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Evaluation of intravenous Acetaminophen on pain and peritoneal irritation signs in patients with acute surgical abdomen in the Emergency department

Mahbob Pouraghaei, Payman Emamverdi Zadeh

Emergency Medicine Department, Emam Reza hospital, Faculty of Medicine, Tabriz University of Medical Science, Tabriz, Iran.
* Corresponding author: Mahbob Pouraghaei (pouraghaeim@yahoo.com)

Abstract: Introduction: Acute surgery abdomen was one of the most common causes of emergency surgery in worldwide and a major cause of severe abdominal pain and sometimes harrowing and intolerable patients are presenting to the emergency department. The duty of every physician especially Emergency physician reduction of pain of patients that is considered as a major priority in new emergency medical treatment. The aim of this study was evaluation of effect IV Acetaminophen on abdominal pain in patients referred to emergency ward. **Methods**: In a double blind clinical trial that performed in emergency department of Tabriz University of medical science on patients with abdominal pain, effect IV Acetaminophen on abdominal pain in patients referred to emergency ward evaluated. **Results and conclusion**: 155 of patients were male and 85 of them were female. Mean age of patients in acetaminophen group was 45.45 ± 20.47 and in Morphine group was 50.99 ± 19.40 year(P=0.0054). Mean of pre injection pain score in male was 8.69 ± 1.29 and in female patients was 9.17 ± 1.27(P=0.848). Mean of pre injection pain score in Morphine group patients was 8.80 ± 1.35 and Mean of post injection pain score in Morphine group patients was 4.06 ± 1.71(P<0.001). Mean of pre injection pain score in acetaminophen group patients was 8.92 ± 1.25 and Mean of post injection pain score in acetaminophen group patients was 6.46 ± 2.25(P<0.001). Mean of post injection pain score in acetaminophen group patients was significantly higher than patient's of Morphine group (P<0.001). Significant liner direct correlation was found between pre injection and post injection pain score in the studied patients (P<0.001 and R=0.520).

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Keywords: Abdominal Pain, IV Acetaminophen(Apotel), Morphine, Accuracy

1. Introduction

Acute abdomen is one of the most common causes of emergency surgeries worldwide and a major cause of severe unbearable abdominal pains in patients admitted to the emergency departments (Bengiomin, 2010).

Since the duty of every physician, especially emergency physician is reduction of pain which is a priority task of new emergency medicine ,the pain management in patients with acute abdomen is necessary (O'Brien, 2011). But since physical examination `in the diagnosis of acute abdomen for signs of peritoneal irritation such as abdominal tenderness and rebound tenderness Analgesic drugs is not routinely prescribed, because the signs may be eliminated by using the analgesics(Thomas, 2003).

Unlike previous theories, recent studies have proved the fact that intravenous administration of opioids can only reduce the pain in these patients while having no effect on treatment process (Thomas, 2003).

Thomas and colleagues conducted a study on the effect of morphine and Apotel in patients with abdominal pain, they concluded that analgesics have no effect on the diagnostic and treatment of acute abdomen (Thomas, 2003).

In a study by Lo Vecchio on patients with abdominal pain due to surgical acute abdomen, it is concluded that the tenderness and rebound tenderness can be resolved with administration of opioid analgesics (Lo Vecchio, 1997).

In the study of Attard et al, on patients with abdominal pain, it is indicated that patients who receiver opioid analgesics had less abdominal pain symptoms and the analgesic had no effect on the therapeutic process(Attard, 1992).

Vermeuleun and colleagues conducted a study on patients with pain due to acute abdomen and stated that opioid analgesic administration does not only masked the symptoms but it can also relieve patients' pain(Vermeulen, 1999).

However, as it is proven, Morphine Sulfate has other side effects like respiratory depression and decreasing the blood pressure, so we used intravenous Acetaminophen as analgesic and antipyretic with minimal side effects on blood pressure and respiratory depression compared to 15mg/kg intravenous opioids.

The aim of this study is the evaluation of the effect of intravenous Acetaminophen on abdominal pain and peritoneal irritation in patients with surgical acute abdomen referring to emergency department.

2. Material and Methods

In a double blind, randomized clinical trial, in the emergency department of Tabriz university of Medical sciences on patients with abdominal pain, the effect of intravenous acetaminophen on abdominal pain and peritoneal irritation in patients with surgical acute abdomen was evaluated. After the diagnosis of patient with acute abdomen, and right before the surgery we determined the patient's pain, tenderness and rebound tenderness with Visual Analogue scale, patients received one of the A or B drugs and the pain score was evaluated 30 minutes later. We determined the drug administration with blocked randomization .The patients and residents was blinded for the drugs(double blind), the 6 pieces blocks of drugs was coded and prepared with single nurse the injection of drug was done by the emergency medicine residents. The type of drug was determined by the specified code that was recorded on top of the data sheets. Changes in pain, tenderness, and rebound tenderness were recorded and the obtained data was analyzed finally.

We enrolled the patients with acute abdomen referring to Tabriz Imam Reza hospital emergency department after recording the vital signs and obtaining the consent. The study population was calculated as 120 patients, we enrolled 240 patients in this study. The study started 1 month after the final ratification, Patients with the history of drug abusing, patients under 12 years, and IV drug using 1 weeks priority study were excluded from the study.

Ethical considerations: All the necessary information was given to patients and its safety was emphasized. Acetaminophen administration was directly before the decision for surgery right before the patient transport to operation room so the study had no effect on diagnosis and treatment of the surgeon. The safety of Acetaminophen administration had been proven. No additional costs was imposed to patient and all of its costs was provided by the conductor, written consent was obtained from the patients and all rules of Helsinki contract was noticed in this study. This study was registered with IRCT2013052311067N2 in Iranian Registry of Clinical Trials (IRCT).

Statistical analysis:

After the collecting, all data was entered to the SPSS 16 software and was analyzed using proper analytic tests. Descriptive tests were used for describing the data, the difference in the pain before and after the surgery was analyzed using the Paired t-test and one way ANOVAs test. The p value considered meaningful in less than 0.05 amounts.

3. Results

We evaluated the effect of IV Acetaminophen and Morphine in 240 patients with abdominal pain referring to emergency department of Tabriz Imam Reza hospital. 155 patients were male and 85 patients were female.

The mean age of male patients was 48.87 ± 20.04 years, the mean age of female patients was 47.04 ±20.47 years(P=0.504). The patients in IV acetaminophen had a mean age of 45.45 ±20.47 years while the mean age in Morphine group was 50.99 ± 19.40 years(P=0.054).

The mean pain score in male patients before the injection was 8.69± 1.29 and the mean pain score in female patients before the injection was 9.17±1.27 (p=0.006). The mean pain score in IV acetaminophen group prior to injection was 8.92 ± 1.25 and the mean pain score in Morphine group was 8.80 ±1.35 (P=0.489).

The mean pain score in male patients after drug administration was 8.69 ± 1.29, this variable was 9.17 ± 1.27 in female patients (p=0.848).

The mean pan score after the IV Acetaminophen administration was 6.46±1.25 while the post morphine administration pain score was 4.06± 1.71, the mean pain score in IV acetaminophen group was significantly higher than Morphine group (P<0.001).

There was a significant reduce in pain in both morphine and IV acetaminophen group before and after the injection(P<0.001). Evaluation pain of patients at before and after base on physical examination finding was shown in table 1. Distribution of Pain Before of patients between two groups was shown in figure 1. Distribution of Pain After of patients between two groups was shown in Figure 2.

4. Discussion

The pain is the most common compliant of the diseases. While the nature and the site of pains is different but is still the chief complaint of almost 50% of patients referring to physicians (Linton and Maebius, 2003). Different studies had shown that 30-

40% of patients suffer from mild to moderated the post-operative pains. Agitations and severe pain is a single or multi factorial phenomenon due to stimulation of nerve ends which is affected by different physiologic, cultural, psychiatric or social factors (Fuller, 1990).

Many attempts have been done for reducing, controlling and eliminating the pains. The recent attempts in pain management before and after the surgery are based on the therapy by analgesics, opioid analgesic and NSAIDs.

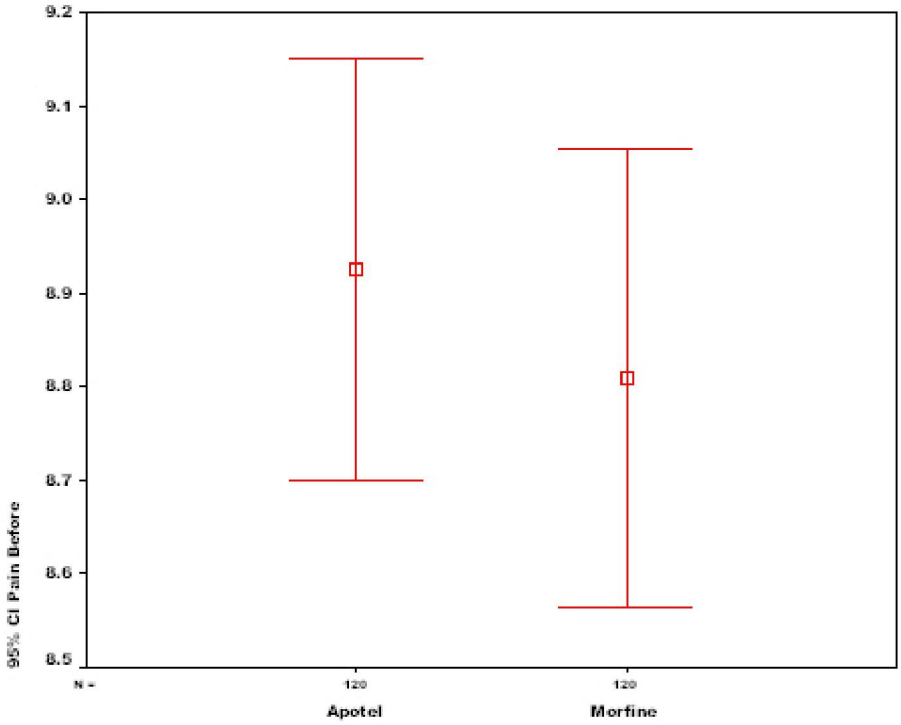

Figure 1: Distribution of Pain Before of patients between two groups

Non opioids can also be used in pain management beside Narcotics (Opioids). Most patients suffer from itching, nausea and vomiting after epidural morphine administration. Naloxone and Diphenhydramine can be prescribed in cases of such complications. The prevention of these side effects is a main clinical goal.

IM injection can reduce the pain only for a short time period and has such complications. 11% of patients who receive IM morphine do not require other analgesics in the next 2 hours. Respiratory depression occurs in 25% of patients. Interatechal morphine seems to be more effective than IM route with similar side effects(Fuller, 1990; Writer, 1990; Palmer, 1999).

Pamukkale University in Turkey in 2012, the IV acetaminophen efficacy was compared to Morphine efficacy in renal colic, the results showed that IV acetaminophen is relatively similar to morphine in reducing the pain of such patients (Serinken, 2012).

In another study by Morgan et al, it is indicated that IV acetaminophen is an effective agent in pain management and can significantly reduce the pain in patients with renal colic (Morgan, 2011).

In our study, like the recent studies, IV acetaminophen could significantly reduce he pain in patients.

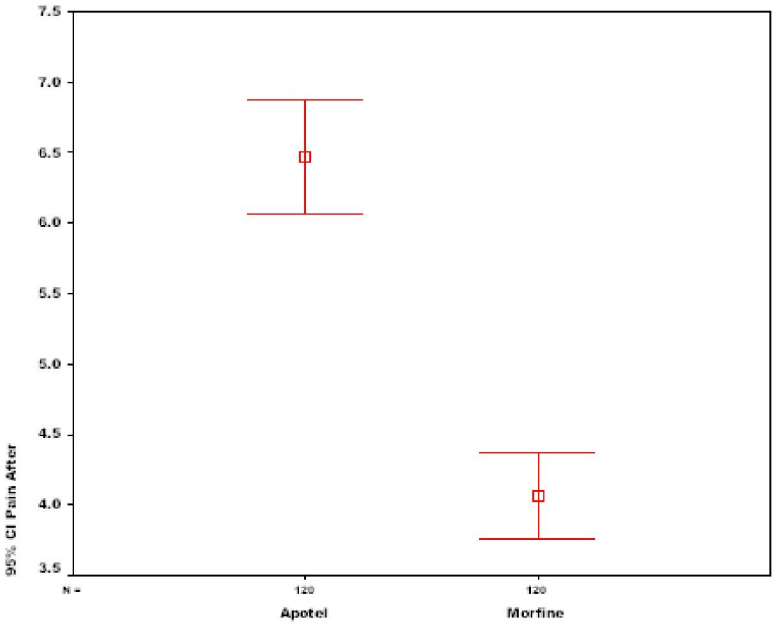

Figure 2: Distribution of Pain After of patients between two groups

Mc Daid and colleagues have stated that IV acetaminophen is effective in post-operative pains and its usage can reduce the need for opioids like morphine resulting in reducing the opioids side effects (McDaid, 2010).

Babl et al in another study in Melbourne royal hospital in 2011 evaluated the IV acetaminophen effects on pain relief in patients of emergency department and stated that IV acetaminophen is effective in reducing the pain of patients and it can also reduce the need for opioid analgesics (Babl, 2011).

In another study Wininger and colleagues in university of Phoenix in Arizona in 2010.

Evaluated the effect of IV acetaminophen in pain management of patients with abdominal pain prior to surgery and stated that IV acetaminophen can effectively reduce the pain in these patients (Wininger, 2010).

Moon et al has also studied the analgesic effect of IV acetaminophen and proved its efficacy in Anesthesia department of Banpordang University in South Korea (Moon, 2011).

Table 1: Evaluation pain of patients at before and after base on physical examination finding

	Group									
	Apotel Group				Morfine Group				P*	P¥
	Pain Before		Pain After	P	Pain Before	P	Pain After	P		
Tenderness Before	8.93 ± 1.25	-	6.47 ± 2.26	-	8.81 ± 1.36	-	4.07 ± 1.71	-	-	-
Rebound Tenderness Before	9.07 ± 1.18	0.003	6.71 ± 2.32	<0.001	9.12 ± 1.16	<0.001	4.38 ± 1.65	<0.001	<0.001	<0.001
Guarding Before	9.44 ± 1.22	0.014	8.59 ± 2.21	<0.001	9.47 ± 1.13	0.044	5.93 ± 1.62	<0.001	<0.001	<0.001
Tenderness After	8.93 ± 1.25	0.630	6.52 ± 2.23	0.060	8.85 ± 1.33	0.015	4.11 ± 1.69	0.032	0.034	0.016
Rebound Tenderness After	9.12 ± 1.11	<0.001	6.77 ± 2.24	<0.001	9.12 ± 1.16	<0.001	4.38 ± 1.65	<0.001	<0.001	<0.001
Guarding After	9.44 ± 1.22	0.014	8.59 ± 2.21	<0.001	9.53 ± 1.13	0.017	5.93 ± 1.62	<0.001	0.001	<0.001

P*_ Pain before Between Group ¥_ Pain After Between Group

Grissa and colleagues have stated that IV acetaminophen is more effective in reducing the renal colic comparing to IM piroxicam (Grissa, 2010).

Bektas and colleagues in the emergency department of Akdeniz university of Antalya, Turkey, concluded that IV acetaminophen is effective in reducing the pain in patients and can reduce the need for opioid analgesics in patients (Bektas, 2009).

Borisov et al had also concluded that IV acetaminophen is effective in reducing the pain after abdominal surgeries (Borisov, 2007).

In the study of Olonisakin, IV acetaminophen had proved to be effective in reducing the abdominal pain in patients and reducing the need for opioid analgesics like morphine (Olonisakin, 2012).

Cakan and colleagues in Ankara, Turkey, in 2008, had shown that while Acetaminophen is effective in reducing the pain of patients, but it could not reduce the need for morphine in patients (Cakan, 2008).

Conclusion:

The results of our study shows that IV acetaminophen is effective in reducing the abdominal pain, while the pain reduction is significantly higher in morphine group, but the pain in patients in IV acetaminophen group was significantly lower after administration of acetaminophen, upon these findings IV acetaminophen can be used instead of opioid analgesics.

Suggestions:

With regard to the effectiveness of IV acetaminophen in pain management, it can be recommended as a suitable substitute that in cases of patients at risk for NSAID and opioid administration.

Corresponding Author:
Dr. Mahbob Pouraghaei
Emergency Medicine Department, Emam Reza hospital, Faculty of Medicine, Tabriz University of Medical Science, Tabriz, Iran.
E-mail: pouraghaeim@yahoo.com

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