



An Evaluation of the Effect of Morphine on Abdominal Pain and Peritoneal Irritation Signs in Patients with Acute Surgical Abdomen

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ABSTRACT

Introduction: Acute surgical abdomen is one of the most common emergency surgical causes all over the world and also one of the most important abdominal pain causes which is sometimes intolerable for the patients referring to the emergency departments. Diagnosis and planning for operation in these cases is based on time-demanding serial examinations and results of paraclinical data. In this waiting period, patients have to tolerate pain. Therefore, we aimed to study the hypothesis that relieving pain has no influence on valuable findings in physical examination. **Methods:** This double blind randomized clinical trial was carried out on 120 patients above 12 years old referred to an emergency department of a referral hospital with acute abdomen. Patients were divided into two groups of receiving intravenous placebo and Morphine randomly. Pain score, change in tenderness as well as change in rebound tenderness before and after receiving morphine or placebo were measured based on Numeric Pain Assessment Scale. **Results:** Statistically significant difference was observed between both groups regarding the mean pain score. Prevalence of tenderness and rebound tenderness after medication administration revealed a significant difference between two groups. Furthermore, pain and tenderness showed a significant decrease in patients receiving morphine also a significant difference occurred in rebound tenderness between two groups. **Conclusion:** Despite the fact that opioid analgesics decrease pain in patients with acute surgical abdomen, they do not tend to eliminate required diagnostic data being obtained from physical examination like tenderness and rebound tenderness. Surprisingly, all the acute abdomen cases had rebound tenderness after morphine administration. Therefore, this research advises a cautious usage of morphine in patients with acute abdomen.

Introduction

Pain can be derived from the anesthesia techniques used for the surgery, for instance, the back pain caused following spinal anesthesia or the surgical process itself.^{1,2} Therefore, the administration of analgesics is widely accepted prior to or throughout surgery. However, analgesics are believed to mask acute abdominal symptoms and signs and hence delay diagnosis. This in turn might increase the mortality rate due to the delay in accurate diagnosis or treatment.³

Administering analgesics has been a controversial issue as most of the researches indicate the fact that analgesics do not interfere with accurate diagnosis. In a study carried out in the United Kingdom, it was concluded that although abdominal tenderness in the intervention group decreased,

localization of pain remained intact.⁴ No finding has so far been suggested confirming that early analgesia alters diagnosis of appendicitis. On the other hand, not only is the treatment of pain moral, but also it has been proven that analgesia is associated with perception of pain in both pediatric and adult patients.⁴

Administration of intravenous morphine in adult patients with acute abdominal pain has been reported to be associated with a 12% difference in diagnostic accuracy; however, it is controversial as some data indicate that morphine provides a safe analgesia without impairing clinically important diagnostic accuracy.⁵

A single weight-based dose of morphine (0.075 mg/kg) does seem quite safe as it has been shown not to induce any significant cognitive changes.⁶ A 30-minute time

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period has been appointed to ensure that the medication would reach its peak clinical effect.⁷ Even at this low dose, a clinically important improvement of pain is experienced by the patients with no significant changes in their physical findings.⁸ Additionally, the number of the enrolled patients in peer-reviewed and non-peer-reviewed studies conducted on the controversy over the effect of analgesics on physical examination findings and or outcome in patients with acute abdominal is less than 1,000 patients.⁸ Therefore, we hypothesized that intravenous morphine sulfate (0.1 mg/kg) would be sufficient to provide pain relief, yet not alter the physical examination findings in patients scheduled for an appendectomy significantly.

Materials and methods

The present study was carried out on the patients older than 12 years who referred to the emergency ward of Imam Reza Hospital affiliated to Tabriz University of Medical Sciences with acute surgical abdomen and later were scheduled for surgery. Patients were divided into two groups of morphine and placebo recipients randomly. Proper relation between the patient and the physician and observational skills are of great importance in evaluating pain. Nonverbal relation is an undeniably important part of pain assessment. Adequate explanation should be provided for the patients. Pain degree, abdominal tenderness and rebound tenderness before and after receiving medication or placebo were determined for each patient based on pain assessment scale and recorded. Our study was a double-blinded randomized clinical trial. The data were gathered from the patients through observation and questioning and then registered in the information collection forms. Pain degree, tenderness and rebound tenderness were assessed using numeric pain assessment scale. Inclusion criteria included the patients with acute surgical abdomen who were scheduled for urgent abdomen surgery and were ready to be transferred to the operating room. Exclusion criteria included: Addicts, Patients younger than 12 years old, and Patients having received intravenous opioids or oral pain killers within the last week.

All the patients after having had laboratory tests, being visited by surgery service and being prepared to be transferred to the operating room were visited by an emergency medicine resident, who was a constant person during this study, just before being transferred to the operating room. Pain degree of the patients in a normal situation, rebound tenderness degree of the patient and existence or lack of rebound tenderness were determined using numeric pain assessment scale and recorded in special forms. Receiving medication or placebo were determined using 6 fold block randomization as from each block three people were given medication and three people placebo. Both the patient and the emergency medicine resident were unaware of the medication given. Randomization was fulfilled by a nurse who was constant during this study. She prepared the blocks of medication and placebo,

numbered them and when needed she distributed them randomly. The type of the medication was defined based on codes and kept by the nurse. The codes were written on the data connection forms. Later patients were given one of the medications A or B. A contained medication or diluted intravenous morphine 0.1 mg/kg. B contained distilled water in the same amount as placebo. Twenty-five minutes after injection of intravenous medication, pain degree, tenderness existence, degree of tenderness, existence of rebound tenderness and the degree of rebound tenderness were evaluated using numeric pain assessment scale and recorded in forms.

T-test was used for numeric pain assessment scale and chi-square test was used to compare pain, tenderness and rebound tenderness. SPSS version 16 was used for statistical analyses. Before injection of the medication, patients were informed that it was a research and the safeness of intravenous opioid administration was explained to the patients based on the documents presented in the surgery and emergency medicine references. Later, written informed consents were obtained from the patients. Considering the fact that intravenous opioid administration was performed after surgeon deciding on the operation and just before patients being transferred to the operation room, it had no effect on the diagnosis or did not mislead the surgeon.

Results

120 patients with acute surgical abdomen were allocated to the study from which 60 patients including 35 males (58.3%) and 25 females (41.7%) were randomly given morphine and other 60 patients including 30 males (50%) and 30 females (50%) were given placebo (Figure 1). The difference between two groups was not statistically significant. The mean age was 30.78 years in the case group and 35.13 years in the control group which was not significantly different. The mean pain degree based on Numeric Pain Assessment Scale (NPAS) before medication administration was 6.82 in case group before injection and 3.38 after injection and 4.32 in control group before injection and 4.38 after injection. The difference between two groups was statistically significant ($df=118$, $P<0.0001$; Figure 2).

The mean pain degree due to abdominal tenderness in case group was 8.63 before medication administration and 7.40 after administration and in case group 7.22 before administration and 7.15 after administrations. The observed difference between two groups was statistically significant ($P=0.0001$; Figure 3).

The mean pain degree due to rebound tenderness in case group was 8.75 before administration and 7.73 after administration and in control group 7.73 before administration and 7.25 after administration. The difference between two groups was statistically significant ($P=0.0001$; Figure 4). No side effects regarding the interventions performed on patients were reported.

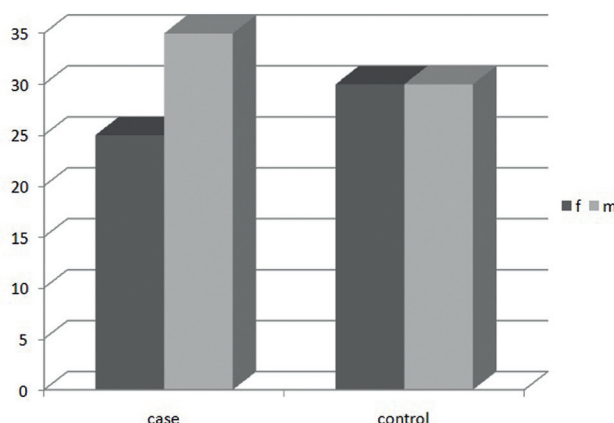


Figure 1. Gender distribution in case and control groups

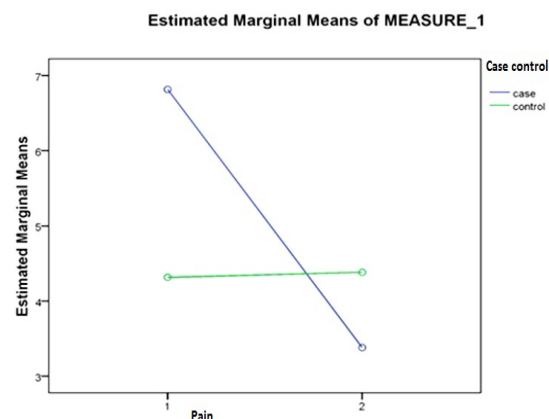


Figure 2. Changes in the mean pain before and after medication administration

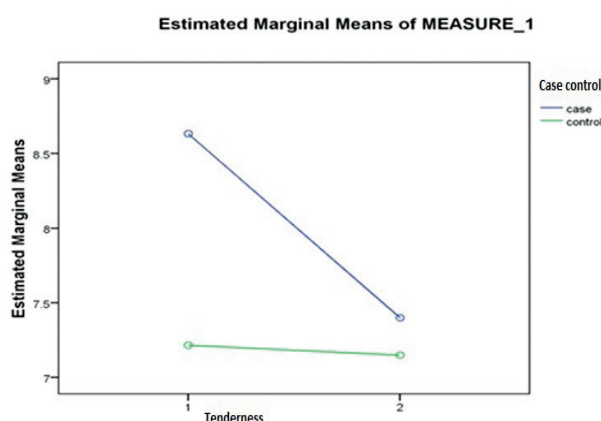


Figure 3. Changes in tenderness before and after medication administration

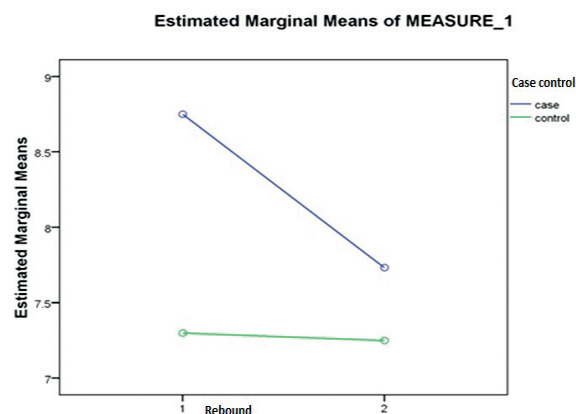


Figure 4. Changes in rebound tenderness before and after medication administration

Discussion

Administration of analgesics for patients with acute abdominal pain has always been avoided due to the belief that they mask the symptoms and signs and consequently delay diagnosis and treatment. However, recent studies are suggestive of the fact that the administration of opioids is associated with significant pain reduction without affecting diagnostic accuracy in the initial evaluation of patients with acute abdominal pain.⁸

Wolfe *et al.* reported that although 85% of the emergency physicians in their center believed that administration of analgesics would not affect important physical findings, some of these physicians refused to prescribe opioids prior to the patient being examined by a surgeon.⁹

In a randomized clinical trial carried out on 340 patients, morphine significantly reduced the pain in the studied patients; however, the number of misdiagnoses in both groups receiving morphine and placebo was the same. Later, it was included that pain relief caused by opioid analgesics in the patients with acute abdominal pain

does not affect proper decision-making regarding the requirement of the surgery.¹⁰

In a study carried out by Zoitie *et al.*, 288 patients with acute abdominal pain were studied. Their study revealed that although clinical signs in physical examination in these patients changed dose-dependently, correct clinical diagnosis remained intact.¹¹

In another controlled randomized clinical trial, 100 patients with acute abdominal pain were divided into two groups of receiving opioid analgesic and placebo. Pain and tenderness were significantly lower in the group receiving opioid than the control group, whereas correct diagnosis ratio was the same in both groups.¹²

In the study of Pace *et al.*, 71 patients were divided into two groups of receiving morphine and placebo. In this study also the group receiving morphine significantly experienced less pain however no further diagnostic problem could be observed and the ratio of misdiagnosis was the same in both groups. The authors later concluded that administration of opioid analgesics does not affect

correct diagnosis and decision-making for treating patients with acute abdominal pain.¹³

In a study carried out in 2005, Kokki *et al.* studied 104 patients with acute abdominal pain and concluded that administration of analgesics significantly reduces pain in the patients without having any undesirable effects on clinical signs or diagnosis. In the study, the ratio of misdiagnosis was the same in both groups.¹⁴ In the study of Moharamzadeh *et al.* carried out in 2005, the results obtained were in line with other studies and the time required for diagnosis by emergency team showed no statistically significant difference between two groups receiving morphine and placebo.¹⁵

Since 75 years ago that it was hypothesized that the danger of analgesic administration in the patients with acute abdomen could rise due to the probable masking of the clinical signs and misdiagnosis, the administration of analgesics in patients with acute abdominal pain has been challenged. However, recently it has been suggested that analgesic administration in the patients with acute abdominal pain with a medical source who do not need operation seems quite safe.¹⁶ Hemasi *et al.* reported that administration of morphine does not affect the accuracy and the time required for surgical diagnosis.¹⁷

The problem emerges when the acute abdominal pain is of an unknown source which could include surgical sources in the patients being referred to the emergency ward. Opioid analgesic administration in these kinds of patients is a challenge for many surgeons and emergency department physicians considering the probable risk of clinical signs being altered. The differences between two groups of our study however were significant confirming that opioid analgesic administration (morphine sulfate 0.1 mg/kg diluted) reduces pain significantly and leads to patient convenience and comfort. Consequently, the patient can wait without or with less pain in the emergency department until the required measurements are taken. The results obtained from our study confirms the fact that morphine administration is associated with decrease in pain degree based on Numeric Pain Assessment Scale (NPAS), tenderness and rebound tenderness which brings along comfort for the patients so that they could wait until all diagnostic procedures are performed and the surgical decisions are made.

Conclusion

The findings of the present study revealed that using opioid analgesics in the patients with acute abdominal pain in spite of reducing pain does not decrease the severity of abdominal tenderness and rebound tenderness. Therefore, opioid analgesics, morphine 0.1 mg/kg diluted, can be cautiously administrated.

Ethical issues: The local ethics committee of Tabriz University of Medical Sciences approved the study and all patients signed informed consent.

Conflict of interests: The authors declare no conflicts of interest.

References

1. Agamohamdi D, Hosseinzadeh H, Golzari S, Alizadeh A, Peirovyfar A, Movassaghi R, et al. Preincisional ipsilateral stellate ganglion block for acute post operative pain control in unilateral mastectomy. **Pak J Med Sci** 2011;27:879-83.
2. Eidy M, Ansari M, Hosseinzadeh H, Kollahdouzan K. Incidence of back pain following spinal anesthesia and its relationship to various factors in 176 patients. **Pak J Med Sci** 2010;26:778-81.
3. Yuan Y, Chen JY, Guo H, Zhang Y, Liang DM, Zhou D, et al. Relief of abdominal pain by morphine without altering physical signs in acute appendicitis. **Chin Med J (Engl)** 2010;123:142-5.
4. Bromberg R, Goldman RD. Does analgesia mask diagnosis of appendicitis among children? **Can Fam Physician** 2007;53:39-41.
5. Gallagher EJ, Esses D, Lee C, Lahn M, Bijur PE. Randomized clinical trial of morphine in acute abdominal pain. **Ann Emerg Med** 2006; 48:150-60.
6. Andress D, Pace S. Cognitive capacity after intravenous morphine sulfate administration. **Ann Emerg Med** 1992; 21: 1047.
7. Whitehead EM, O'Sullivan GM, Lloyd J, Bullingham RE. A new method for rate of analgesic onset: two doses of intravenous morphine compared with placebo. **Clin Pharmacol Ther** 1992; 52:197-204.
8. Wolfe JM, Smithline HA, Phipen S, Montano G, Garb JL, Fiallo V. Does morphine change the physical examination in patients with acute appendicitis? **Am J Emerg Med** 2004; 22:280-5.
9. Wolfe JM, Lein DY, Lenkoski K, Smithline HA. Analgesic administration to patients with an acute abdomen: a survey of emergency medicine physicians. **Am J Emerg Med** 2000;18:250-3.
10. Vermeulen B, Morabia A, Unger PF, Goehring C, Grangier C, Skljarov I, et al. Acute appendicitis: influence of early pain relief on the accuracy of clinical and US findings in the decision to operate- a randomized trial. **Radiology** 1999; 210:639-43.
11. Zoltie N, Cust MP. Analgesia in the acute abdomen. **Ann R Coll Surg Engl** 1986;68:209-10.
12. Attard AR, Corlett MJ, Kidner NJ, Leslie AP, Fraser IA. Safety of early pain relief for acute abdominal pain. **BMJ** 1992; 305:554-6.
13. Pace S, Burke TF. Intravenous morphine for early pain relief in patients with acute abdominal pain. **Acad Emerg Med** 1996;3:1086-92.
14. Kokki H, Lintula H, Vanamo K, Heiskanen M, Eskelinen M. Oxycodone vs placebo in children with undifferentiated abdominal pain: a randomized, double-blind clinical trial of the effect of analgesia on diagnostic accuracy. **Arch Pediatr Adolesc Med** 2005;159:320-5.
15. Moharamzadeh p. Effect of morphine on acute abdomen and peritoneal stimulation [Thesis]. Tehran: Tehran University of medical sciences; 2005.
16. Silen W. Cope's Early Diagnosis of the Acute Abdomen, 19th ed. New York: Oxford University Press; 1996.
17. Hemasi G, Zadeh Y, Mofidi M, Abbasi S, Farsi D, Zare A, et al. Evaluation of Morphine Effect on Diagnosis of Acute Appendicitis. **Razi Journal of Medical Sciences** 2008;14:63-8.