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Corresponding Author
M. Sunitha,
Department of Anesthesiology, KMC, Manipal, Karnataka, India

Author Designation
[1,2]Assistant Professor
[3]Senior Registrar
[4]Senior Resident

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Dexamethasone Versus Ketamine Soaked Pharyngeal Pack for Prevention of Sore Throat Following Oro-Nasal Surgeries: Hemodynamic Changes

[1]Khajabanu Y. Hugar, [2]Shilpa Nijalingappa Bingi, [3]B.M. Chandan and [4]M.Sunitha

[1,2]Department of Anesthesiology, GIMS, Gadag, Karnataka, India
[3]Department of Anesthesiology, Fortis Hospital, Cunningham Road, Bangalore, Karnataka, India
[4]Department of Anesthesiology, KMC, Manipal, Karnataka, India

ABSTRACT
Ketamine crosses the blood brain barrier rapidly and has an onset of action within 30 to 60 seconds after intravenous administration and 2 to 4 minutes after intramuscular injection. A peak plasma concentration of ketamine occurs within 1 minute after intravenous administration and within 5 minutes after intramuscular injection. Preanesthetic assessment was done one day prior to the surgery. A detail history of present and past medical illness, past h/o of anaesthetic exposure, concomitant history of drug allergy and intake of any medications in preoperative period was recorded. General physical examination and systemic examination of the patients was done. There was no significant difference in mean SBP comparison between three groups at any interval.

INTRODUCTION

Dexamethasone is a water soluble ester, in the form of dexamethasone sodium phosphate. It has an oral, intramuscular or intravenous preparation. It acts rapidly and attain high concentration in tissue fluids. Dexamethasone is mainly metabolized in the liver by hepatic microsomal enzymes[1]. The t 1/2 of dexamethasone in greater than 36hrs, its action starts within 30 minute of injection and action persists even after the drug disappears from the circulation. Proven analgesic and anesthetic effects of the drug are primarily attributed to NMDAR inhibition. However, ketamine's pharmacological targets are not limited to NMDARs. It has been reported that ketamine interacts with several other receptors and ion channels, including dopamine, serotonin, sigma, opioid and cholinergic receptors, as well as hyper polarization -activated cyclic nucleotide-gated (HCN) channels. Ketamine typically has a lower affinity (higher inhibitory constant-Ki-values) for these receptors and channels compared with NMDA receptors[2]. Ketamine crosses the blood brain barrier rapidly and has an onset of action within 30-60 seconds after intravenous administration and 2-4 minutes after intramuscular injection. A peak plasma concentration of ketamine occurs within 1 minute after intravenous administration and within 5 minutes after intramuscular injection. The duration of action after a single intravenous administration of a general anaesthetic dose (2mg/kg) is 10-15 minutes and recovery of full orientation to person, place and time occurs within 15-30 minutes[3]. Effect on Central Nervous System: Ketamine produces dose-related dissociative anesthesia and analgesia. At high concentrations of ketamine acts on s opioid receptors, muscarinic receptors are blocked and leads to facilitation of GABA-ergic neurotransmission. Most important action of ketamine is inhibition of NMDAR mediated glutamergic input to the GABA-ergic system which leads to changes in the excitatory activity in the cortex and limbic system. Whereas at the spinal cord level, ketamine has potent antinociceptive effect at the NMDAR and it acts by inhibiting acetylcholine release[4].

MATERIALS AND METHODS

After obtaining written informed consent, participation consent and approval from institutional ethical committee, patients were be randomly allocated to one of the three groups using numbers generated from www.random.org. Preanesthetic assessment was done one day prior to the surgery. A detail history of present and past medical illness, past h/o of anaesthetic exposure, concomitant history of drug allergy and intake of any medications in preoperative period was recorded. General physical examination and systemic examination of the patients was done. Routine investigation and relevant specific investigations were done. Height in cms and weight in kgs were recorded. Patients were advised overnight fasting and were premeditated with Tab. Pantoproazole 40 mg and Tab. Ondansetron 8mgs on the previous day of surgery and on the morning of surgery with few sips of water.

A proforma was used to collect the data which includes patient's demographic parameters, indication for surgery, the anaesthetic details, intra operative and post-operative monitoring.

Drug and Dilutions: Patients were randomly allocated into three groups.

- **Group K:** Throat pack soaked in Ketamine 1mg/kg diluted in 15ml normal saline.
- **Group D:** Throat pack soaked in dexamethasone 8mg diluted in 15ml normal saline.
- **Group N:** Throat pack soaked in 15ml Normal saline.

Inclusion Criteria:

- Patients who are willing to give written/informed consent.
- Patients aged 18-75 years of both genders.
- Patients scheduled for elective oro-nasal surgeries under general anaesthesia.
- Patients under Physical status ASA-1 and ASA-2.

Exclusion Criteria:

- Patients refusing to take part in study.
- Patients under physical status ASA-3 and ASA-4.
- Pregnant women.
- Patients with known allergy to study drugs.
- Patients with history of pre-op sore throat, chronic obstructive pulmonary disease, upper respiratory tract infection.
- Patients with anticipated difficult airway.
- Patients with history of head injury.

RESULTS AND DISCUSSIONS

There was no significant difference in mean heart rate comparison between three groups at any interval (Table 1). There was no significant difference in mean SBP comparison between three groups at any interval (Table 2). There was no significant difference in mean DBP comparison between three groups at any interval (Table 3). There was no significant difference in mean MAP comparison between three groups at any interval (Table 4). A prospective randomized double blind study was conducted involving 105 patients of ASA grade I and II in the age group of 18-60 years of either sex undergoing elective oro-nasal surgeries under general anaesthesia were included after obtaining informed written consent. Patients were randomly allocated in to three groups of 35 patients each.

Table 1: Mean Heart Rate Comparison Between Three Groups at Different Intervals of Time

	Group						
	Ketamine		Dexamethasone		Normal Saline		
	Mean	SD	Mean	SD	Mean	SD	Pvalue
Baseline	78.23	9.29	78.09	7.78	76.34	6.83	0.552
At Packing	83.34	8.75	83.00	7.86	83.49	6.48	0.964
5 Min	83.09	7.91	82.51	7.73	82.63	6.67	0.944
10 Min	82.51	7.66	81.34	7.69	81.29	6.67	0.733
15 Min	80.31	7.82	79.91	7.24	80.00	7.05	0.972
20 Min	79.34	7.25	79.09	7.01	79.11	6.49	0.986
30 Min	78.51	7.92	78.26	7.01	78.40	6.59	0.989
1 hr	78.63	8.19	78.03	6.77	77.66	6.25	0.847
2 hr	77.31	8.34	77.57	7.13	77.37	6.32	0.988
3 hr	77.97	8.39	78.09	6.69	77.51	6.33	0.940

Table 2: Mean SBP Comparison Between Three Groups at Different Intervals of Time

	Group						
	Ketamine		Dexamethasone		Normal Saline		
SBP	Mean	SD	Mean	SD	Mean	SD	Pvalue
Baseline	122.71	8.76	120.54	7.98	121.26	8.86	0.558
At Packing	124.74	8.95	123.94	7.76	126.29	8.40	0.496
5 Min	123.26	8.54	124.89	7.25	126.94	8.37	0.165
10 Min	122.54	7.63	122.63	6.71	124.91	8.24	0.333
15 Min	122.51	8.03	122.09	6.91	123.31	8.16	0.796
20 Min	121.14	7.37	121.03	6.99	122.91	8.07	0.500
30 Min	120.14	8.19	120.06	6.94	121.69	7.47	0.599
1 hr.	118.14	8.22	119.09	7.24	121.20	7.84	0.247
2 hr.	117.71	7.73	118.23	7.10	120.09	7.83	0.389
3 hr.	118.29	7.62	117.23	7.16	119.66	7.67	0.400

Table 3: Mean DBP Comparison Between Three Groups at Different Intervals of Time

	Group						
	Ketamine		Dexamethasone		Normal Saline		
DPB	Mean	SD	Mean	SD	Mean	SD	Pvalue
Baseline	71.00	7.55	73.00	4.24	73.09	5.93	0.269
At Packing	72.00	7.14	74.40	4.20	75.23	7.00	0.086
5 Min	72.29	7.35	74.14	4.65	74.89	6.47	0.206
10 Min	71.91	8.21	73.46	4.52	74.54	6.15	0.238
15 Min	71.46	7.51	74.26	4.47	74.23	5.99	0.094
20 Min	70.89	7.70	73.77	4.27	73.43	5.98	0.105
30 Min	70.31	8.02	72.91	4.65	73.20	5.97	0.118
1 hr	70.06	7.42	72.49	4.08	72.97	6.66	0.116
2 hr	70.14	7.63	71.06	4.50	72.31	6.15	0.346
3 hr	70.26	7.43	71.14	5.05	72.14	5.78	0.444

Table 4: Mean MAP Comparison Between Three Groups at Different Intervals of Time

	Group						
	Ketamine		Dexamethasone		Normal Saline		
MAP	Mean	SD	Mean	SD	Mean	SD	Pvalue
Baseline	88.05	7.80	88.85	4.62	89.14	6.58	0.765
At Packing	89.58	7.38	90.91	4.45	92.25	7.10	0.228
5 Min	89.28	7.40	91.06	4.73	92.24	6.63	0.151
10 Min	88.79	7.67	89.85	4.57	91.33	6.31	0.243
15 Min	88.48	7.22	90.20	4.61	90.59	6.15	0.307
20 Min	87.64	7.08	89.52	4.31	89.92	6.11	0.234
30 Min	86.92	7.58	88.63	4.46	89.36	5.99	0.239
1 hr.	86.09	7.15	88.02	4.14	89.05	6.52	0.123
2 hr.	86.00	7.21	86.78	4.59	88.24	6.22	0.302
3 hr.	86.27	7.11	86.50	5.12	87.98	5.81	0.444

- **Group K:** For 35 patients, 1mg/kg Ketamine diluted in 15 ml of normal saline was given.
- **Group D:** For 35 patients, 8mg dexamethasone diluted in 15 ml of normal saline was given.
- **Group N:** For 35 patients, 15ml of Normal saline[5,6].

In all the groups, standardized length of throat pack of 100 cm were soaked with the drug. In the postoperative period the incidence and severity of sore throat and dysphagia were evaluated at 0, 1, 2, 6, 12 and 24 hours. Ahmed[7] in his study concluded that the method used for airway management has the strongest influence on the incidence of sore throat. Out of 312 patients interviewed, 81(26%) patients suffered with sore throat postoperatively. Of them

28% of patients with endotracheal intubation (ETT) and 3.5% of patients with laryngeal mask airway had a sore throat[7]. The method of airway management in our study was using endotracheal tube for intubation, which were comparable in both the groups. Reddy[8], conducted a study over 90 patients on effective dose of ketamine nebulization in preventing post-operative sore throat due to tracheal intubation and divided them into three equal groups. Group a received 0.5mg/kg, group B received 1mg/kg and group C 1.5mg/kg body weight of Nobelist preservative free ketamine for 5min, 5min before intubation. He concluded that 1mg/kg and 1.5mg/kg of Nobelist ketamine are better and equally effective in reducing the incidence and severity of post-operative throat. Based on this study, we standardized our ketamine dosage to 1mg/kg body weight and it was found to be effective in preventing sore throat post operatively[8]. Salama[9] conducted randomized controlled trial using 120 patients. They were randomly assigned into 2 groups of 60 each. Group D received dexamethasone 8mg in 5ml nebulization and group S received normal saline in 5ml nebulization 15min before general anesthesia and endotracheal intubation. He noted that the incidence and severity of POST were significantly reduced in the dexamethasone group than in saline group. In our study, dexamethasone was used at a dosage of 8mg and was diluted to 15ml using normal saline. Pharyngeal pack soaked in dexamethasone was effective in reducing post-operative sore throat compared to normal saline group[10].

CONCLUSION

Intra operative HR, SBP, DBP, MAP were comparable in all the three groups. ($p>0.05$).

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