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Evaluation of Effectiveness of Adding Intravenous Acetaminophen As A Complement Drug To Opioids on Post Cardiac Surgery Pain

[1]Mansour Soltanzadeh, [2]Aghigh Heydari, [1]Ahmad Ebadi, [3]Mohammad Ali Sheikhi

[1]Associate Professor of Cardiac Anesthesiology MD, Department of Cardiac Anesthesiology, Golestan Hospital, Atherosclerosis Research Center , Pain Research Center, Ahvaz Jundishapur University, Ahvaz, Iran.
[2]Resident of Cardiac Anesthesiology MD, Department of Cardiac Anesthesiology, Golestan Hospital, Atherosclerosis Research Center , Pain Research Center, Ahvaz Jundishapur University, Ahvaz, Iran.
[3]Assistant Professor of Cardiovascular surgery MD, Department of Cardiac surgery, Atherosclerosis Research Center Golestan Hospital, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

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ABSTRACT

Scope and purpose: Pain is one of the important factors making the patients accept and go through surgeries and at the same time, possibly the most important factor involving in the fear from surgery. One of the important postoperative functions is controlling the acute pain to prevent the chronic one. Today, using morphine is one of the most fundamental methods for preventing or treating postoperative pain. However, using these medications is limited due to their complications. Therefore, the present study aims at investigating intravenous acetaminophen efficacy as a supplement to morphine controlling patients' pain after cardiac surgeries. Methodology: This study has been a Randomized Clinical Trial on the candidate patients for CABG surgery in Golestan and Imam Khomeini Hospitals. Using randomized block design, the patients were divided into two groups: the treatment group and the placebo group. The treatment group received 1g intravenous acetaminophen at 6-h intervals over 24 h dose every 6 hours for 24 h and the placebo group normal saline at the same dose. Both groups received morphine based on nurse control criterion with respect to the patients' clinical symptoms. The scores for pain, nausea and vomiting, relief, and complications were measured in 8, 16, and 24 hours after entering ICU. Findings: demographic characteristics in the two groups had no significant difference. There was no significant difference between the least pain scores in the first and second 8 hours respectively with the values of P=0.16 and P=0. 58. However, results revealed a significant difference benefiting the treatment group with the value of P=0.02 in the third 8 hours. Measurements for Satisfaction, nausea and vomiting, fear and depression were not significantly different in the two groups; however, relief level and decrease in complications like vertigo, stress, and respiratory failures were significantly different between the groups benefiting the treatment group. Conclusion: Findings of this study show that intravenous acetaminophen, as a supplement to morphine, is effective in controlling patients' pain and their relief after cardiac surgeries. In addition, acetaminophen causes less complications such as vertigo, stress, and respiratory failures than the placebo.

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INTRODUCTION

Due to its importance and controlling necessity to prevent fatality and postoperative and during-operation complications, pain is considered as one of the important life signals in investigating and controlling the patient (Millr, R.D., 2010). Recognizing and developing pain epidemiology and pathology, a special attention has been paid to postoperative pain treatment for improving patient relief, reducing failures resulting from the surgery, and cutting the costs by shortening the hospital length of stay after surgery. One of the most important problems in surgery sections is postoperative pain. Thus, improving postoperative pain controlling and management methods has become increasingly important for anaesthesiologists. Inventing patient-controlled analgesia methods, an effective step was made in this field. In these methods, different procedures are used to relieve the pain including systematic use of morphine and non-morphine or prescribing intrathecal and epidural narcotics (Cordts, G., *et al*., 2011; Anderson, M., *et al*., 2010).

Corresponding Author: Aghigh Heydari, Resident of Cardiac Anesthesiology MD, Department of Cardiac Anesthesiology, Golestan Hospital, Atherosclerosis Research Center, Pain Research Center, Ahvaz Jundishapur University, Ahvaz, Iran.

Many survey studies have shown that in spite of increasing attention to pain and improving or promoting pain controlling standards, many patients suffer from moderate to severe postoperative pains (Binhas, M., *et al*., 2011).

Multiple studies have been performed for effective pain reduction and also reduction of morphine and non-morphine consumption which show that non-steroidal anti-inflammatory drugs (NSAIDS) and acetaminophen can be used as supplements to or substitutes for morphine in the time period after surgeries (Miller, M., *et al*., 2012).

Traditionally, pain treatment after cardiac surgeries is usually based on prescribing morphine. Although morphine are good painkillers, their prescription brings about different complications including respiratory distress, slow bowel movement, and nausea and vomiting after surgery.

Morphine consumption can be reduced by simultaneous use of non-morphine in pain treatment and creating analgesia. Studies have shown that non-steroidal anti-inflammatory drugs per se or along with paracetamol significantly reduce morphine consumption and some of their complications such as nausea and vomiting. Also, extubation time for the patient has decreased significantly compared to the placebo group (Choiniere, J., D. Turley, 2010). However, fear from the complications which may occur after surgeries during consumption of such medicines, such as increase in bleeding after surgery or failure in kidneys functionality has caused a decrease in using NSAIDS for controlling pain after CPB cardiac surgeries. Therefore, the present study aims at investigating intravenous acetaminophen efficacy as a supplement medicine in combination with morphine medicine in controlling patients' pain after cardiac surgeries.

Methodology:

This study was performed as a Randomized Clinical Trial on 40 candidate patients for CABG surgery in Golestan and Imam Khomeini Hospitals of Ahwaz. Criteria for selecting the participants for the study were male and female patients above 18 who were candidate for non-emergency cardiac surgery with Midline incision. Those patients with history of redo cardiac surgery, combined (along with valve replacement) cardiac surgery, weighing lower than 50kg or BMI >38kg/m2 ، EF <%30, recent and less than 6 months CVA, severe lung disease requiring oxygen, kidney failures and Cr >2, active liver disease and or cirrhosis background, addiction background or morphine consumption in chronic pains and history of allergy to acetaminophen were discarded from the study.

Using randomized block design, the patients were divided into two groups: the treatment group and the placebo group. And the provided code remained till the end of the study. The treatment group received 1g intravenous acetaminophen at 6-h intervals over 24 h dose every 6 hours for 24 h and the placebo group normal saline at the same dose.

Both groups received morphine based on nurse control criterion with respect to the patients' clinical symptoms, anti-hypertension, anti-Tachycardia, anti-sweating, etc. implying the pain, at intubation time at the beginning of entering to ICU. When the patients became alert and their tracheal tube was taken out, morphine was injected based on the pain level felt by the patients.

Their pain was assessed using visual analogue scale (VAS) for pain. This scale includes figures 0 to 10 and is based on the patient's claims in which the score 10 is the highest pain experienced by the individual and 0 is the complete analgesia. Before surgery, the method of measuring the amount of pain was taught to the individual. The patient determined the felt pain by a certain number. Measuring the pain was performed in 8, 16, and 24 hours after entering the ICU. Existence of nausea and vomiting and other complications resulting from morphine was recorded in the above time periods as well. The time of removal of tracheal tube after entering ICU and the amount of morphine consumption was recorded in both groups. The patients' satisfaction was also investigated using the designed questionnaire including the patients' preliminary characteristics - the scores of pain, nausea and vomiting, relief, and complications.

The data obtained were analyzed using statistical software SPSS17 and Mann-Whitney and McNemar's tests were used for analyzing changes in pain level. In all cases, P was considered statistically significant when less than 0.05.

Findings:

This study was conducted on two 20-member groups (total: 40 patients). Demographic findings, including age, weight, number of children, history of diabetes, smoking, HTN, CVA, and disease, showed no significant difference between the two groups.

The pain intensity was measured and in turn compared based on visual analogue scale in each group separately in 8, 16 and 24 hours after surgery. Comparison of pain scores showed that pain scores in both groups had a significant reduction only in the third 8 hours of investigating the least pain with the value of P=0.02 for the treatment group. While, in the first and second 8 hours of investigating the least pain and also in the first, second, and third 8 hours of investigating the worst pain, no significant difference was observed (Table 1).

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Table 1: comparing the least pain and the worst pain scores in the treatment and placebo groups

the least pain level in		Total	Placebo	Treatment	P-Value
The first 8 hours	Mild	29	12	17	0.16
	Moderate	7	5	2	
	Severe	5	4	1	
The second 8 hours	Mild	24	12	12	0.58
	Moderate	15	7	8	
	Severe	2	2	0	
The third 8 hours	Mild	35	15	20	0.02
	Moderate	6	6	0	
	Severe	0	0	0	
the worst pain level in					0.10
The first 8 hours	Mild	25	10	15	
	Moderate	9	5	4	
	Severe	7	6	1	
The second 8 hours	Mild	19	10	9	0.76
	Moderate	15	7	8	
	Severe	6	4	2	
The third 8 hours	Mild		12	18	0.3
	Moderate		9	2	
	Severe		0	0	

Regarding nausea and vomiting scores, no significant difference was observed in the first, second, and third 8 hours after surgery comparing the two groups of treatment and placebo, and P value was respectively calculated as 0.61, 0.78, and 0.20 (Table 2).

Table 2: comparing nausea and vomiting scores in the first, second, and third 8 hours after surgery in the treatment and placebo groups

Nausea		Total	Placebo	Treatment	P-Value
The first 8 hours	Absent	38	20	18	0.61
	Moderate	3	1	2	
	Severe	0	0	0	
The second 8 hours	Absent	33	15	18	0.78
	Moderate	1	1	0	
	Severe	3	1	2	
The third 8 hours	Absent	35	15	20	0.20
	Moderate	2	2	0	
	Severe	0	0	0	

Comparing relief scores between these two groups showed that the treatment group had more sleep and relief in the first 8 hours compared to the placebo group indicating a significant difference with the value of P=0.01. However, no significant difference was observed in the second and third 8 hours (Table 3).

Table 3: comparing relief and sleep disorder scores in the treatment and placebo groups

relief and sleep disorder		Total	Placebo	Treatment	
The first 8 hours	Absent	25	9	16	0.01
	Moderate	6	3	3	
	Severe	10	9	1	
The second 8 hours	Absent	27	11	16	0.30
	Moderate	5	3	2	
	Severe	7	5	2	
The third 8 hours	Absent	37	17	20	0.23
	Moderate	1	1	0	
	Severe	1	1	0	

Satisfaction level was not significantly different in any groups and P value was P>0/05. However, respiratory failure in the second 8 hours showed a significant difference for the treatment group with P=0.00. It should be mentioned that this difference has not been significant in the first and third 8 hours.

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Comparing stress levels between the two groups, there was a significant difference in the first and second 8 hours respectively with the values of P=0.03 and 0.04 which was not significant in the third 8 hours (Table 4).

Table 4: comparing stress scores in the treatment and placebo groups

Stress		Total	Placebo	Treatment	
The first 8 hours	Never	34	15	19	0.03
	High	4	4	0	
	Very high	2	2	0	
The second 8 hours	Never	33	15	18	0.04
	High	5	5	0	
	Very high	0	0	0	
The third 8 hours	Never	33	17	16	1.00
	High	3	2	1	
	Very high	1	1	0	

There was no significant difference comparing fear and vertigo levels between the two groups (Tables 5 and 6).

Table 5: comparing fear scores after surgery in the treatment and placebo groups

Fear		Total	Placebo	Treatment	
The first 8 hours	Never	33	15	18	0.21
	High	4	3	1	
	Very high	2	2	0	
The second 8 hours	Never	32	14	18	0.07
	High	4	4	0	
	Very high	1	1	0	
The third 8 hours	Never	32	17	15	1.00
	High	1	1	0	
	Very high	3	2	1	

Table 6: comparing vertigo scores in the treatment and placebo groups

Vertigo		Total	Placebo	Treatment	
The first 8 hours	Absent	21	5	16	0.00
	Moderate	16	13	3	
	Severe	4	3	1	
The second 8 hours	Absent	28	11	17	0.12
	Moderate	9	6	3	
	Severe	2	2	0	
The third 8 hours	Absent	30	16	20	0.10
	Moderate	3	3	0	
	Severe	0	0	0	

Also, comparing of amount of activity in bed between the two groups, a significant difference was observed in the first, second, and third 8 hours, with the value of P=0.00 for the treatment group (Table7).

Table 7: comparing activities in bed scores in the treatment and placebo groups

Doing activities in bed		Total	Placebo	Treatment	
The first 8 hours	no interference	2	1	1	0.00
	moderate interference	1	0	1	
	complete interference	37	19	18	
The second 8 hours	no interference	4	0	4	0.00
	moderate interference	8	1	7	
	complete interference	27	18	9	
The third 8 hours	no interference	4	0	4	
	moderate interference	22	9	13	0.00
	complete interference	1	10	2	

Discussion:

The present study investigated the intravenous acetaminophen efficacy as a supplement to morphinein controlling patients' pain after cardiac surgeries and also evaluated its effect as a supplementary medicine supplement to morphine on nausea and vomiting, relief and complications in 8, 16, and 24 hours after entering the ICU.

Findings of this study show that prescription of intravenous acetaminophen as a supplement to morphine at the end of the surgery is more effective than in placebo group in controlling the pain after cardiac surgery. This finding has been approved in recovery time, 24 hours after surgery, and VAS of patients in the treatment group has been less than that of placebo group (P=0.02). In addition, there was a significant relationship between the treatment and placebo groups in the level of relief and reducing complication such as vertigo, stress and respiratory failures for the treatment group with the value of P<0/05. However, the level of satisfaction, nausea and vomiting, fear, and depression in the two groups showed no significant difference. Controlling patients' postoperative pain is an effective measure for reducing many acute and chronic pain effects (Timoty, H., S. Keklet, 2011). Prescription of morphine injection intravenously or intramuscularly is a common method to relieve the postoperative pain which has some unwanted complications such as decrease in awareness level, respiratory weakness, nausea and vomiting, constipation, itching, etc. (Chung, F., J. Lorriom, 2010) Based on the study of Crighton, non-steroidal anti-inflammatory drugs and acetaminophen are effective as supplements to or substitutes for morphine in pain treatment and are more welcomed by patients (Crighton, C., A. Arici, 2011; Hedner, L., *et al*., 2010). A study carried out in 2012 pointed out to the effect of acetaminophen use in big surgeries and morphine complications (Rahimzadeh, P., *et al*., 2013). In other studies performed in Iran, effectiveness of intravenous acetaminophen prescription in controlling postoperative pain has been proved. Also, it has been stated that consumption of additional painkillers for controlling the pain in the patients receiving intravenous acetaminophen is less (Imani, F., *et al*, 2011). And intravenous acetaminophen has decreased the pain scores of patients and complications like nausea and vomiting, and relief and increased satisfaction.

Conclusion and Recommendations for Further Studies:

Given the results of this study, using intravenous acetaminophen as a supplement to morphine in controlling patients' pain after cardiac surgeries has been effective and has decreased the pain scores of patients and also complications such as vertigo, stress, relief and respiratory failure. In addition, it has increased the patients' ability to do activities in bed. It is recommended that acetaminophen effect be compared with those of widely used morphine and in in surgeries of different body organs for further studies.

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REFERENCES

Anderson, M., C. Jeng, J. Wittig, M. Rosenblatt, 2010. Anesthesia for patients undergoing orthopedic oncologic surgeries.JclinAnesth, 22(7): 565-72.

Binhas, M., F. Roudot-Thoraval, F. Bonnet, S. Guerineau, S. Lory, G. Jeanblanc and J. Marty, 2011. Use of a Validated Reference Tool to Evaluate Postoperative Pain Management through a Quality-Improvement Program in a University Hospital. Journal for Healthcare Quality, 33(1): 7-13.

Choiniere, J., D. Turley, 2010. Effects of estroed drug with paracetamol lead to improved outcomes after cardiac surgery. Drug Safety, 12(2): 435-442.

Chung, F., J. Lorriom, 2010. Effects of the control of pain in peripheral tissue by opioids. J Clin Anesth, 5: 134-146.

Cordts, G., M. Grant, L. Brandt, S.A. Mears, 2011. qualitative and quantitative needs assessment of pain management for hospitalized orthopedic patients. Orthopedics., 34(8): 368-73.

Crighton, C., A. Arici, 2011. Systematic review of the analgesic efficacy and tolerability of COX-2 inhibitors in postoperative pain control. [Review] [49 refs] journal of Anesthesiology and Pain, 3(6): 29-217.

Hedner, L., P. Kurdi, E. Boccard, 2010. Effects of pediatric intravenous paracetamol (propacetamol) pharmacokinetics:a population analysis. Br J Anesth, 13(1): 262-275.

Imani, F., M. Radmehr, M. Mohammadian-erdi, M. Alimian, 2011. Evaluation of adding Acetaminophen to Fentanyl in Patient- Controlled IV Analgesia (PCIA) after Lower Limb Orthopedic Surgery. Journal of Anesthesiology and Pain official Journal of ISRAPM (JAP). 1(4): 1-46.

Miller, M., N.R. Montana, T. Penderton, *et al*., 2012. Efficacy and costs of patient-controlled analgesia versus regularly administered intramuscular opioid therapy. J Clin Anesth., 9: 1246-1258.

Millr, R.D., 2010. Anesthesia. 7thed, Churchil Livingston, pp: 2745-68.

Rahimzadeh, P., F. Imani, M. Alimian, B. Behzadi, H.R. Faiz, 2013. Comparison between ketamine and acetaminophen administered at the end of anesthesia for pain management after hysterectomy. Journal of Anesthesiology and Pain official Journal of ISRAPM (JAP)., 4(1): 15-24.

Timoty, H., S. Keklet, 2011. Effects of postoperative analgesia on surgical outcome. Anesth Analg, 35: 434-451.