



PREVENTION OF PROPOFOL INJECTION PAIN-COMPARISON BETWEEN LIDOCAINE VS KETAMINE INFUSION

Anaesthesiology

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ABSTRACT

Pain during the injection of anaesthetic agents may be distressing to the patients and can reduce the acceptability of an otherwise useful agent such as propofol for short cases and day care surgeries. Lidocaine and ketamine both are used as pre-treatment to decrease propofol related injection pain. In this study 108 patients were randomized into 2 groups of 54 each. Patients are undergoing elective surgery under general anaesthesia are assigned into two groups, group L and group K. Incidence and severity of pain will be scored by McCrick and Hunter pain scale and results and hemodynamic changes will be recorded. We found that incidence of mild pain was 33.33% in group K in compare to 57.41% in group L, which was statistically significant ($p=0.01$).

KEYWORDS

propofol inducing pain, propofol, lidocaine, ketamine

INTRODUCTION

Pain during the injection of anesthetic agents may be distressing to the patients and can reduce the acceptability of an otherwise useful agent. It may be a limiting factor in commonly used intravenous anesthetic drugs such as propofol. It produces a good quality of anesthesia and rapid recovery. It belongs to the group of phenols, and so propofol can irritate the skin, mucous membrane, and venous intima.

Ketamine is an anaesthetic agent and that has analgesic and local anaesthetic property. It acts by antagonize the NMDA receptor, neuroprotective potency, sympathomimetic activity by enhanced central peripheral noradrenaline transmission. Ketamine is found to be useful in preventing PIP to mitigate the nociceptive response by attenuating the afferent pain pathway.

The most common method used to decrease propofol injection pain is the usage of lidocaine. Some ideas are suggested, such as a decrease in the pH of the lidocaine-propofol mixture, which decreases the concentration of propofol in aqueous phase with less pain. Another mechanism is the lidocaine effect as a local anesthetic itself, by stopping the sodium ion from passing through voltage gated channels, so the signals for pain can be stopped even before the signals are formed by binding the sodium channels.

This study aimed to compare the effectiveness of ketamine injection to decrease propofol-induced pain in comparison to lidocaine injection experienced during the administration of the pretreatment solution and after the release of the tourniquet during propofol injection for the induction of general anesthesia. This study will also help to determine the local anesthetic effect of ketamine and find an alternative drug to lidocaine injection to decrease propofol-induced pain.

MATERIALS & METHODS

This prospective, randomized Study was conducted on 108 patients of age group of 18 to 65 years and American society of anesthesiologist (ASA) grade 1,2,3 randomly allotted in two groups 54 each, group L and group K. Patients were undergoing elective surgery under general anaesthesia.

Patients were kept nil per orally before surgery. On the day of surgery patients were reassessed in the preoperative room. In the operating room, standard monitored including ECG, NIBP, SPO2 will be attached and an intravenous line was secured via 18g on the dorsum of hand. 4 lit oxygen through nasal prongs was applied to patient.

No premedication other than study drugs was administer to the patients. Patients of **Group L** were injected with inj. Lidocaine 0.5mg/kg diluted in 10ml normal saline given slowly over 5 minutes and **Group K** were given inj. Ketamine 0.2mg/kg diluted in 10ml

normal saline given slowly over 5 minutes. The principal investigator prepared the study drugs and the co-investigators were blinded to the study drugs being administered to the patients. immediately after infusion, inj. Propofol 2.5mg/kg iv injected over 25 seconds. Patients were assessed for pain every 5 seconds, by saying Does it hurt? Until the patient became unresponsive.

Incidence and Severity of PIP was scored by McCrick and Hunter Pain Scale and results were recorded. Hemodynamic changes were recorded. PAIN SEVERITY SCALE:

DEGREE OF PAIN	RESPONSE
None	No response
Mild	Pain reported in response to questioning alone without any behavioral sign
Moderate	Pain reported in response to questioning accompanied by behavioral sign or Pain reported without any questioning
Severe	Strong vocal response or Response accompanied by facial grimacing arm withdrawal, tears

Was followed by 100% oxygenation given via bair circuit with oxygen rate of 8 to 10lit/min and Inj. glycopyrrylate 0.004mcg/kg iv given followed by Inj. fentanyl 2mcg/kg iv given. After confirmation of chest rise with mask ventilation Inj. scoline 2mg/kg given. Airway was secured with Polyvinyl chloride cuffed ETT of proper size

Deeper plane of anesthesia was Maintained with O2+N2O+ Sevoflurane intermittent positive pressure ventilation and Inj. Atracurium 0.4-0.5mg/kg iv f/b 0.08-0.1mg/kg iv given.

Patient was Reversed with the help of Inj. Glycopyrrylate 0.008mg/kg iv and Inj. Neostigmine 0.03-0.07mg/kg iv. After thorough oral suction cuff deflated ETT removed.

DATA ANALYSIS METHODS

Statistically Chi square test was applied to compare the data. Statistical significance was defined as $p < 0.05$.

All demographic data were summarized as mean $\pm$ standard deviation (SD) for continuous variables and percentages in case of frequency/categorical variables.

Continuous variables between the groups like Systolic BP and diastolic BP were analyzed using independent t test. Categorical variables like pain scale were assessed using chi squared test between the two groups.

RESULTS

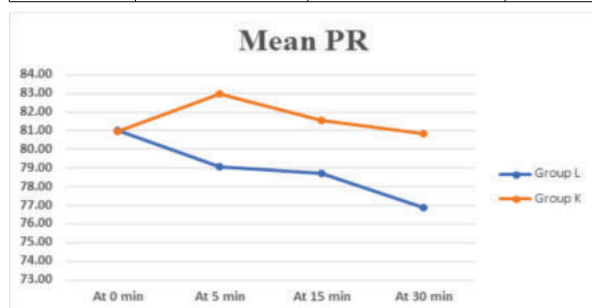
All 108 patients were divided into two groups with 54 patients in each group to compare propofol injection pain (PIP) by giving Lidocaine vs Ketamine infusion.

Table 1: Pulse Rate

We have studied the hemodynamic parameters like pulse rate during Propofol injection pain (PIP) between two groups and compared.

Comparison of changes in PR mean between two groups

HR	Group L Mean $\pm$ SD	Group K Mean $\pm$ SD	P Value
At 0 min	81.06 $\pm$ 5.97	80.96 $\pm$ 7.64	0.944165
At 5 min	79.09 $\pm$ 7.19	82.96 $\pm$ 7.68	0.007998
At 15 min	78.72 $\pm$ 5.74	81.54 $\pm$ 7.90	0.036536
At 30 min	76.91 $\pm$ 6.07	80.85 $\pm$ 7.77	0.004022



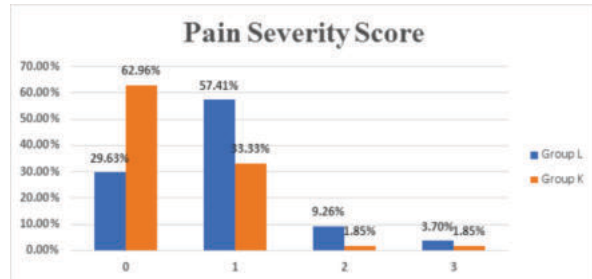
This table shows the comparison of changes in mean heart rate at various pre determine time interval and P value to determine significant changes in heart rate between two groups. There was no significant difference in PR between two groups.

Table 2: Pain Severity Scale

The incidence and severity of Propofol injection pain (PIP) following administration of drugs like Lidocaine and Ketamine among patients in two groups and the pain score and severity are compared with each other.

McCrirk And Hunter Scale

PAIN SCORE	Group L		Group K		P Value
	No.	%	No.	%	
0	16	29.63%	34	62.96%	0.0005
1	31	57.41%	18	33.33%	0.01
2	5	9.26%	1	1.85%	0.09
3	2	3.70%	1	1.85%	0.56



Incidence of no pain with group L and K is 29.63% and 62.96% following drug administration. Severity of mild pain is 57.41% with group L and 33.33% with group K. Incidence of moderate to severe pain is 12.96% with group L and 3.7% with group K. The incidence and mild severity of Propofol injection pain more decreases with Ketamine administration and was found to be clinically significant, p value (<0.05)

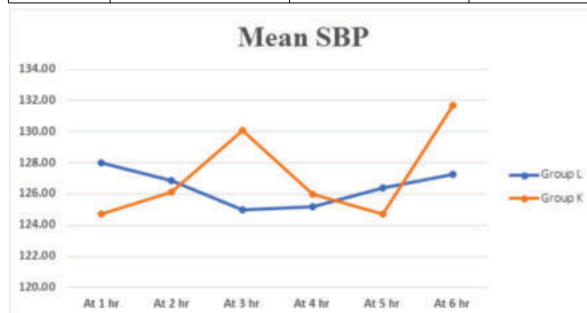
Table 3: SBP

We have studied the hemodynamic parameters like SBP during Propofol injection pain (PIP) between two groups and compared.

Comparison of hourly SBP between two groups

SBP	Group L Mean $\pm$ SD	Group K Mean $\pm$ SD	P Value
At 1 hr	128.04 $\pm$ 9.59	124.72 $\pm$ 17.55	0.225894

At 2 hr	126.89 $\pm$ 6.83	126.15 $\pm$ 15.90	0.753665
At 3 hr	125.02 $\pm$ 8.94	130.06 $\pm$ 16.49	0.051075
At 4 hr	125.22 $\pm$ 7.87	126.02 $\pm$ 17.66	0.762761
At 5 hr	126.37 $\pm$ 10.84	124.74 $\pm$ 16.73	0.549259
At 6 hr	127.26 $\pm$ 8.53	131.70 $\pm$ 12.80	0.036042



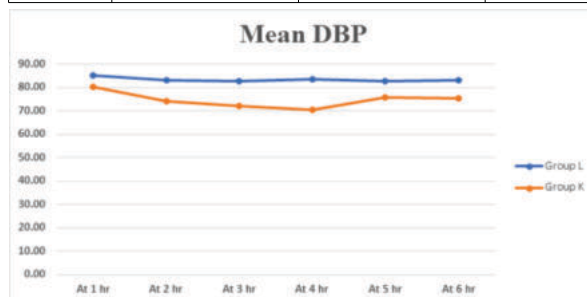
This table shows the comparison of SBP at various predetermined time interval and P value to determine the significance of the changes in between both groups. There was a significant difference of SBP observed between both the groups at 3hour of drug administration p value 0.04

Table 4: DBP

We have studied the hemodynamic parameters like DBP during PIP between two groups and compared.

Comparison of DBP between two groups

DBP	Group L Mean $\pm$ SD	Group K Mean $\pm$ SD	P Value
At 1 hr	85.11 $\pm$ 5.27	80.26 $\pm$ 6.17	<0.0001
At 2 hr	83.06 $\pm$ 4.95	74.13 $\pm$ 4.58	<0.0001
At 3 hr	82.83 $\pm$ 5.32	71.98 $\pm$ 5.29	<0.0001
At 4 hr	83.39 $\pm$ 5.56	70.67 $\pm$ 5.75	<0.0001
At 5 hr	82.80 $\pm$ 4.97	75.96 $\pm$ 6.73	<0.0001
At 6 hr	83.09 $\pm$ 5.19	75.57 $\pm$ 7.24	<0.0001



This table shows the comparison of DBP at various predetermined time interval and P value to determine the significance of the changes in between both groups. There was a significant difference of DBP observed between both the groups at first 6 hours of drug administration p value 0.001

DISCUSSION

Propofol is an anaesthetic agent used iv for induction and Maintenance of anaesthesia, due to its good absorption, rapid action, rapid recovery and minor side effects which includes propofol injection pain (PIP).

The overall risk of pain from propofol injection alone was about 60%. Use of antecubital vein instead of hand vein use of wide bore iv cannula were the effective interventions. Similarly, pretreatment with lidocaine in conjunction with venous occlusion was also effective. The pain on propofol injection may not be a serious complication but patient remember it as an unpleasant experience during the induction of anesthesia. So, many efforts are underway to alleviate the propofol injection pain.

We have analyzed that 33.33% of patients in group k had mild pain where as 57.41% of patients of group L had mild pain which is statistically significant as p value is 0.01. There was no incidence of pain in 62.96% of group K and 29.63% of group L which was statistically significant as p value is 0.0005. There were no intra

operative adverse drug reaction except 3 patients showed bradycardia and 1 patients shows hypotension of group L compared with group K 2 patients showed tachycardia. The incidence of moderate to severe pain during propofol injection was 12.96% and 3.7% in group L and K respectively which was statistically not significant suggesting that both of them were equally effective in reducing moderate to severe PIP.

CONCLUSIONS

We found the incidence of no pain was 62.96% in Group K in compare to 29.63% in group L, which was statistically significant ($p=0.0005$).

We found that the incidence of mild pain was 33.33% in Group K in compare to 57.41% in group L, which was statistically significant ($p=0.01$)

There was no statistically significant difference in moderate and severe pain among both groups. There was also no significant difference of side effects among both groups.

The study concluded that intravenous infusion of Ketamine 0.2mg/kg before Propofol injection more effective in alleviating the incidence of PIP and severity (mild pain only) when compared to lignocaine 0.5 mg/kg without any statistically significant side effects.

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