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ORIGINAL RESEARCH

Ketamine infusion for postoperative analgesia in asthmatics: A comparison with intermittent Tramadol

[1]Dr. Mohammad Ilyas, [2]Dr. Satyendra Uike, [3]Dr.Akhilesh Chaudhary, [4]Dr. Ajay Singh

[1,4]Assistant Professor, Department of Anaesthesia, Bundelkhand Medical College, Sagar, M.P., India
[2]Professor, Department of Emergency Medicine, Bundelkhand Medical College, Sagar, M.P., India
[3]Senior Resident, Department of Anaesthesia, Bundelkhand Medical College, Sagar, M.P., India

Corresponding Author:
Dr Ajay Singh, Assistant Professor, Department of Anaesthesia, Bundelkhand Medical College, Sagar, M.P., India

ABSTRACT

Background: Narcotics when used for postoperative analgesia may release histamine and cause bronchospasm in asthmatic patients. The present study was conducted to compare ketamine and tramadol for postoperative analgesia in asthmatics.

Materials & Methods: 60 asthmatic patients of both genders were divided into 2 groups of 30 each. Group I received ketamine-midazolam infusion preceded by a bolus of ketamine 0.5 mg-kg-' IV. Group II received a bolus dose of tramadol (2 mg/kg) followed by an intravenous infusion (0.2 mg $\cdot$ $kg^{-1}\cdot$ h^{-1}) postoperatively. Parameters such as Forced vital capacity in 1 s (FEV_1), respiratory rate, pain score in minutes and sedation score was compared.

Results: Group I had 16 males and 14 females and group II had 12 males and 18 females. There was significant difference in respiratory rate and non- significant difference in forced vital capacity in 1 s (%) and pain score in minute in both groups. The mean sedation score at baseline was 3.2 in group I and 5.2 in group II, at 1 hour was 2.5 in group I and 4.7 in group II, at 2 hours was 2.3 in group I and 3.4 in group III and 1.7 in group I and 2.8 in group II. The difference was significant ($P< 0.05$).

Conclusion: Both Ketamine and tramadol infusion can provide a safe alternative to the usual parenteral narcotic therapy in asthmatics in terms of analgesia.

Key words: Ketamine, Narcotics, Tramadol

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Introduction

Narcotics when used for postoperative analgesia may release histamine and cause bronchospasm in asthmatic patients. Ketamine in subanesthetic doses is an effective analgesic. There is a growing body of evidence that ketamine, a non-competitive antagonist at NMDA receptors can facilitate postoperative pain management.[1] Ketamine also alleviates provoked pain by preventing postoperative hyperalgesia. Narcotics when used for postoperative analgesia may release histamine and cause bronchospasm in asthmatic patients. Therefore, Ketamine in subanaesthetic doses is an effective analgesic.[2]

Tramadol hydrochloride on the other hand is a synthetic opioid agonist analgesic acting at the μ receptor (OP3).[3] Its analgesic potency has been described as 5–10 times less than that of morphine, equal to that of meperidine and to 0.001 that of fentanyl. Its analgesic efficacy lies between that of codeine and morphine. Tramadol is a racemic mixture of two enantiomers with a structure similar to that of other opioid analgesics.[4]

Postoperative bolus of tramadol, followed by an infusion, shows a good risk/benefit ratio as an analgesic regimen for postoperative pain relief and is at least as effective as epidural morphine. The analgesic

action of tramadol is based on a multimodal mechanism of action, which may also have advantages over conventional opioids in terms of side effects.[5] The present study was conducted to compare ketamine and tramadol for postoperative analgesia in asthmatics.

Materials & Methods

The present study comprised of 60 asthmatic patients of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. . All patients were receiving medications for asthma (salbutamol 4-8 mgday-'1, and all had wheezes when assessed preoperatively. Patients were divided into 2 groups of 30 each. Group I received ketamine-midazolam infusion preceded by a bolus of ketamine 0.5 mg-kg-' IV. Group II received a bolus dose of tramadol (2 mg/kg) followed by an intravenous infusion ($0.2\ mg \cdot kg^{-1} \cdot h^{-1}$) postoperatively. Parameters such as forced vital capacity in 1 s (FEV_1), respiratory rate, pain score in minutes and sedation score was compared. Results were tabulated and assessed statistically. P value less than 0.05 was considered significant.

Results

Table I Distribution of patients

Groups	Group I	Group II
Number	ketamine	tramadol
M:F	16:14	12:18

Table I shows that group I had 16 males and 14 females and group II had 12 males and 18 females.

Table II Assessment of parameters

Parameters	Variables	Group I	Group II	P value
Respiratory rate	Baseline	22	19	0.02
	1 hour	24	20	
	2 hours	23	21	
	4 hours	21	18	
Forced vital capacity in 1 s (%)	Baseline	-30	-40	0.94
	1 hour	-24	-50	
	2 hours	-10	-35	
	4 hours	-5	-28	
Pain score in min	Baseline	5.4	5.8	0.12
	1 hour	4.8	4.6	
	2 hours	3.4	4.0	
	4 hours	2.6	3.5	

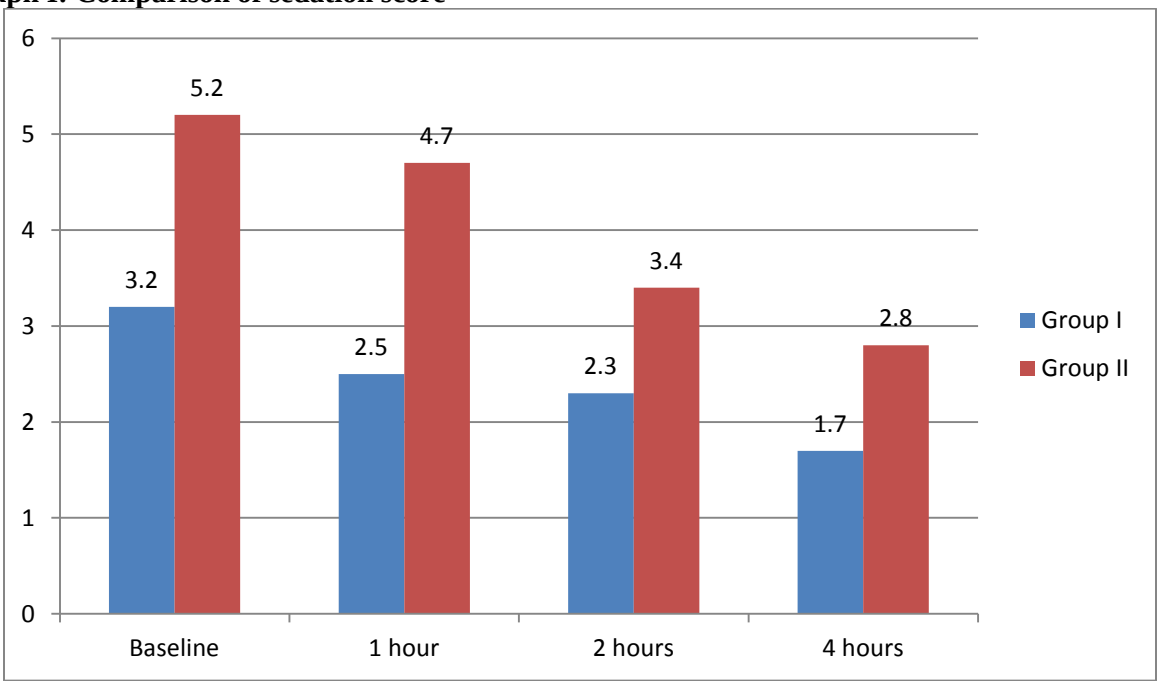
Table II shows that there was significant difference in respiratory rate and non- significant difference in forced vital capacity in 1 s (%) and pain score in minute in both groups.

Table III Comparison of sedation score

Sedation score	Group I	Group II	P value
Baseline	3.2	5.2	0.01
1 hour	2.5	4.7	
2 hours	2.3	3.4	
4 hours	1.7	2.8	

Table II, graph I shows that mean sedation score at baseline was 3.2 in group I and 5.2 in group II, at 1 hour was 2.5 in group I and 4.7 in group II, at 2 hours was 2.3 in group I and 3.4 in group III and 1.7 in group I and 2.8 in group II. The difference was significant (P< 0.05).

Graph I: Comparison of sedation score



Discussion

Pain is one of the most common patient complaints in the emergency department (ED), and management of pain is important parts of care in the ED.[6] Pain control has been considered a human right and in 2011, analgesics were administered in 97 million ED visits. Many medications are used as analgesics for acute pain; examples include opioids, non-steroidal anti-inflammatory drugs, acetaminophen, ketamine, and duloxetine etc.[7] Tramadol is considered an atypical opioid with multiple effects on various receptors.[8] It has shown efficacy in reducing different types of pain and is less likely to cause dependence than opioids. Its adverse effect profile is different from opioids and is less likely to cause respiratory depression but more likely to induce seizures.[9] The present study was conducted to compare ketamine and tramadol for postoperative analgesia in asthmatics.

We observed that group I had 16 males and 14 females and group II had 12 males and 18 females. Al-Sudani BH et al[10] in their study 120 parturients prepared for an elective cesarean section under general anaesthesia were allocated into two groups (60 patients in each group): Group A (Ketamine group) (n = 60) patients received a bolus dose of ketamine (0.3 mg/kg) followed by an intravenous infusion at 0.1 mg • kg−1 • h−1) postoperatively . Group B (Control group) (n = 60) patients received a bolus dose of tramadol (2 mg/kg) followed by an intravenous infusion (0.2 mg • kg−1 • h−1) postoperatively Diclofenac suppositories were given to both groups postoperatively. The ketamine group had less pain at rest and with movement, required less diclofenac suppositories throughout the 24 h study period. Ketamine improved subjective analgesic efficacy. Hallucinations were more common in ketamine patients, but other side effects were similar.

We found that there was significant difference in respiratory rate and non- significant difference in forced vital capacity in 1 s (%) and pain score in minute in both groups. Nimmo and Clements[11] suggested that a constant infusion of 3 pg.kg-'.min-' after a bolus of 1-2 mg-kg-' is sufficient to produce a blood concentration of 150 ng.mL-', greater than that required for analgesia. Owen et al[12] have successfully used ketamine for analgesia from a constant infusion at a rate of 4 pg.kg-'.min-' after a bolus of 1 mg-kg-'.

We found that mean sedation score at baseline was 3.2 in group I and 5.2 in group II, at 1 hour was 2.5 in group I and 4.7 in group II, at 2 hours was 2.3 in group I and 3.4 in group III and 1.7 in group I and 2.8 in group II. Jahangir et al[13] delivered subanesthetic doses of ketamine in combination with midazolam (5.88-6.42 micrograms.kg-1.min-1 and 1.17-1.28 micrograms.kg-1.min-1, respectively), via an infusion for postoperative analgesia after elective abdominal hysterectomy in patients with asthma. Data were compared with those from a similar group of patients receiving conventional intramuscular meperidine. A significant degree and earlier onset of analgesia ($P < 0.05$) was achieved in the ketamine group. For other variables no significant difference was observed between the groups ($P > 0.05$). Ketamine-midazolam infusion can thus provide a safe alternative to the usual parenteral narcotic therapy in asthmatics, in terms of analgesia and patient acceptability.
The shortcoming of the study is small sample size.

Conclusion

Authors found that both Ketamine and tramadol infusion can provide a safe alternative to the usual parenteral narcotic therapy in asthmatics in terms of analgesia.

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