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Research Article

Studying the Complications of Ketamine and Morphine in Pain Management at Emergency Department

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ABSTRACT

Aim:we evaluate the adverse effect of ketamine and morphine in pain management in the emergency department.
Methods: This randomized, controlled, double-blinded, clinical trial was conducted in the adult emergency department (ED) of Emam Khomeini hospital, a tertiary general hospital affiliated with Mazandaran University of Medical Sciences, in Northern Iran.The patients were divided into two groups' ketamine and morphine. Way to assign patients to one of two groups based on the random number table. Patients at zero minutes 0.5 mg per kg ketamine and 0.1 mg per kg of morphine received intravenous slow. Blood pressure, respiration and side effects by two unrelated residents were unaware of the project assessed and recorded.
Results: In both groups, nausea was observed in which in ketamine group 14.3 percent and in the morphine group 10.1%. Agitation and hallucinations was observed in the ketamine group.
Conclusion: we concluded that Ketamine like morphine dos not have significant complications in the patients and can be considered in these patients for pain management.

INTRODUCTION

Uncontrolled pain is highly dangerous with a variety of physiological results including an increase in sympathetic inhibition, reduction in peripheral vascular resistance, decrease myocardial oxygen consumption, the amount of co2, coagulopathy, and decreased immune function.Poor control of severe pain can increase chronic pain.Hence the need to improve the development of comprehensive programs for the measurement of treatment, documentation and quality improvement efforts associated with the inhibition of acute and chronic pain, is the subject of many clinical researches (1,2,3).

Thepsychological symptoms of traumatic patients admitted to the hospital, including nightmares, phobias, anxiety and pain assembly includes PTSD that studies indicate that reducing the pain is effective in reducing these symptoms. (1,2,3)Opioid analgesics in pain management in the ED are cornerstone of moderate and severe pain. Opioids side effects, such as respiratory depression, hypotension, nausea, vomiting, constipation, pruritus, urinary retention, confusion and more are concerning. (1,2,3)

Ketamine, a noncompetitive antagonist of the N-methyl-D-aspartate (NMDA) subtype of excitatory amino acid receptor, is a dissociative anesthetic agent [4-11]. It is commonly used in anesthesiology due to its safety in various clinical situations, [4-11].

Up to now few studies examined the side effects of morphine and ketamine in traumatic patients in

emergency departments. Therefore in this study we evaluate these symptoms to find out how to remove them.

MATERIALS AND METHODS

Type of study:

This randomized, controlled, double-blinded, clinical trial was conducted in the adult emergency department (ED) of Emam Khomeini hospital, a tertiary general hospital affiliated with Mazandaran University of Medical Sciences, in Northern Iran, during a 6-month period. This study conducted in period of September 2016 to February 2016 with the aim of the evaluation of morphine injection with ketamine injection with a low dose in patients with pain due to bone fractures referring to the emergency hospital Sari in a period of six months.

The study protocol was approved by the institutional review board (IRB) and the medical ethics committee of the Mazandaran University of Medical Sciences and all the patients provided their informed written consents before inclusion in the study (IR.MAZUMS.REC.95-1954). The study protocol was also registered with the Iranian Registry for Clinical Trials (IRCT?????;www.irct.ir).

IR.MAZUMS.REC.95-1954

Inclusion criteria:

Patients in this study were 18 to 65 years with the upper or lower extremity long bone fractures caused by blunt trauma and directed to the hospital emergency department for control of pain.

Exclusion criteria:

- Patients with a history of mental or neurological disorders, liver, kidney, stroke, asthma and other respiratory diseases, heart diseases
- Weight below 45 or above 155 kg
- Pregnant or lactating women
- Pressure above 180 or less than 90 mm Hg
- Heart rate less than 50 or more than 150 minutes
- Respiratory rate below 10 or above 30 minutes
- decreased level of consciousness
- Blow to the head or eyes
- Multiple Trauma
- Sensitivity to analgesics used in research
- Drug addiction
- Intravenous drug use
- Apart from fractures of long bones
- Fractures, dislocations and fractures with severe displacement, along with the need to reduction
- Open fracture
- Compartment syndrome
- Reluctance of patients to participate in the project
- receiving analgesic before participating in the study

Research assistant examined patients with blunt and direct trauma to the limbs.

The patients were divided into two groups K and M. Way to assign patients to one of two groups based on the random number table. Patients at zero minutes 0.5 mg per kg ketamine and 0.1 mg per kg of morphine received intravenous slow. The affected limb immobilized with sling and orthopedic residents were asked to approve the x rays.

Blood pressure, pulse, respiration and side effects by two unrelated residents were unaware of the project assessed and recorded. Eventually related complications include hypotension, nausea, vomiting, suppress the respiratory center, agitation were recorded and if needed were treated.

Statistical analysis:

To evaluate the results obtained, SPSS software version 18 including t-test and the Chi-square test was used for variables.

RESULTS

This study aimed to evaluate the side effect of a low dose of morphine injection with intravenous ketamine in patients with long bone fractures. Study performed on 156 patients with 65 -18year-old presenting to the emergency department Hospital for pain control. Individuals randomly divided into two groups of 78 patients, morphine and ketamine group. Many patients because of issues presented in Exclusion criteria were excluded such as fractures with dislocation 1, open fracture 3, 3 people allergic to morphine, 5 people were addicted, 8 fractures require traction by orthopedic, use of analgesics hours ago

referring to the center 35 and 7 were not satisfied. 7 patients left the hospital because of personal satisfaction and refusal of treatment were excluded. (Replaced by other patients)

In both groups, nausea was observed in which in ketamine group 14.3 percent and in the morphine group 10.1%. Agitation and hallucinations was observed in the ketamine group. Hallucinations and agitation showed no statistically significant difference between the two groups. In this study, serious complications such as cardiorespiratory arrest occurred in none of the patients. Table 1.

Table 1. Complications between the two groups

p	Total		Morphine injection		Ketamine injection		Complications
	%	number	%	number	%	number	
0.089	84.6%	132	89.9%	71	79.2%	61	No complications
	12.2%	19	10.1%	8	14.3%	11	Nausea
	1.9%	3	.0%	0	3.9%	3	agitation
	1.3%	2	.0%	0	2.6%	2	hallucination
	100.0%	156	100.0%	79	100.0%	77	Total

The results showed that in the two groups' systolic blood pressure less than 80% was not observed. In the ketamine group 88.3% were in normal range and 11.7% had above 130 percent. Results showed that the mean of systolic blood pressure in in two groups had not significant differences. Table2,3

Table2. Evaluation of systolic blood pressure in both groups

p	total		morphine		Ketamine injection		Vital signs	
	%	number	%	number	%	number		
.954	.0%	0	.0%	0	.0%	0	Less than80	systolic blood pressure
	88.5%	138	88.6%	70	88.3%	68	80-130	
	11.5%	18	11.4%	9	11.7%	9	More than130	

Table3.Mean systolic blood pressure in both groups

P	df	t	sd	mean	group	
.752	154	-.316	7.41	124.94	Ketamine injection	systolic blood pressure
			7.65	125.32	morphine	

There were no statistically differences in diastolic blood pressure between the groups. Table 4,5

Table4. Diastolic blood pressure in both groups

p	total		morphine		Ketamine injection		Vital signs	
	%	number	%	number	%	number		
-	.0%	0	.0%	0	.0%	0	Less than60	diastolic blood pressure
	100.0%	156	100.0%	79	100.0%	77	60-100	
	.0%	0	.0%	0	.0%	0	above100	

Table5. Mean diastolic blood pressure in both groups

P	df	t	sd	mean	group	
.325	154	.987	.00	80.00	Ketamine injection	diastolic blood pressure
			8.10	79.09	morphine	

The results showed that there was no case of heart rate less than 70.in the ketamine group 94.8 percent were in normal range and 5.2 percent more than 90 , in the morphine group 94.9 percent in normal range and 54.1percent more than 90 which There were no statistically differences between the groups.Our results revealed that There were no statistically differences between the groups in heart rates.in ketamine group mean of heart rate was 86.71and in morphine group was 86.63. Table 6,7

Table 6. Heart rate in two groups

p	total		morphine		Ketamine injection			
	%	number	%	number	%	number		
1	.0%	0	.0%	0	.0%	0	Less than70	Heart rate

	94.9%	148	94.9%	75	94.8%	73	70-90	
	5.1%	8	5.1%	4	5.2%	4	More than90	

Table 7. Evaluation of mean heart rate between the groups

P	df	t	sd	mean	group	
.897	154	.129	3.57	86.71	Ketamine injection	Heart rate
			4.25	86.63	morphine	

There were no statistically differences between the groups in Respiratory rate in ketamine group the Respiratory rate was 18.3 and in morphine group was 18.56. table8.

Table 8. Mean of Respiratory rate between the groups

P	df	t	sd	mean	group	
.795	128	.111	2.37	18.31	Ketamine injection	Respiratory rate
			3.25	18.56	morphine	

DISCUSSION

Our result showed that in both groups, nausea was observed in which in ketamine group 14.3 percent and in the morphine group 10.1%. Agitation and hallucinations was observed in the ketamine group.

Motov S et al examined safety of sub dissociative intravenous-dose ketamine with morphine in emergency department (ED) patients. Their study was a prospective, randomized; double-blind trial evaluating ED patients aged 18 to 55 years and experiencing moderate to severe acute abdominal, flank, or musculoskeletal pain. They showed No statistically significant or clinically concerning changes in vital signs were observed. No serious adverse events occurred in either group. Patients in the ketamine group reported increased minor adverse effects at 15 minutes post-drug administration. As well as this study our paper indicated the same results.(12)

In this regards,Howard PK et al (13) in A Randomized Controlled Trial enrolled 90 patients into 2 groups (ketamine vs. morphine) . Like our paper they indicated there were no serious or life-threatening adverse effects in either group.

In another study Wang L et al (14) evaluated that ketamine added to morphine or hydromorphone patient-controlled analgesia (PCA) provides clinically relevant reductions in postoperative pain, opioid requirements, and adverse events when compared with morphine or hydromorphone PCA in adults undergoing surgery. They examined Thirty-six RCTs including 2,502 patients proved eligible, and 22 of these were at low risk of bias. The addition of ketamine to morphine/hydromorphone PCA decreased postoperative pain intensity at six to 72 hr when measured at rest and during mobilization. They reported, the addition of ketamine to morphine/hydromorphone PCA significantly reduced postoperative nausea and vomiting. Significant effects on other adverse events (e.g., hallucinations, vivid dreams) were not detected, though only a few studies reported on them. This study also approved our results in this regards.

CONCLUSIONS

Ketamine like morphine dos not have significant complications in the patients and can be considered in these patients for pain management.

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