. Kappa for interobserver concordance in classification of clinically important diagnostic accuracy was 0.94 (95% CI 0.79 to 1.00). No patients required naloxone.

Amoli 2008.

Randomized double-blind controlled trial with adequate allocation concealment, conducted at Sina Hospital, Teheran, Iran. 71 consecutive patients over 14 years with clinically significant abdominal pain were enrolled in the study, 35 were allocated to receive morphine and 36 to receive placebo. In the study, subjects were randomised to receive 0.1 mg/kg morphine sulphate or saline (0.9%) to a maximum dose of 10 mg over a 5 min period. Outcome measures considered were pain intensity using a visual analogue scale (VAS) and signs of acute appendicitis. A more favorable change in VAS score was reported in the morphine group with a significantly greater reduction in the median VAS score than in the placebo group. In 76.7% of patients in the morphine group, appendicitis was confirmed vs. 71.4% of the placebo group. Morphine administration did not cause significant changes in patients' signs or in the physicians' plans or diagnoses. No adverse events were seen in either group.

Summary of included trials.

In summary, eight studies were selected for this systematic review. All of them published in English. The aim of these studies was to compare the use of opioid analgesia (477 patients) versus placebo (446 patients) in patients with AAP. Six trials use morphine sulphate, one study used tramadol, and the other study papaveretum. The inclusion criteria were the same for all studies: patients over 14 years old with non-traumatic AAP, less than a weeks duration, without gender restriction. Few outcome measures were analysed: changes in physical examination, pain measured by VAS (basal and after intervention), adverse events, final diagnosis, diagnostic accuracy, management decisions.

Risk of bias in included studies

The methodological quality of the studies found was evaluated using the Jadad scale, analysing whether the treatment allocation was random, if the method used was appropriate, if there was double blinding and whether this was appropriate and if losses and drop-outs were mentioned. Two studies resulted in a point score of 5 on the Jadad 1996 scale (Gallagher 2006 and Amoli 2008), two studies scored 4 points (LoVecchio 1997 and Pace 1996), three studies scored 3 points (Attard 1992, Thomas 2003

and Vermeulen 1999) and one study scored 2 points (Mahadevan 2000).

Effects of interventions

Eight studies fulfilled the inclusion criteria. The sample is made up of 922 patients, 475 in an opioid treatment group and 447 in a placebo group. The eight clinical trials evaluated the use of opioids compared with a saline solution administered in equivalent volume and in the same manner; six of them used morphine in a dose of 5 to 15 mg with a total of 392 subjects in the treatment group (Pace 1996, LoVecchio 1997, Vermeulen 1999, Thomas 2003, Gallagher 2006 and Amoli 2008); one study used Tramadol in a dose of 1mg/kg with a total of 33 subjects in the treatment group (Mahadevan 2000) and one study used papaveretum in a dose of 20 mg with a total of 50 subjects (Attard 1992). In all the studies, the groups were comparable with respect to the intensity of pain prior to the administration of the therapies under study (Analysis 01:01: WMD 0.12, 95% CI [-0.01, 0.26]). When analysing by subgroups of drugs (Analysis 01:02), no significant differences were found in relation to the intensity of pain measured by VAS among those subjects that received morphine (WMD 0.10, 95% CI [-0.04, 0.24]) versus those that received tramadol (WMD 0.68, 95% CI [-0.04, 1.40]) or papaveretum (WMD 0.20, 95% CI [-0.65, 1.05]). The studies were combined by means of a random effects model given that there was statistical heterogeneity.

Change in the intensity of pain (Analysis 01:05)

The 8 trials registered the intensity of post-treatment pain as a measure of the result, reported using VAS. The grouping of the results showed that in 7 studies the intensity of the pain decreased significantly with the use of opioid analgesics (Amoli 2008, Gallagher 2006, LoVecchio 1997, Pace 1996, Thomas 2003, Vermeulen 1999 and Attard 1992) in patients with AAP (grouped WMD -1.94, 95% CI [-2.92, -0.95]). Only Mahadevan 2000 did not demonstrate any benefit in the reduction of pain (WMD -0.09, 95% CI [-0.81, 0.63]).When analysing by subgroups of drugs, it was observed that those patients that received morphine (WMD -1.78, 95% CI [-2.62, -0.95]) and papaveretum (WMD -5.20, 95% CI [-6.91, -3.49])had a significant reduction in pain compared to those that received tramadol (WMD -0.09, 95% CI [-0.81, 0.63]). In spite of this, statistical heterogeneity can be seen in the sample, which can be influenced by the type of patient included (age and gender) as well as the pharmacological aspects (dosage and type of drug used).

Change in patient's comfort level (Analysis 01:03; 01:04)

With respect to patient comfort, there are only two studies that report on it and in both there is significant improvement of this variable for the group of patients treated with opioid analgesics: Attard 1992 with RR 0.05 [95% CI 0.01, 0.19] and LoVecchio 1997 with WMD -2.10, 95% CI [-3.00, -1.20].

Changes in the physical exploration (Analysis 01:06)

With respect to changes in the physical examination, this variable was reported in only 5 studies (Amoli 2008, LoVecchio 1997, Pace 1996, Thomas 2003 and Mahadevan 2000). There were no significant differences among the groups in the comparison or when comparing them by drug (RR 1.32 [95% CI 0.67, 2.59]).

Errors in making decision about treatment (Analysis 01:07; 01:08)

The variable of error in treatment decision-making is reported in 3 studies (Attard 1992; LoVecchio 1997; Vermeulen 1999) with no differences being found among the groups in comparison nor when comparing them by drug (RR 0.77 [95% CI 0.23, 2.54]).

Incorrect diagnosis (Analysis 01:09; 01:10)

This variable was reported in 6 studies (Attard 1992, Gallagher 2006, LoVecchio 1997,Pace 1996, Thomas 2003, Vermeulen 1999); no significant differences were found among the groups in the study (RR 0.81 [95% CI 0.48, 1.37]). When analysing by subgroups of active ingredient, it was observed in Attard 1992 that the group that received papaveretum had a lower proportion of patients with an incorrect diagnosis than the placebo group (RR 0.22 [95% CI 0.05, 0.98]).

Morbidity (Analysis 01:11)

The adverse effects reported in 4 studies (Amoli 2008, Pace 1996, Vermeulen 1999, Attard 1992) were nausea and vomiting. In relation to this variable, no statistically significant differences can be seen among the groups in the comparison nor when comparing by drug (RR 5.14 [95% CI 0.26, 103.37]).

Lenght of Hospital stay (Analysis 01:12)

This variable was only reported in Attard 1992, with no statistically significant differences found among the groups being compared (WMD -1.00, 95% CI [-1.52, -0.48]).

Accurate management decisions (Analysis 01:13)

This variable was only reported in 3 studies (LoVecchio 1997, Vermeulen 1999, Attard 1992), with no statistically significant differences being found among the groups being compared (RR 0.77, 95% CI [0.23 - 2.54]).

DISCUSSION

Eight trials fulfilled the selection criteria and were included in this study. These contribute 922 patients, a number that seems reduced to us given the high prevalence that AAP represents as a cause of consultation in ED. In general terms, it is possible to mention that the methodological quality of the studies included is good, but heterogeneous.

This review shows that the administration of opioid analgesics as part of the diagnostic process for patients with AAP prior to a decision being made did not increase the risk of making unsuitable treatment decisions; it also significantly improved the patient's comfort when comparing it with the placebo.

No information was found relating to whether the administration of opioids increases the time of clinical evaluation or if a delay occurs in the decision-making with respect to surgery. As a result, it is not possible to determine for this study the costs involved.

In relation to the hospital stay, this was scarcely reported; and it is only possible to mention that there are not differences in the times of hospitalisation in patients who received opioid analgesics in comparison with those who received a placebo.

A systematic review was found on the subject (Ranji 2006), which used 9 Randomized Controlled Trials. We excluded two of these: one for having used sublingual buprenorphine as the analgesic (Zoltie 1986); and the other for having used intravenous fentanyl as the analgesic and for failure to specify the characteristics of the population in the study (Garyfallou 1997). There is also a narrative review (McHale 2001) that do not establishes definitive conclusions and only suggest that it is safe and humane to administer opioid analgesics to patients with AAP that require emergency attention and that do not have any contraindications for their use.

In general terms, there are sufficient data in this review to suggest that the use of opioid analgesics in patients with AAP does not increase the risk of inadequate treatment decisions; and indeed, it significantly improves the patient's comfort level, while the diagnostic process if brought to a conclusion.

AUTHORS' CONCLUSIONS

Implications for practice

Some evidence indicates that the use of opioid analgesics in patients with AAP, in addition to improving their comfort while the diagnostic process is concluded, does not increase the risk of diagnosis error or the risk of error in decisions for treatment. However, this review is not attempting to recommend any analgesic regime in particular.

Implications for research

More high-quality clinical trials are needed to establish the most effective treatment protocols. The included studies are in generally adequate to answer the questions; however, some methodological issues make it imperfect (different research objectives, small sample size and inadequate randomisation). Thus, primary studies require a common objective, an adequate sample size estimation and proper use of random assignment of study subjects. These are the methodological details that can determine that the final conclusion is inappropriate, truthful and non-reliable. In this case, the results suggest that "the use of opioid analgesics in the therapeutic diagnosis of patients with AAP does not increase the risk of diagnosis error or the risk of error in making decisions regarding treatment", but if the primary studies were less heterogeneous and had a larger number of in study subjects, it is possible that the end result was different; for example that "the non use of opioid analgesics in the therapeutic diagnosis of patients with AAP does increase the risk of diagnosis error or the risk of error in making decisions regarding treatment" (this, based on the trend observed in the graphs of meta-analysis).

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Amoli 2008

Methods	Randomized double-blind controlled trial
Participants	Patients over 14 years who presented to the ED with clinical signs of acute appendicitis
Interventions	Patients scheduled were randomised to receive 0.1 mg/kg morphine (n=35) sulphate or saline 0.9% (n=36) to a maximum dose of 10 mg over a 5 min period.
Outcomes	Pain intensity using a visual analogue scale (VAS) and signs of acute appendicitis.
Notes	

Attard 1992

Methods	Randomized double-blind controlled trial
Participants	100 patients over 16 years with clinically significant abdominal pain who were admitted as emergencies to a surgical firm
Interventions	Papaveretum (20 mg) or placebo (normal saline made up to an equal volume) 50 patients to each group
Outcomes	Pain and tenderness scores, assessment of patient comfort, accuracy of diagnosis and management decisions
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Gallagher 2006

Methods	Randomized double-blind controlled trial
Participants	Patients were eligible if they were 21 years or older, had atraumatic abdominal pain of less than 48 hours' duration, and were judged by the ED attending physician to warrant opioid analgesia for pain control
Interventions	Patients were randomised to receive 0.1 mg/kg morphine intravenously up to a maximum of 10 mg (n=78), or an equal volume of normal saline solution administered as a single intravenous bolus (n=75).
Outcomes	The primary endpoint was the difference between the 2 study arms in clinically important diagnostic accuracy

Gallagher 2006 (*Continued*)

Notes	

LoVecchio 1997

Methods	Randomized double-blind controlled trial
Participants	48 patients over 18 years admitted to emergency department with acute abdominal pain
Interventions	Morphine 5mg (13 patients), morphine10 mg (19 patients) or placebo (normal saline made up to an equal volume) (16 patients)
Outcomes	Changes in localization and tenderness, pain measure by VAS
Notes	

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

Mahadevan 2000

Methods	Randomized double-blind controlled trial
Participants	66 patients over 16 years with right lower quadrant pain less than a week's duration (non traumatic in origin) suggestive of acute appendicitis
Interventions	Tramadol (1 mg/Kg) or placebo (normal saline made up to an equal volume) 33 patients to each group
Outcomes	Absence or presence of seven abdominal signs in predicting for appendicitis (tenderness on light and deep palpation, tenderness in RLQ and elsewhere, rebound, cough and percussion tenderness) and pain measure by VAS
Notes	

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

Pace 1996

Methods	Randomized double-blind controlled trial
Participants	71 patients over 18 years abdominal pain for = 48 hours evolution
Interventions	Morphine 10 mg (35 patients) or placebo (normal saline made up to an equal volume) (36 patients)
Outcomes	VAS pain level, changes at physical examination, accuracy of diagnosis
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Thomas 2003a

Methods	Randomized double-blind controlled trial
Participants	74 patients over 18 years with undifferentiated abdominal pain of less than 72 hours duration
Interventions	Morphine 15 mg (38 patients) or placebo (normal saline made up to an equal volume) (36 patients)
Outcomes	VAS pain level, diagnostic accuracy, changes in diagnostic signs
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Vermeulen 1999

Methods	Randomized double-blind controlled trial
Participants	340 patients over 16 years who consulted the emergency department for pain in the right lower part of the abdomen
Interventions	Morphine 10 mg (175 patients) or placebo (normal saline made up to an equal volume) (165 patients)
Outcomes	VAS pain level, final diagnosis, diagnostic accuracy, appropriateness of the decision to operate
Notes	

Vermeulen 1999 (*Continued*)

Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Al-Waili 1998	Use of non-opioid analgesia regime (non-steroidal anti-inflammatory drug)
Alshehri 1995	Diagnostic test design about the value of rebound tenderness as a clinical diagnostic tool in the diagnosis of acute appendicitis Non use of any analgesia regime
Anderson 2000	Diagnostic test design about identify systematic errors in surgeons' estimations of the importance of diagnostic variables in the decision to explore patients with suspected appendicitis Non use of any analgesia regime
Bailey 2007	Use of paediatric population
Cardall 2004	Diagnostic test design about assess the discriminatory value of the total WBC count and presenting body temperature in patients presenting to the emergency department with signs and symptoms suggestive of appendicitis
Champault 1993	Diagnostic test design about conventional diagnostic approach versus primary laparoscopy in women with non-specific abdominal pain Non use of any analgesia regime
Chaudhary 1999	Use of non-opioid analgesia regime (combination of antispasmodic analgesic)
Chong 2004	This study used a retrospective chart review design
Clarke 1991	Decision tree study about a model of the surgical decision Non use of any analgesia regime
Clère 2002	Editorial
de los Santos 1999	Use of non-opioid analgesia regime about the efficacy and tolerance of propinox
Decadt 1999	RCT of the use of early laparoscopy for acute non-specific abdominal pain Non use of any analgesia regime

(*Continued*)

Eskelinen 1995	Diagnostic test design about the value of history-taking, physical examination, and computer assistance in the diagnosis of acute appendicitis in patients more than 50 years old Non use of any analgesia regime
Franke 2002	Cases series about compared two histopathological examinations for the diagnosis of neurogenic appendicopathy Non use of any analgesia regime
Frei 2008	Case-control study
Furyk 2008	A retrospective chart review of adults and children
Gaitan 2002	Diagnostic test design about the accuracy of laparoscopy and the conventional method based on clinical observation in the etiological diagnosis of non-specific acute lower abdominal pain in women of reproductive age Non use of any analgesia regime
Gallagher 2002	Diagnostic test design about assess the validity and reliability of the visual analog scale in the measurement of acute abdominal pain Non use of any analgesia regime
Garyfallou 1997	Abstract from an Annual Meeting. Subjects characteristics not reported. Full text not available.
Graff 2000	Diagnostic test design about false-negative and false-positive errors in abdominal pain evaluation Non use of any analgesia regime
Green 2005	Early analgesia for children with acute abdominal pain (a type of population study)
Hong 2003	RCT about clinical assessment versus computed tomography for the diagnosis of acute appendicitis Non use of any analgesia regime
Kim 2002	RCT in children with acute abdominal pain (a type of population study)
Kokki 2005	RCT in children with acute abdominal pain (a type of population study)
Lane 1997	Diagnostic test design about a useful sign for the diagnosis of peritoneal irritation in the right iliac fossa Non use of any analgesia regime
Lee 2000	Abscence of results in treatment and non-treatment groups. Prospective, observational study
Marinsek 2007	Prospective, observational cohort study to examine current practice of analgesia in adults with acute abdominal pain
McHale 2001	Review article about narcotic analgesia in patients with acute abdominal pain
Milojevic 2001	Multicenter prospective survey to measure and describe frecuence of severe acute pain any origin management in emergency departments

(*Continued*)

	Non use of any analgesia regime
Mittal 2004	Diagnostic test design about advantages of focused helical computed tomographic scanning with rectal contrast only vs triple contrast in the diagnosis of clinically uncertain acute appendicitis Non use of any analgesia regime
Ng 2002	RCT for the use of CT in patients with acute abdominal pain of unknown cause Non use of any analgesia regime
Niederau 1999	Use of non-opiod analgesia regime on upper abdominal pain due to functional disorders of the biliary system
Nik Hisamuddin 2008	Prospective observational study involving the use of questionnaires to compare acute pain management and pain relief among ethnic groups
Nissman 2003	A telephone survey of emergency medicine physicians to assess the current practices and opinions regarding the early administration of narcotic analgesia.
Obermaier 2003	Diagnostic test design about the value of ultrasound in the diagnosis of acute appendicitis Non use of any analgesia regime
Orr 1995	Decision tree study about ultrasonography to evaluate adults for appendicitis Non use of any analgesia regime
Oruc 2004	Diagnostic test design about The value of 5-hydroxy indole acetic acid measurement in spot urine in diagnosis of acute appendicitis Non use of any analgesia regime
Ranji 2006	Design. Systematic review
Rettenbacher 2002	Diagnostic test design about diagnostic imaging is required if the clinical presentation suggests acute appendicitis with high probability Non use of any analgesia regime
Sarfati 1993	Diagnostic test design about impact of adjunctive testing on the diagnosis and clinical course of patients with acute appendicitis Non use of any analgesia regime
Soda 2001	Diagnostic test design about the efficacy of ultrasonography for the diagnosis of acute appendicitis Non use of any analgesia regime
Steiner 2009	Randomized, double-blind, placebo controlled clinical trials of single-doses of aspirin 1000 mg in the treatment of acute migraine attacks, episodic tension-type headache and dental pain.
Tait 1999	Descriptive study about surgical practice for any analgesia administration in patients with acute abdominal pain

(*Continued*)

Terasawa 2004	Systematic review about the diagnostic accuracy of computed tomography and ultrasonography in adults and adolescents with suspected acute appendicitis Non use of any analgesia regime
Thomas 1999	Correlational study about patient and physician agreement on abdominal pain severity and need for opioid analgesia Non use of any analgesia regime
van Dalen 2003	Diagnostic test design about the utility of laparoscopy in the diagnosis of acute appendicitis in women of reproductive age Non use of any analgesia regime
Vane 2005	Editorial
Vermeulen 1995	Diagnostic test design about the influence of white cell count on surgical decision making in patients with abdominal pain in the right lower quadrant Non use of any analgesia regime
Wolfe 2000	Descriptive study about the current practice patterns of analgesia administration among emergency physicians when caring for a patient with an acute abdomen
Wolfe 2004	Abscence of results in treatment and non-treatment groups
Zoltie 1986	Clinical trial in patients with acute abdomen but without hard measure outcomes

DATA AND ANALYSES

Comparison 1. Acute abdominal pain

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Intensity of pain (VAS pretreatment)	8	922	Mean Difference (IV, Random, 95% CI)	0.12 [-0.01, 0.26]
2 Intensity of pain (VAS pretreatment) according to type of opioid	8	922	Mean Difference (IV, Fixed, 95% CI)	0.12 [-0.01, 0.26]
2.1 Morphine	6	756	Mean Difference (IV, Fixed, 95% CI)	0.10 [-0.04, 0.24]
2.2 Tramadol	1	66	Mean Difference (IV, Fixed, 95% CI)	0.68 [-0.04, 1.40]
2.3 Papaveretum	1	100	Mean Difference (IV, Fixed, 95% CI)	0.20 [-0.65, 1.05]
3 Change in patient comfort level (dicotomic)	1	100	Risk Ratio (M-H, Random, 95% CI)	0.05 [0.01, 0.19]
4 Change in patient comfort level (continous)	1	48	Mean Difference (IV, Random, 95% CI)	-2.1 [-3.00, -1.20]
5 Change in intensity of the pain	8	922	Mean Difference (IV, Random, 95% CI)	0.00 [-2.89, -1.10]
5.1 Morphine	6	756	Mean Difference (IV, Random, 95% CI)	-1.93 [-2.82, -1.03]
5.2 Tramadol	1	66	Mean Difference (IV, Random, 95% CI)	-0.09 [-0.81, 0.63]
5.3 Papaveretum	1	100	Mean Difference (IV, Random, 95% CI)	-5.20 [-6.91, -3.49]
6 Change in physical exploration	5	328	Risk Ratio (M-H, Random, 95% CI)	1.23 [0.69, 2.20]
6.1 Morfina	4	262	Risk Ratio (M-H, Random, 95% CI)	1.29 [0.38, 4.36]
6.2 Tramadol	1	66	Risk Ratio (M-H, Random, 95% CI)	1.27 [0.68, 2.38]
7 Errors in making decision about treatment	3	488	Risk Ratio (M-H, Random, 95% CI)	0.77 [0.23, 2.54]
8 Treatment error according to type of opiod	3	488	Risk Ratio (M-H, Random, 95% CI)	0.77 [0.23, 2.54]
8.1 Morfin	2	388	Risk Ratio (M-H, Random, 95% CI)	1.19 [0.63, 2.27]
8.2 Papaveretum	1	100	Risk Ratio (M-H, Random, 95% CI)	0.33 [0.07, 1.57]
9 Incorrect diagnosis	6	786	Risk Ratio (M-H, Random, 95% CI)	0.86 [0.57, 1.29]
10 Incorrect diagnosis according to type of opiod	6	786	Risk Ratio (M-H, Fixed, 95% CI)	0.85 [0.62, 1.19]
10.1 Morfin	5	686	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.68, 1.35]
10.2 Papaveretum	1	100	Risk Ratio (M-H, Fixed, 95% CI)	0.22 [0.05, 0.98]
11 Morbidity	4	581	Risk Ratio (M-H, Random, 95% CI)	5.14 [0.26, 103.37]
11.1 Morfine	3	481	Risk Ratio (M-H, Random, 95% CI)	5.14 [0.26, 103.37]
11.2 Papaveretum	1	100	Risk Ratio (M-H, Random, 95% CI)	Not estimable
12 Hospital stay	1	100	Mean Difference (IV, Random, 95% CI)	-1.0 [-1.52, -0.48]
13 Accurate management decisions	3	488	Risk Ratio (M-H, Random, 95% CI)	0.77 [0.23, 2.54]
13.1 Morfin	2	388	Risk Ratio (M-H, Random, 95% CI)	1.19 [0.63, 2.27]
13.2 Papaveretum	1	100	Risk Ratio (M-H, Random, 95% CI)	0.33 [0.07, 1.57]

Analysis 1.1. Comparison 1 Acute abdominal pain, Outcome 1 Intensity of pain (VAS pretreatment).

Review: Analgesia in patients with acute abdominal pain

Comparison: 1 Acute abdominal pain

Outcome: 1 Intensity of pain (VAS pretreatment)

Study or subgroup	Opiod N	Mean(SD)	Placebo N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
Amoli 2008	34	6.55 (2)	36	5.7 (2)		2.1 %	0.85 [-0.09, 1.79]
Attard 1992	50	8.8 (2)	50	8.6 (2.33)		2.6 %	0.20 [-0.65, 1.05]
Gallagher 2006	78	9.9 (0.5)	75	9.8 (0.5)		74.9 %	0.10 [-0.06, 0.26]
LoVecchio 1997	32	4.12 (1.5)	16	4.36 (1.5)		2.3 %	-0.24 [-1.14, 0.66]
Mahadevan 2000	33	5.68 (1.5)	33	5 (1.5)		3.6 %	0.68 [-0.04, 1.40]
Pace 1996	35	7.9 (2)	36	8 (1.5)		2.8 %	-0.10 [-0.92, 0.72]
Thomas 2003a	38	7.4 (1.7)	36	7.4 (1.8)		2.9 %	0.0 [-0.80, 0.80]
Vermeulen 1999	175	5.29 (2.32)	165	5.18 (2.04)		8.7 %	0.11 [-0.35, 0.57]
Total (95% CI)	**475**		**447**			**100.0 %**	**0.12 [-0.01, 0.26]**

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 5.70$, df = 7 (P = 0.58); $I^2 = 0.0\%$

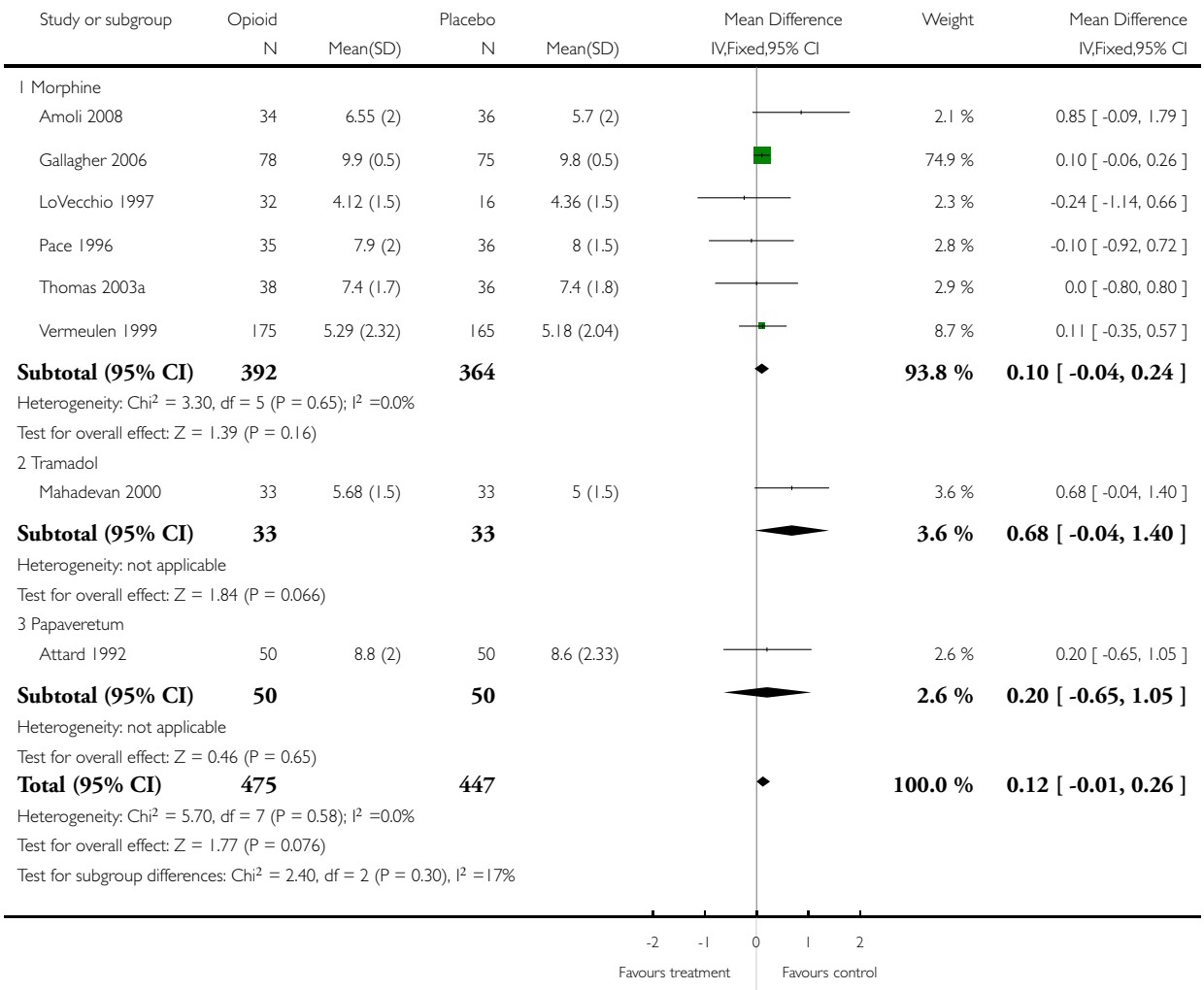
Test for overall effect: Z = 1.77 (P = 0.076)

Analysis 1.2. Comparison 1 Acute abdominal pain, Outcome 2 Intensity of pain (VAS pretreatment) according to type of opioid.

Review: Analgesia in patients with acute abdominal pain

Comparison: 1 Acute abdominal pain

Outcome: 2 Intensity of pain (VAS pretreatment) according to type of opioid



Analysis 1.3. Comparison 1 Acute abdominal pain, Outcome 3 Change in patient comfort level (dicotomic).

Review: Analgesia in patients with acute abdominal pain

Comparison: 1 Acute abdominal pain

Outcome: 3 Change in patient comfort level (dicotomic)

Study or subgroup	Opiod n/N	Placebo n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
Attard 1992	2/50	41/50		100.0 %	0.05 [0.01, 0.19]
Total (95% CI)	**50**	**50**		**100.0 %**	**0.05 [0.01, 0.19]**

Total events: 2 (Opiod), 41 (Placebo)

Heterogeneity: not applicable

Test for overall effect: Z = 4.34 (P = 0.000014)

Analysis 1.4. Comparison 1 Acute abdominal pain, Outcome 4 Change in patient comfort level (continous).

Review: Analgesia in patients with acute abdominal pain

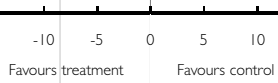
Comparison: 1 Acute abdominal pain

Outcome: 4 Change in patient comfort level (continous)

Study or subgroup	Opiod N	Mean(SD)	Placebo N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
LoVecchio 1997	32	2.02 (1.5)	16	4.12 (1.5)		100.0 %	-2.10 [-3.00, -1.20]
Total (95% CI)	**32**		**16**			**100.0 %**	**-2.10 [-3.00, -1.20]**

Heterogeneity: not applicable

Test for overall effect: Z = 4.57 (P < 0.00001)



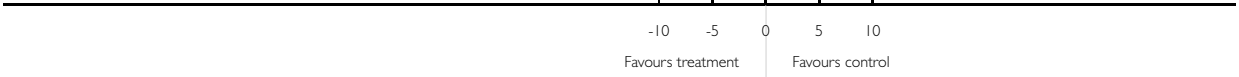
Analysis 1.5. Comparison 1 Acute abdominal pain, Outcome 5 Change in intensity of the pain.

Review: Analgesia in patients with acute abdominal pain

Comparison: 1 Acute abdominal pain

Outcome: 5 Change in intensity of the pain

Study or subgroup	Opiod N	Mean(SD)	Placebo N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
1 Morphine							
Amoli 2008	34	4.7 (1)	36	5.9 (1)		13.5 %	-1.20 [-1.67, -0.73]
Gallagher 2006	78	6.6 (0.5)	75	9.6 (1)		13.9 %	-3.00 [-3.25, -2.75]
LoVecchio 1997	32	2.57 (1.5)	16	3.93 (1.5)		12.3 %	-1.36 [-2.26, -0.46]
Pace 1996	35	4 (2.8)	36	7.2 (2.2)		11.3 %	-3.20 [-4.37, -2.03]
Thomas 2003a	38	4.4 (1.01)	36	6.4 (1.56)		13.2 %	-2.00 [-2.60, -1.40]
Vermeulen 1999	175	3.13 (2.14)	165	4.09 (2.09)		13.6 %	-0.96 [-1.41, -0.51]
Subtotal (95% CI)	**392**		**364**			**77.8 %**	**-1.93 [-2.82, -1.03]**
Heterogeneity: Tau^2 = 1.14; Chi^2 = 91.81, df = 5 (P<0.00001); I^2 =95%							
Test for overall effect: Z = 4.20 (P = 0.000026)							
2 Tramadol							
Mahadevan 2000	33	4.26 (1.5)	33	4.35 (1.5)		12.9 %	-0.09 [-0.81, 0.63]
Subtotal (95% CI)	**33**		**33**			**12.9 %**	**-0.09 [-0.81, 0.63]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.24 (P = 0.81)							
3 Papaveretum							
Attard 1992	50	3.1 (4.83)	50	8.3 (3.83)		9.3 %	-5.20 [-6.91, -3.49]
Subtotal (95% CI)	**50**		**50**			**9.3 %**	**-5.20 [-6.91, -3.49]**
Heterogeneity: not applicable							
Test for overall effect: Z = 5.96 (P < 0.00001)							
Total (95% CI)	**475**		**447**			**100.0 %**	**-2.00 [-2.89, -1.10]**
Heterogeneity: Tau^2 = 1.48; Chi^2 = 135.99, df = 7 (P<0.00001); I^2 =95%							
Test for overall effect: Z = 4.38 (P = 0.000012)							

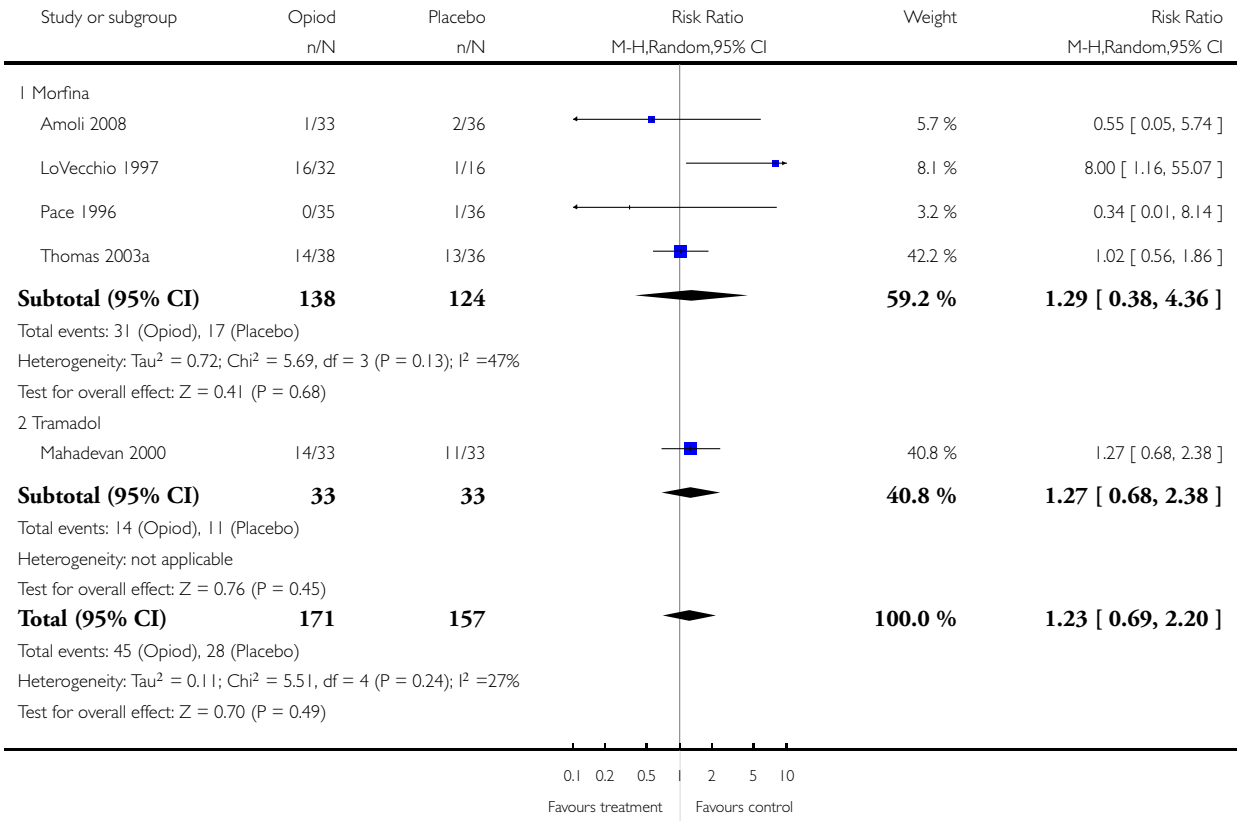


Analysis 1.6. Comparison 1 Acute abdominal pain, Outcome 6 Change in physical exploration.

Review: Analgesia in patients with acute abdominal pain

Comparison: 1 Acute abdominal pain

Outcome: 6 Change in physical exploration



Analysis 1.7. Comparison 1 Acute abdominal pain, Outcome 7 Errors in making decision about treatment.

Review: Analgesia in patients with acute abdominal pain

Comparison: 1 Acute abdominal pain

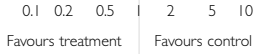
Outcome: 7 Errors in making decision about treatment

Study or subgroup	Opiod n/N	Placebo n/N	Risk Ratio M-H,Random,95% CI	Risk Ratio M-H,Random,95% CI
Attard 1992	2/50	6/50		0.33 [0.07, 1.57]
LoVecchio 1997	0/32	0/16		0.0 [0.0, 0.0]
Vermeulen 1999	19/175	15/165		1.19 [0.63, 2.27]
Total (95% CI)	**257**	**231**		**0.77 [0.23, 2.54]**

Total events: 21 (Opiod), 21 (Placebo)

Heterogeneity: $Tau^2 = 0.45$; $Chi^2 = 2.23$, df = 1 (P = 0.13); $I^2 = 55\%$

Test for overall effect: Z = 0.43 (P = 0.67)



Analysis 1.8. Comparison 1 Acute abdominal pain, Outcome 8 Treatment error according to type of opiod.

Review: Analgesia in patients with acute abdominal pain

Comparison: 1 Acute abdominal pain

Outcome: 8 Treatment error according to type of opiod

Study or subgroup	Opiod n/N	Placebo n/N	Risk Ratio M-H,Random,95% CI	Risk Ratio M-H,Random,95% CI
1 Morfin				
LoVecchio 1997	0/32	0/16		0.0 [0.0, 0.0]
Vermeulen 1999	19/175	15/165		1.19 [0.63, 2.27]
Subtotal (95% CI)	**207**	**181**		**1.19 [0.63, 2.27]**

Total events: 19 (Opiod), 15 (Placebo)

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.00$, df = 0 (P<0.00001); $I^2 = 100\%$

Test for overall effect: Z = 0.54 (P = 0.59)

2 Papaveretum				
Attard 1992	2/50	6/50		0.33 [0.07, 1.57]
Subtotal (95% CI)	**50**	**50**		**0.33 [0.07, 1.57]**

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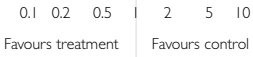
Study or subgroup	Opiod n/N	Placebo n/N	Risk Ratio M-H,Random,95% CI	Risk Ratio M-H,Random,95% CI
Total events: 2 (Opiod), 6 (Placebo)				
Heterogeneity: not applicable				
Test for overall effect: Z = 1.39 (P = 0.17)				
Total (95% CI)	**257**	**231**		**0.77 [0.23, 2.54]**
Total events: 21 (Opiod), 21 (Placebo)				
Heterogeneity: Tau^2 = 0.45; Chi^2 = 2.23, df = 1 (P = 0.13); I^2 =55%				
Test for overall effect: Z = 0.43 (P = 0.67)				



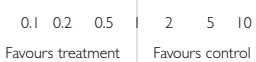
Analysis 1.9. Comparison 1 Acute abdominal pain, Outcome 9 Incorrect diagnosis.

Review: Analgesia in patients with acute abdominal pain

Comparison: 1 Acute abdominal pain

Outcome: 9 Incorrect diagnosis

Study or subgroup	Opiod n/N	Placebo n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
Attard 1992	2/50	9/50		6.9 %	0.22 [0.05, 0.98]
Gallagher 2006	11/78	11/75		19.6 %	0.96 [0.44, 2.08]
LoVecchio 1997	3/32	1/16		3.4 %	1.50 [0.17, 13.30]
Pace 1996	7/35	14/36		19.4 %	0.51 [0.24, 1.12]
Thomas 2003a	14/38	12/36		25.9 %	1.11 [0.59, 2.06]
Vermeulen 1999	19/175	15/165		24.9 %	1.19 [0.63, 2.27]
Total (95% CI)	**408**	**378**		**100.0 %**	**0.86 [0.57, 1.29]**
Total events: 56 (Opiod), 62 (Placebo)					
Heterogeneity: Tau^2 = 0.07; Chi^2 = 6.85, df = 5 (P = 0.23); I^2 =27%					
Test for overall effect: Z = 0.74 (P = 0.46)					

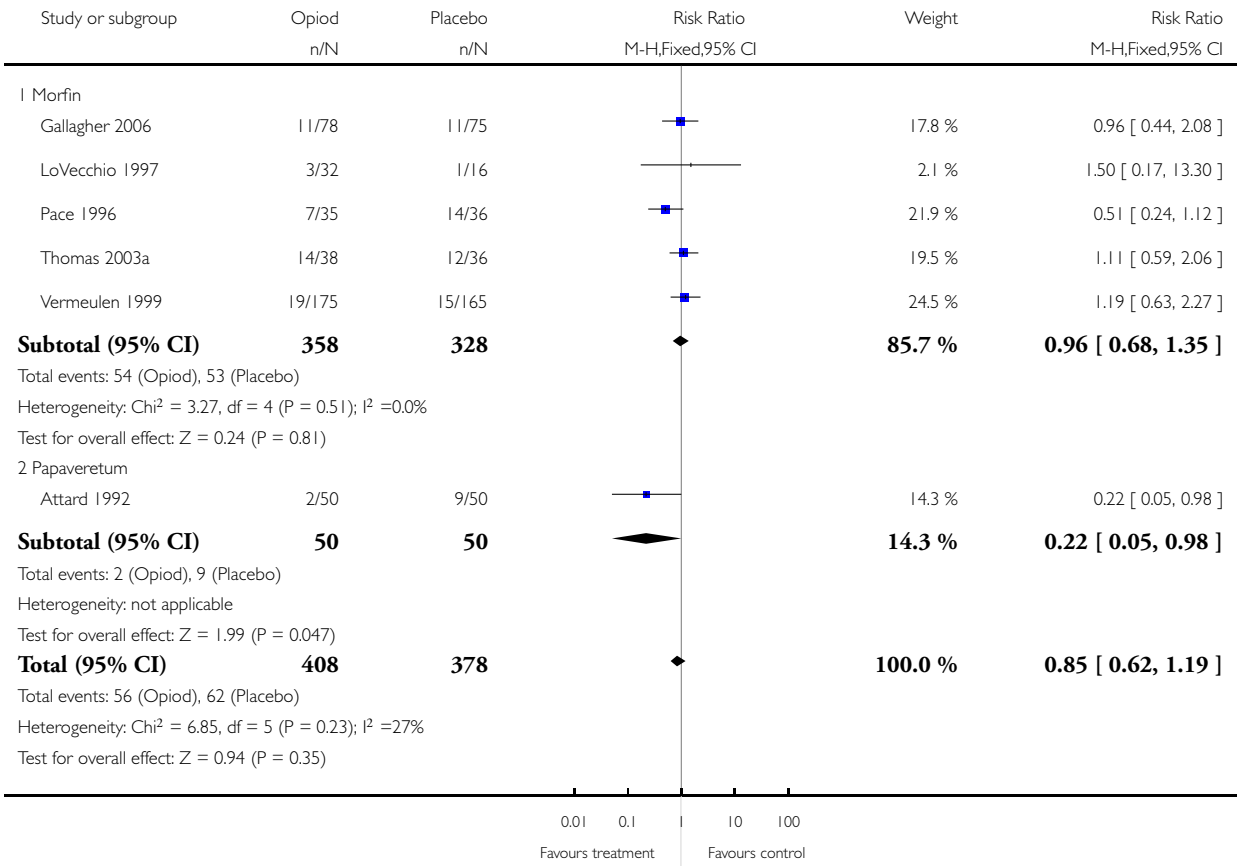


Analysis 1.10. Comparison 1 Acute abdominal pain, Outcome 10 Incorrect diagnosis according to type of opiod.

Review: Analgesia in patients with acute abdominal pain

Comparison: 1 Acute abdominal pain

Outcome: 10 Incorrect diagnosis according to type of opiod



Analysis 1.11. Comparison 1 Acute abdominal pain, Outcome 11 Morbidity.

Review: Analgesia in patients with acute abdominal pain

Comparison: 1 Acute abdominal pain

Outcome: 11 Morbidity

Study or subgroup	Opiod n/N	Placebo n/N	Risk Ratio M-H,Random,95% CI	Risk Ratio M-H,Random,95% CI
1 Morfine				
Amoli 2008	0/34	0/36		0.0 [0.0, 0.0]
Pace 1996	2/35	0/36		5.14 [0.26, 103.37]
Vermeulen 1999	0/175	0/165		0.0 [0.0, 0.0]
Subtotal (95% CI)	**244**	**237**		**5.14 [0.26, 103.37]**
Total events: 2 (Opiod), 0 (Placebo)				
Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.0$, df = 0 (P = 1.00); $I^2 = 0.0\%$				
Test for overall effect: Z = 1.07 (P = 0.29)				
2 Papaveretum				
Attard 1992	0/50	0/50		0.0 [0.0, 0.0]
Subtotal (95% CI)	**50**	**50**		**0.0 [0.0, 0.0]**
Total events: 0 (Opiod), 0 (Placebo)				
Heterogeneity: not applicable				
Test for overall effect: Z = 0.0 (P < 0.00001)				
Total (95% CI)	**294**	**287**		**5.14 [0.26, 103.37]**
Total events: 2 (Opiod), 0 (Placebo)				
Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.0$, df = 0 (P = 1.00); $I^2 = 0.0\%$				
Test for overall effect: Z = 1.07 (P = 0.29)				

Analysis 1.12. Comparison 1 Acute abdominal pain, Outcome 12 Hospital stay.

Review: Analgesia in patients with acute abdominal pain

Comparison: 1 Acute abdominal pain

Outcome: 12 Hospital stay

Study or subgroup	Opiod N	Mean(SD)	Placebo N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
Attard 1992	50	5 (1)	50	6 (1.6)		100.0 %	-1.00 [-1.52, -0.48]
Total (95% CI)	**50**		**50**			**100.0 %**	**-1.00 [-1.52, -0.48]**

Heterogeneity: not applicable

Test for overall effect: Z = 3.75 (P = 0.00018)

Analysis 1.13. Comparison 1 Acute abdominal pain, Outcome 13 Accurate management decisions.

Review: Analgesia in patients with acute abdominal pain

Comparison: 1 Acute abdominal pain

Outcome: 13 Accurate management decisions

Study or subgroup	Opiod n/N	Placebo n/N	Risk Ratio M-H,Random,95% CI	Risk Ratio M-H,Random,95% CI
1 Morfin				
LoVecchio 1997	0/32	0/16		0.0 [0.0, 0.0]
Vermeulen 1999	19/175	15/165		1.19 [0.63, 2.27]
Subtotal (95% CI)	**207**	**181**		**1.19 [0.63, 2.27]**
Total events: 19 (Opiod), 15 (Placebo)				
Heterogeneity: Tau^2 = 0.0; Chi^2 = 0.00, df = 0 (P<0.00001); I^2 =100%				
Test for overall effect: Z = 0.54 (P = 0.59)				
2 Papaveretum				
Attard 1992	2/50	6/50		0.33 [0.07, 1.57]
Subtotal (95% CI)	**50**	**50**		**0.33 [0.07, 1.57]**
Total events: 2 (Opiod), 6 (Placebo)				
Heterogeneity: not applicable				
Test for overall effect: Z = 1.39 (P = 0.17)				
Total (95% CI)	**257**	**231**		**0.77 [0.23, 2.54]**

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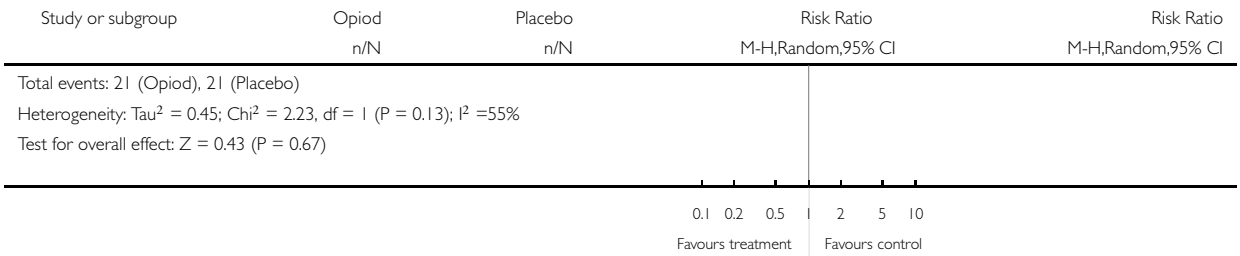

WHAT'S NEW

Last assessed as up-to-date: 10 February 2010.

Date	Event	Description
16 June 2010	New citation required but conclusions have not changed	Two RCT has been added to the review

HISTORY

Protocol first published: Issue 1, 2006

Review first published: Issue 3, 2007

Date	Event	Description
23 July 2008	Amended	Converted to new review format.
8 May 2007	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

Manterola, Carlos - Critical analysis of articles, protocol and review writing and data collection

Vial, Manuel - Critical analysis of articles, protocol and review writing and data collection

Astudillo, Paula - Critical analysis of articles, protocol writing

Moraga, Javier - Data collection

DECLARATIONS OF INTEREST

None Known.

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Internal sources

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External sources

- No sources of support supplied

INDEX TERMS

Medical Subject Headings (MeSH)

*Analgesics, Opioid; Abdominal Pain [*drug therapy]; Acute Disease; Analgesia [*methods]; Randomized Controlled Trials as Topic

MeSH check words

Adult; Humans