

ORIGINAL ARTICLE

Efficacy of intravenous tramadol in reduction of propofol induced pain

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ABSTRACT

Objectives: Propofol is one of the mainly used intravenous anaesthetic used around the globe. However, it is commonly associated with intravascular pain at the time of administration. In this study, we wanted to determine the effectiveness of Tramadol in comparison to Lignocaine in reducing Propofol induced pain.

Study Design: Randomized clinical trial.

Study Setting: It was performed in Main Operation Theatre, AK CMH Rawalakot; over a period of seven Months from 27-09-2013 to 27-04-2014

Subjects and Methods: 100 patients, having ASA I and ASA II who had presented for elective surgery, were included in the study. Patients with psychiatric disorder or hypersensitivity to lignocaine, propofol or tramadol were excluded. They were divided into two groups of 50 each. Group A received 50 mg intravenous Tramadol, followed by 25 % of dose calculated for Propofol (2 mg/kg). Drugs were injected into most prominent vein of hand, using 20 G cannula, at rate of 1 ml/sec. Group B received 2 ml of 2 % lignocaine, followed by Propofol in same manner. IBM SPSS version 20 was used for statistical analysis. Independent sample T-test was used for find out p value for age. Chi square was used to find out p value for gender and pain. Pain was assessed by anesthetist as per patient's facial response or complaint of pain.

Results: Mean age was 31.94 ± 17.59 and 29.86 ± 13.58 in group- A and B respectively (P value=0.07). Group A comprised of 33 female and 17 males, whereas Group B comprised of 30 females and 20 males (P value =0.534). Pain was present in 7 (14%) patients in group A as compared to 11 (22%) patients in group B (P value=0.298). Statistically the difference in regards to gender or pain was insignificant.

Conclusion: The study concludes that there is no significant difference between pretreatment with tramadol or lignocaine, in relieving pain caused by propofol.

Key words: Pain; Propofol; Tramadol; Lignocaine

Citation: Shah SARA, Bukhari RH, Naqvi SSN. Efficacy of intravenous tramadol in reduction of propofol induced pain. *Anaesth Pain & Intensive Care* 2016;20(2):150-153

Received: 19 March 2015; **Reviewed:** 5, 6 June 2015; 24 May 2016; **Corrected:** 9, 14 August 2015; 10 February 2016; **Accepted:** 24 May 2016

INTRODUCTION

Propofol is one of the most commonly used induction agents around the globe. This is due to its fast onset, and short duration of action. The commercial preparation is 1 % aqueous solution, having egg lecithin, soybean oil and glycerol. It causes pain when given intravenously, and incidence can be very high, with a range of 28 to 90%.¹ Studies were conducted around the globe to find methods

of preventing it. Lignocaine had been the center of focus due to its local anesthetic properties, and different drugs have been tested against it. Maxolon and flurbiprofen axetil² were compared in one study, whereas fentanyl³ was tested in another study; and yet in another study, granisetron⁴ was tested against lignocaine. So lignocaine played a role like gold standard. Other strategies were tested as well, for example, magnesium sulfate, ketamine, ketorolac,

ondansetron⁵ or using more prominent veins.

Tramadol is a centrally acting analgesic. It is similar in structure to codeine and morphine.⁶ It has two different mechanisms of action, which complement each other. One is that it acts as weak opioid agonist. Other is that it inhibits reuptake of monoamine neurotransmitter.⁷ Its role in perioperative pain management is established.^{7,8} Studies have shown that it has peripheral action as well, which help decrease pain induced on injection of propofol.⁹

This study was carried out to compare efficacy of pretreatment with lignocaine and tramadol for reduction of propofol induced pain.

METHODOLOGY

It was a randomized clinical trial. Sampling was done using non-probability sampling technique. Patients with ASA I and II were included for study who had presented for elective surgery, and had given consent for it. Patients with hypersensitivity to lignocaine, propofol or tramadol were excluded from the study. So was the case with those who had any psychiatric disorder or disorientation.

Data Collection Procedure: After taking approval from hospital ethical committee, informed consent was taken from the patient before including them in the sample. Procedure was explained to them in detail. Most prominent vein was selected in hand, and intravenous access obtained with 20 G cannula. Monitors were attached including non-invasive blood pressure, ECG and pulse oximeter. Venous occlusion was obtained with rubber tourniquet for one minute prior to administration of tramadol and lignocaine. Patients were divided into two groups using computer generated table of Random numbers, comprising of 50 patients each. Group A was given 50 mg of Tramadol intravenously. Propofol dose was calculated for each patient

at dose of 2 mg/kg. 25 % of this dose was given at rate of 01 ml/second. Group B was given 02 ml (2%) lignocaine. This was followed by propofol administration in the same fashion as for group A.

Anesthetist recorded pain as per patient's facial response or complaint of pain. Presence of pain was marked as "yes", and absence as "no".

Statistical Analysis: Statistical analysis was done using IBM SPSS version 20. Mean and standard deviation

were used for age. Independent sample T-Test was used to find p value. Chi Square

was used to find out p value for gender and pain. p value \leq 0.05 was taken as significant.

RESULTS

100 Patients were included in study, divided in two groups of 50 each. Mean age was 31.94 ± 17.59 and 29.86 ± 13.58 in group- A and B respectively (P value=0.07). Group A comprised of 33 female (66%) and 17 males (34%), whereas Group B comprised of 30 females (60%) and 20 males (40%) [P value =0.534] {Table 1}. Pain was present in 7 patients (14%) in group A as compared to 11 patients in group B (22%) [P value=0.298]. This shows that there was no significant statistical difference between Pretreatment with Tramadol and Lignocaine.

DISCUSSION

Rapid onset and short duration of action has made Propofol one of the most used induction agents around the globe. Its sedative effect has made its impact in ICU setting,¹⁰ and studies found it as good as midazolam¹¹, or even better if patient was on ventilator¹². It has its own set of side effects, especially the pain it caused when given

Table1: Distribution of cases by gender. Data given as N(%)

Sex	Group-A (Tramadol) n = 50 N(%)	Group-B (Lignocaine) n = 50 N(%)	P value
Male	17(34)	20(40)	0.534
Female	33(66)	30(60)	

Table-2: Distribution of cases by pain response n = 100

Pain	Group-A (Tramadol) n = 50		Group-B (Lignocaine) n = 50	
	No.	%	No.	%
Yes	07	14.0	11	22.0
No	43	86.0	39	78.0
P value	0.298			

efficacy of intravenous tramadol in reduction of propofol induced pain

intravenously. Different studies were done to prevent it, and different levels of success were obtained.

Some studies concentrated on factors like age, gender, size of vessel selected and site of injection, and observed that young age and female gender are associated with higher incidence.¹³

Nakane and Iwama¹⁴ suggested that the pain produced by Propofol injection is due to activation of plasma kallikrein-kinin system by lipid solvent, and this results in formation of bradykinin. It modifies vessel, and permeability is increased, which causes more drug to come in contact with free nerve endings.

Lignocaine is one of the widely used local anesthetic agents. It served as a gold standard for other drugs to be compared with. Picard and Tramer¹⁵ concluded that it was most effective drug for the sake of prevention. They used a tourniquet to give a "Bier block like effect" for lignocaine.

Different drugs are part of anesthetic technique, for example opioids for pain relief or anti emetics used for preventing PONV. These drugs were tested against lignocaine to see if these are of any use to decrease Propofol induced pain. And it was found that fentanyl,¹⁶ alfentanil¹⁷ and remifentanil¹⁸ also prevented or decreased propofol induced pain. And these have added advantage of decreasing pain as well.

IV paracetamol pretreatment was tested against lignocaine as well, but lignocaine proved better.¹⁹

However, pretreatment with thiopentone was better than lignocaine as per study of Haugen et al.²⁰

Anti-emetics were tested as well. Metoclopramide in different doses was tried against lignocaine by Fujii Y et al,²¹ whereas Liaw WJ et al²² tried these two drugs with tourniquet, which helped intravenous retention of the drugs. Liaw et al found that IV retention was effective.

Apart from metoclopramide, Ondansetron²³ and Granisetron²⁴ was also tried. And studies showed that they can also be useful for decreasing propofol induced pain.

Tramadol is a synthetic agent which acts centrally to exert its analgesic effect. It has different mechanisms of action, that is, it is a weak opioid agonist, and inhibits reuptake of monoamine neurotransmitter.⁷ It differs from other opioids in that, it has minimal effects on cardiovascular and respiratory systems. Also, studies show that it is associated with very low chance of drug abuse or dependence.²⁵ It is effective for moderate to severe post-operative pain⁷. This means it has certain advantages over opioids.

Due to its safety profile, we decided to look into its efficacy against propofol induced pain. And we tested it against lignocaine.

In our study, P value was 0.298. This shows that statistically,

there is no significant difference between tramadol or lignocaine.

Our study was similar to work of Wong and Cheong,²⁶ who also tested lignocaine and tramadol. And they found both are equally effective. However, their study differed from ours in regards to dose of lignocaine used. They used 50 mg lignocaine; as compared to 40 mg we used (2ml 2%). Also, they included 30 patients in each sample whereas we took 50 patients in each sample.

Borazan et al²⁷ tested the two drugs in children. However, they compared tramadol with lignocaine mixed with propofol. Tramadol was used in dose of 1 mg/kg, whereas Lignocaine was mixed with Propofol in a way that 18 ml (180 mg) of propofol 2 ml of 1 % lignocaine. Propofol induced pain was present in 35% patients pretreated with tramadol, whereas pain was present in 10 % in patients treated with lignocaine-propofol mixture. Their study demonstrated that there was no statistically significant difference ($P > 0.05$) between tramadol and lignocaine. They also noted that intraoperative fentanyl consumption and postoperative analgesic requirement was significantly less in patients pre-treated with tramadol.

Memis D et al²⁸ compared ondansetron and tramadol for decreasing propofol associated pain. In regards to pain, there was no difference. But ondansetron demonstrated reduction in nausea and vomiting, due to which they preferred it. Analgesic requirements were not taken into account, which could have given an edge to tramadol.

Zahedi et al²⁹ also compared ondansetron and tramadol, and their results were similar to that of Memis D et al.²⁸ Both ondansetron and tramadol were equally effective, and ondansetron was given preference due to reduction of PONV.

These two studies show that tramadol and ondansetron have similar efficacy. And other studies showed that it had similar effect to lignocaine.

CONCLUSION

Thus, we conclude that tramadol can be used in order to decrease the pain caused by propofol. Though it was not covered in this particular study, but tramadol will have added advantage of intra- and postoperative analgesia. However, we did not take into account incidence of PONV which is a limitation of this study. In addition, we did not calculate sample size based on WHO calculator, which may have affected the study.

Conflict of interest: Nil declared by the authors

Authors' contribution: SARAS: Conducted the study, manuscript writing; RHB: Data collection; SSN: Editing of the manuscript, literature search

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