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Original Research

Comparison of intravenous ketamine with morphine in pain relief of long bones fractures

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ABSTRACT:
Background: Fractures have a high incidence rate in traffic accidents and are one of the three most important complications during accidents. The present study was conducted to compareintravenous ketamine with morphine in pain relief of long bones fractures. **Materials & Methods:** 64 patients of long bones fractures of both genders were included. Patients were randomly divided into two groups- group Ireceived intravenous (IV) morphine at a dose of 0.1 mg/kg and group II received IV ketamine at a dose of 0.5 mg/kg. Pain severity of the patients was recorded before and 10 minutes after injection based on numeric rating scale. **Results:** Group I had 20 males and 12 females and group II had 18 males and 14 females. The mean age was 52.8 years in group I and 48.4 years in group II. Fracture site was upper extremity in 14 and 15 and lower extremity in 18 and 17. Pain score beforetreatment was 9.4 and 9.1 and after treatment was 2.7 and 3.0 in group I and II respectively. The difference was significant (P< 0.05). **Conclusion:** Low dose of ketamine (0.5 mg/kg) results in a significant decrease in the severity of acute pain in patients with fractures of long bones.
Key words: Fractures, Ketamine, morphine

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INTRODUCTION

Fractures have a high incidence rate in traffic accidents and are one of the three most important complications during accidents.[1] Each year millions of people all over the world suffer from bone fractures, the complications of which threaten the patients' health for several years. One of the most important measures in the management of such patients in the emergency unit is fixation and pain control.[2]

Ketamine is an antagonist of N-methyl-D-aspartate (NMDA) and is used in IV, intramuscular, enteric, subcutaneous, intra-nasal, rectal and epidural forms. However, at higher doses it can have complications such as hallucination, dysphoria, nightmares, an increase in intracranial pressure, hypertension, tachycardia, tremors and clonic-tonic seizures.[3] Several studies have shown that ketamine is effective in pain relief.The safety and efficacy of ketamine have been well documented in more than 11,000 pediatric procedures, including a small number of orthopaedic procedures.[4] It is quick and reliable in producing a unique combination of sedation, amnesia, and analgesia. Ketamine has even been reported as the ideal anesthetic for use in children in the emergency department.[5,6]The present study was conducted to compareintravenous ketamine with morphine in pain relief of long bones fractures.

MATERIALS & METHODS

The present study comprised of 64patients of long bones fractures of both genders. The consent was obtained from all enrolled patients.

Data such as name, age, gender etc. was recorded. Patients were randomly divided into two groups- group Ireceived intravenous (IV) morphine at a dose of 0.1 mg/kg and group II received IV ketamine at a dose of 0.5 mg/kg. Pain severity of the patients was recorded before and 10 minutes after injection based on numeric rating scale. Data thus obtained were

subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Method	intravenous (IV) morphine	IV ketamine
M:F	20:12	18:14

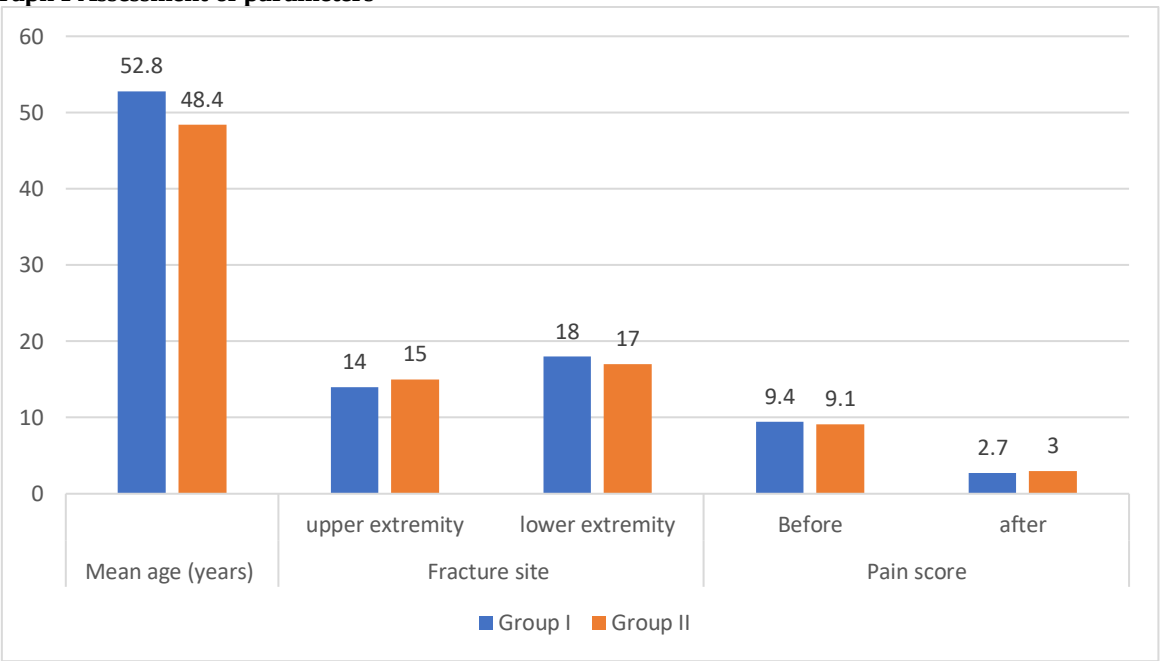
Table I shows that group I had 20 males and 12 females and group II had 18 males and 14 females.

Table II Assessment of parameters

Parameters	Variables	Group I	Group II	P value
Mean age (years)		52.8	48.4	0.05
Fracture site	upper extremity	14	15	0.91
	lower extremity	18	17	
Pain score	Before	9.4	9.1	0.12
	after	2.7	3.0	

Table II, graph I shows thatmean age was 52.8years in group I and 48.4years in group II. Fracture site was upper extremity in 14 and 15 and lower extremity in 18 and 17. Pain score before treatment was 9.4 and 9.1 and after treatment was 2.7 and 3.0 in group I and II respectively. The difference was significant (P< 0.05).

Graph I Assessment of parameters



DISCUSSION

Opioids are one of the main and most effective medications to relieve pain by suppression of pain center in the CNS through stimulation of μ and δ receptors.[7] However, complications such as dependence, tolerance, suppression of respiratory center and activation of vomiting center are some of their problems.[8,9] Other medications are NSAIDs, which prevent synthesis ofprostaglandin E2 by inhibiting cycloxygenase. Nonetheless, this group of medications has gastrointestinal complications and even some of them exhibit renal and hepatic toxicity.[10.11]The present study was conducted to compareintravenous ketamine with morphine in pain relief of long bones fractures.

We found that group I had 20 males and 12 females and group II had 18 males and 14 females.McCarty ECet al[12] in their study 114 children who underwent closed reduction of an isolated fracture or dislocation in the emergency department at a level-I trauma center were prospectively evaluated. Ketamine hydrochloride was administered intravenously (at a dose of two milligrams per kilogram of body weight) in ninety-nine of the patients and intramuscularly (at a dose of four milligrams per kilogram of body weight) in the other fifteen. The average time from intravenous administration of ketamine to manipulation of the fracture or dislocation was one minute and thirty-six seconds (range, twenty seconds to five minutes), and the average time from intramuscular administration to manipulation was

four minutes and forty-two seconds (range, sixty seconds to fifteen minutes). The average score according to the Children's Hospital of Eastern Ontario Pain Scale was 6.4 points (range, 5 to 10 points), reflecting minimal or no pain during fracture reduction. Adequate fracture reduction was obtained in 111 of the children. Ninety-nine percent (sixty-eight) of the sixty-nine parents present during the reduction were pleased with the sedation and would allow it to be used again in a similar situation.

We observed that mean age was 52.8 years in group I and 48.4 years in group II. Fracture site was upper extremity in 14 and 15 and lower extremity in 18 and 17. Pain score beforetreatment was 9.4 and 9.1 and after treatment was 2.7 and 3.0 in group I and II respectively. Zakineet al[13] in their study 81 patients scheduled for abdominal surgery were prospectively randomized under double-blind conditions to three groups- peri group receiving intraoperative and postoperative ketamine for the first 48 h after surgery and intra group receiving intraoperative ketamine administration only and control group receiving placebo. Morphine consumption, visual analog scale scores and side effects (sedation score, nausea-vomiting score, nightmares, psychiatric disorders, or delusions) were recorded for the first 48 hours. Cumulative morphine consumption 24 h after surgery was significantly lower in the PERI group (median 27 mg, interquartile range [19]) than in the INTRA group (48 mg [41.5]) and CTRL group. Postoperative visual analog scale scores were significantly lower in the PERI group and INTRA group than in the CTRL group. A higher rate of nausea was observed in the CTRL group compared with the PERI group. No difference in sedation scores or psychiatric disorders was observed among groups.

Snijdelaar et al[14] reported that the combination of ketamine/morphine significantly decreases the need for morphine and has better analgesic effects. Jennings et al[15] reported similar findings but emphasized that more minor complications are seen with a combination of morphine/ketamine.Haliloglu et al[16] in clinical trial, 52 women with American Society of Anesthesiologists (ASA) class I-II identification undergoing elective Cesarean section in general anesthesia were enrolled. In the ketamine group (group K), a ketamine bolus of 0.5 mg kg1 IV was administered at the time of induction of general anesthesia. After induction, a ketamine infusion was started and discontinued at the end of surgery. Patients allocated to the control group (group C) were given identical volumes of saline. The cumulative dose of morphine consumption after surgery was measured as the primary outcome of this study. Secondary outcomes were pain control assessed by numeric rating scale (NRS) and need for rescue analgesia and incidence of side effects. The mean 24-h morphine consumption was lower in group K (p ¼ 0,001). At 15 min postoperatively, NRS values were lower in group K than group C (p ¼ 0,001). There was no difference among groups regarding the need for supplemental analgesia (rescue diclofenac doses).

CONCLUSION

Authors found that low dose of ketamine (0.5 mg/kg) results in a significant decrease in the severity of acute pain in patients with fractures of long bones.

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