Original Article

Comparison of the analgesic effect of intravenous morphine and morphine suppositories in patients with extremity fractures

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ABSTRACT

Introduction: Fractures of the extremity are common and presents with moderate or severe pain in 80% of patients. It seams route of administration may modify the pain relief and adverse complication of medications. This double blind, randomized, clinical trial was conducted to evaluate the safety and efficacy of morphine suppositories versus intravenous morphine for acute pain control in patients with extremity fractures for the first time. Materials and Methods: 230 patients with extremity fracture were randomly divided into two groups, 5 ml of distilled water with morphine suppositories and the 115 other patients, 5 ml intravenous morphine suppositories given placebo. The patients of pain at 0, 15 and 30 minutes and 1, 3, 6, 12, 18 and 24 hours and analgesic drugs and the need to repeat medical complications were studied. Results: Patient satisfaction in both groups received morphine analgesia of intravenous and rectal suppositories Please not significantly different ($p=0.85$). Nausea and vomiting, and loss of consciousness in the group receiving intravenous morphine was significantly higher ($p <0.05$). Conclusion: With regard to the application of the rectal and intravenous administration of morphine equivalent analgesia may be appropriate in patients with rectal as a method according to this method more secure and more convenient administration compared with intravenous administration.

Keywords: extremity fracture, morphine suppositories, IV morphine, pain relief

Introduction

Management of pain have been studied frequently in the emergency department (ED). Fractures of the extremity are common and presents with moderate or severe pain in 80% of patients [1].

Acute pain of extremity fracture can be improved with several classes of Non-steroidal medications including; paracetamol, diclofenac, ketorolac, etoricoxib [2].

Intravenous patient-controlled analgesia (IV PCA) can effective control of pain due to fractures and is accompanied with e high degree of satisfaction [3]. Morphine is still choice agent in IV PCA protocols [4]. There was important adverse effects associated with Morphine such as sedation, respiratory depression, pruritus, nausea and vomiting [3, 4]. A few studies have suggested that similar analgesia can be achieved with changed the intravenous or intramuscular administration of morphine to the rectal route without major dose adjustment [5-7]. The best of our knowledge, there was no previous study to evaluate the analgesic effect of suppository morphine to pain control caused by extremity fractures.

Therefore, this double blind, randomized, clinical trial was conducted to evaluate the safety and efficacy of morphine suppositories versus intravenous morphine for acute pain control in patients with extremity fractures.

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Materials and Methods

Study design

This double blind, randomized, clinical trial study was performed on 230 patients with acute extremity fractures. The study protocol was approved by the ethics committee. Informed consent was obtained from patients. The study was registered in Iranian registry of clinical Trials (IRCT…….).

Patients and procedure

The patient between15-70 years old were included in the study. Patients who abused narcotic recently; patient with history of chronic respiratory, renal, hepatic or heart failure; history of allergy to opioid were excluded.

The patients were randomly divided into two groups: the group receiving 5 ml of distilled water with morphine suppositories and the second group receiving IV morphine at a dose of 5 mg/kg with suppositories placebo. Vital signs and oxygen saturation, drugs adverse effects and pain score was registered before, 15 and 30 min and 1,3,6,12,18,24 hours after injection.

In cases who experienced insufficient pain relief after 10 minutes, an additional dose of analgesia drug was injected by a trained physician.

Statistics

With considering 95% confidence interval (α=0.05), 80% power (ß=0.2) and 1.65 standard deviation, sample size in each group was calculated as 115 patients in each group.

Data are presented as the mean ± sd. For statistical analysis T-test and Mann-Whitney U test (for nonparametric statistical analyses) were applied. P< o.o5 considered significant.

Results

The mean ± standard deviation of age was 31.14 ±10.89 years and 32.59 ± 13.05 years in the morphine suppositories and IV morphine groups respectively. NO significant differences mean of age was seen between the two groups of study (P=0.364).

There was no significant correlation in the type of gender between the two treatment groups (P=0.188).

There was no significant differences between time of initial dose of opioid and second dose in morphine suppositories group and IV morphine (P=0.0001).

There was meaningful differences in mean of pain severity in the morphine suppositories group and IV morphine at different times of study (P=0.085) (fig1).

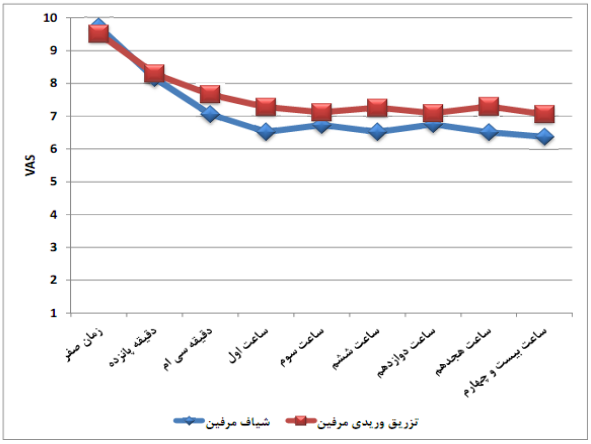

Figure 1. Comparison of mean of pain severity in the morphine suppositories group and IV morphine at different times of study

Further evaluation indicated meaningful differences of pain severity after 3o sec, 1,6,18,24 h of intervention among morphine suppositories (P=0.04, p=0.01 respectively) and IV morphine (P= 0.009, p=0.005, P= 0.028 respectively) recipient .

There was statistical significant differences in pain severity at different times of study in the each of age in the both groups (P=0.0001). But there was no significant differences in pain severity in the each of age between the suppositories /IV morphine groups.

There was no significant differences in mean of pain at different times of study between female (P=0.095) and male (P=0.178) of two groups.

Reduction of O2sata was significantly differences before, 15 min and 12, 18, 24 hrs after analgesic administration in two groups (P=0.0001).

Positive significant differences in breath rate was seen at different times in the two groups (P=0.0001). But there was no significant differences between suppositories and IV morphine groups (P=0.158).

There was significant differences in heart rate in the morphine suppositories group in compared to IV morphine recipient at different times of research (P= P=0.004, P=0.407 respectively). But, no significant differences in heart rate was seen at different times between two groups (P=0.158).

Systolic and diastolic blood pressures were dropped before opoied injection, but there was significant differences in both groups before medication administration in two variable. In addition, significant differences after 15 min of intervention was recorded for systolic blood pressures.

No significant differences in apnea were found at different time between two groups (P>0.05).

There was a meaningful correlation of nausea and vomiting after the first and fourth times of drug administration in the morphine suppositories (P=0.0001, P=0.034 respectively) and IV morphine (P=0.014, P= 0.002 respectively) groups.

There was no meaningful correlation in decreased level of consciousness at different time in the both groups (P>0.05).

Discussion

Despite the development of anesthesia medication, morphine remains choice for effective pain relief in the ED [8]. The successful analgesic effect of morphine was described in several previous studies [9, 10]. Intravenous administration of morphine for pain relief was reported in major surgery, however Nausea and/or Vomiting, sleepiness and apnea may accompany the use of this painkiller. An effective strategy to reduce occurrence of these side effects is the administration of oral, intramuscular or suppositories. The successful management of pain was reported with rectal morphine [11].

There was no meaningful differences in mean severity of pain at different time between two groups (P=0.085). In fact,

morphine suppositories analgesic effect was very similar to that of IV morphine.

In present study no meaningful correlation were shown in gender, age and arrival time between two patient groups (P=0.188; P=0.364; P=0.549 respectively). It has been reported that age plays an important role in analgesia effectiveness. A retrospective work by Jones et al. Identified that elders are less likely to receive ED analgesics for lower-extremity fractures than their younger counterparts [12].

According to statistical analysis, there was a positive correlation between first administration of IV/ suppositories morphine (P=0.0001), which may be related to peripheral vein of all traumatic patients and nursing facility administration.

O2satin, bps, Nausea/Vomiting were showed significant differences among suppositories/IV morphine recipient (P=0.0001). In general, data from recent investigation emphasized the less complications of rectal administration of morphine compared to the intravenous morphine group.

Similar to this finding Rahimi et al. Showed that after 24 hours of intervention, no significant differences was found in mean of pain intensity between IV morphine (1.50±0.97) and morphine suppository (1.57±1.33) group. Although, nausea and vomiting was more common in suppository group which incompatible with present results [5]. These results are similar to finding of the study of Cole et al. and Beaver and Feise. Cole et al. and Beaver and Feise demonstrated that morphine hydrogen suppository can be effective in controlling postoperative pains [6, 7].

Also Beaver and Feise espressed that single rectal oxymorphone has lower and more delayed peak analgesia and a longer duration of action than intramuscular oxymorphone administration on postoperative pain and suggested that 5–10 mg suppository oxymorphone provides more analgesic effects than routinely used parenteral narcotics. It seems that the rectal route is an acceptable and practical way of administering potent analgesics and is probably being underutilized by physicians in the control of moderate to severe pain [6, 7].

Willkinson et al [11] compared the effect of oral and rectal route of morphine in relieving cancer pain, and their results indicated that rectal route as being suitable for MST administration when the oral route is no longer available. In a study by Lokas et al. Different rout of morphine administration was compared and rectal route is suggested as a safety method [13].

In contrast, an animal model has been reported that, 1, 2, and 5 mg/kg of morphine per rectum has a similar safety and adverse complication to IV and IM administration in dogs [14].

Limitations

There are some limitations in the present study. First, some findings may be due to the given doses and time intervals. Second, the sample size might be questionable. Not related to power analysis, but the limited number of patients and populations which we just studied the adult patients. If the number of patients was more, maybe the difference between success rates between two groups would be significant in pain relief.

Conclusion

With regard to the application of rectal and intravenous administration of morphine equivalent analgesia may be appropriate in patients with rectal as a method according to this method more secure and more convenient administration compared to intravenous administration. Also, we suggest altering the study design and further investigation.

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Conflict of interest: None.

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