ORIGINAL ARTICLE

Comparison of Efficacy of Lignocaine alone and Lignocaine Plus Metoclopramide for the Prevention of Intravenous Propofol Induced Pain in Patients Undergoing G/A for Elective Surgical procedures

MUZAMIL HUSSAIN[1], MUHAMMAD SHAHID[2], MUHAMMAD OMER AJMAL[3]

ABSTRACT

Aim: To compare the efficacy of lignocaine alone and lignocaine plus metoclopramide as pretreatment for the prevention of pain caused by the propofol injection in patients undergoing elective surgeries under general anaesthesia

Methods: Hundred patients were included in this study and were divided into two groups, A&B, each having fifty patients. Each patient in both groups was educated about the procedure and verbal rating scale of pain. After attaching standard ASA monitoring devices and recording baseline heart rate, blood pressure, ECG and SpO_2 , group A was given 10 ml of1% propofol mixed with I ml of 2% lignocaine and group B was given 10 ml of 1% propofol mixed with the mixture of1 ml of 2% lignocaine and 2ml of metochlopramide.

Results: A statistically significant difference (p value= 0.000) was observed in the verbal rating score of both groups of patients. In group A, 80% (40 out of 50) of the patients remained pain free compared to 36%(18 out of 50) patients)in group B, during propofol injection.

Conclusion: The study has revealed that the lignocaine alone when mixed with propofol was more efficacious to reduce the pain caused by the propofol injection as compared to the combination of lignocaine and metoclopramide. This difference of efficacy was statistically significant.

Keywords: comparison of efficacy, pain on propofol injection, lignocaine alone and lignocaine mixed with metochlopramide.

INTRODUCTION

Propofol, a phenol derivative is short acting sedative and anesthetic agent introduced in 80s has been extensively accepted in the field of medicine in intensive care units, operation theatres and in emergency situations. It has anxiolytic properties, antioxidant, immunomodulatory, analgesic, antiemetic and neuroprotective effects[1].

Experiencing a varying degree of pain by the patients being infused propofol is considered a most common adverse effect of the drug. Activation of recombinant Transient Receptor Potential A_1 and V_1 by the propofol injection leads to release of inflammatory mediators which result in in pain and tissue damage[2,3]. Young female patients with a small guage peripheral lines are more sensitive to this distressing pain caused by the propofol injection during the induction of general anesthesia[4]. Studies have been done to prevent this pain. Changing the lipid formulation to non-lipid formulation has been found to be effective[5]. Injecting local anesthetic like lidocain just before propofol injection is considered to be the most effective way of reducing this pain. However it does not completely abolishes the pain[6].

Pretreatment with flubiprofenaxetil with venous occlusion is also found to be effective[7]. Changing the traditional formulation to Etomidate-lipuro emulsion is also a good way to reduce this pain in pediatric population[8]. Pretreatment with lignocaine, metoclopramide, or flurbiprofen is also considered a very effective modality in reducing the pain caused by the propofol injection. has been reported to be effective in reducing propofol-induced pain.[9]Opoids like tramadol has also been used for this purpose and is quite comparable with lignocaine[10].

Metoclopramide is a pro-kinetic drug, commonly used as anti-emetic in perioperative period. There is literature evidence that when used before the propofol administration, it can reduce the pain. It can be used alone or mixed with other agents like lignocaine for this purpose. This study shows that efficacy is 60% in lignocaine alone vs 90% in lignocaine plus metoclopramide in decreasing the intensity of propofol injection[11]. In this way, the lidocaine not only reduces the the pain caused by propofol injection but is also used as a prophylaxis against post-operative nausea and vomiting[12].

In this study, the comparison of the efficacy of lignocaine alone and lignocaine plus metoclopramide as a pretreatment for the prevention of intravenous

[1]Associate Professor Anesthesia Sahiwal Medical College Sahiwal.
[2,3]Asst Professor Anesthesia Sahiwal Medical College Sahiwal.
Correspondence to Dr. Muzamil Hussain
Email: drmuzamilhussain@yahoo.com Cell:+923004247012.

propofol induced pain, in patients undergoing elective surgeries under general anaesthesia was done and the rational of the study was to see whether the combination of
Lignocaine plus metoclopramide is more efficacious to reduce i/v propofol induced pain compared to lignocaine alone. Once determined this combination i.e., lignocaine plus metoclopramide may be recommended because it decreases the chances of postoperative nausea and vomiting.

MATERIALS AND METHODS

This study was done in the general operation theatre of Lahore General Hospital Lahore on one hundred (100) patients. It was randomized control study. In this study, Purposive non probability sampling technique was employed. The demographic information including name, age, sex and history of problem requiring surgery was taken and was kept confidential. The patients of both gender with age range between 20 – 50 years, belonging to ASA class 1 & 2 undergoing elective surgical procedures were included in the trial. Patients having communication issues and known sensitivity to the used drugs and its components were excluded. These patients were divided randomly into two groups on the basis of drugs used on them to decrease the intensity of pain induces by propofol injection for the induction of general anesthesia. A randomization table was formulated. After an elaborated history and through physical examination, the laboratory reports of these patients were reviewed. An informed consent for general anesthesia was obtained, routine pre-operative instructions to the patients were given and the patients were educated about the procedure. Drugs and equipment meant for resuscitation were also ensured available.

An 18 G I/V cannula was passed on the dorsum of right hand of each patient before the induction of general anesthesia, standard ASA monitoring devices were applied to the patient and baseline vital signs were recorded. The study drugs were prepared in separate syringes in 3 ml volume just before induction. Syringes belonging to study Group A, contained 1 ml of 2% Lignocaine alone. Study Group B syringe contained mixture Metoclopramide 10mg (2ml) plus 1ml of 2% Lignocaine. These study drugs were mixed with 10 ml of Propofol 1% solution by blinded anesthetist, according to their respective groups. Final mixtures were given slowly intravenously, after 30 seconds and pain response was observed.

If there was no response, again drug was given slowly in 10 second, then patient was asked about the pain felt by him and it was graded according to the verbal rating scale ranging from 0 to 4 (0=none, 1=mild pain, 2=moderate pain, and 3 = severe pain) . Any additional signs & symptoms like edema, wheel and inflammation or extra-pyramidal disturbance at the injection site were also noted.

Data analysis: The obtained data was analyzed using SPSS version.17. Quantitative variables like age and age categories were presented as mean. Chi-square test was employed to compare the pain reducing efficacy between two the groups of drugs. P value ≤ 0.05 was considered as significant.

RESULTS

Age distribution of the patients was done and most of the patients belonged to age group 20-30 years, in group A, 42%(21/50) and 48%(24/50) in group B, age group of 31-40 years was 44%(22/50) in both A and B groups and age group >40 years was 14%(7/50) in group A and 8%(4/50) in group B. Mean and S.D was computed as 34.28±6.11 and 34.00±6.36 in group A and B respectively. Comparison of efficacy between group A and group B was done by using chi-square test and it was recorded that in group A, 38 patients out of 50(76%) remained pain free compared to 20 patients out of 50(40%)in group B, during propofol injection. P value was 0.000.

Table-1: Group statistics

Groups	n	Mean	Std. Deviation	Std. Error Mean
A	50	34.2800	6.11135	.86428
B	50	34.0000	6.36637	.90034

Table 2: Descriptive statistics age of both groups

	N	Min	Max.	Mean	Std
Age of pt	100	20.00	49.00	34.1400	6.21016
Valid N (list wise)	100				

Table 3: Efficacy group cross tabulation

Efficacy		Group A	Group B	Total
Yes	Count	38(76%)	20(40%)	58(58%)
No	Count	12(24%)	30(60%)	42(42%)
Total	Count	50(100%)	50(100%)	100(100%)

Chi-square test P-Value=0.000

Table 4: Frequency table of gender

Valid	Frequency	%	Valid	Cumulative
Male	72	72.0	72%	72%
Female	28	28.0	28%	100%
Total	100	100.0	100%	

Table 5: age category

Valid	Frequency	%	Valid	Cumulative
20-30	45	45	45	45
31-40	44	44	44	89
>40	11	11	11	100
Total	100	100	100	

DISCUSSION

28-90% patients experience discomfort during induction of anesthesia using propofol. This pain not only pollutes the memory of the patient about his experience of anesthesia, but may trigger stress response. There is a case report where such pain triggered severe bronchospasm[13]. As varying degrees of pain is experienced on propofol injection, different techniques and drugs or combination of both modalities is being used extensively in an attempt to reduce the intensity of such pain. It has been observed that combination of different techniques and drugs is far more effective in reducing the propofol induced pain than a single drug or technique. [16]Our study compared the efficacy of lignocaine alone and lignocaine plus metoclopramide when mixed with propofol in decreasing the intensity of pain caused by propofol injection in patients undergoing elective surgeries under general anaesthesia. If found effective this combination may be recommended to reduce patient discomfort.Metoclopramide can also provide prophylaxis against PONV.

In a study conducted by Chouhdri AH, Masjadi, 202 patiens with ASA I&II class were included for elective surgical procedures under general anesthesia. The patients were divided into three different groups on the basis of pretreatment drugs they received to decrease the propofol induced pain on the induction of general anesthesia. Just before induction of general anesthesia, Group A received the mixture of 20 ml propofol and 20mg of 1% lidocaine followed by 2ml of normal saline. Group B received the mixture of 20 ml of propofol and 2 ml of normal saline followed by 5 mg of metochlopramide. Group C, which was a controle group, was given the mixture of 20ml of propofol and 2 ml of normal saline followed by 2ml of normal saline. It was observed that in placebo group (control group), the pain incidence was 72% as compared to the 58% in the group which received metochlopramide and 28% in the group pretreated with lidocaine. On the basis of the resulted obtained, they came to conclusion that the mixture of propofol and lidocaine was far more effective than the metochlopramide in reducing the intensity of propfol induced pain on the induction of general anesthesia[12]

Our study also concluded that as far as propofol induced pain is concerned, lidocain-propofol mixture is far more effective than lidocain-metoclopramide mixed with propofol in decreasing the the intensity of the pain.

In a study conducted by O. Canbay*, N. Celebi, O. Arun, A. H. Karago¨z, F. Sarıcaog˘lu and S. O ¨ Zgen, the role of acetaminophen in reducing the intensity of pain induced by propofol injection was explored. They included 150 patients (ASA I–II class) undergoing elective surgical procedures under general anesthesia. The patients were divided into three groups A, B and C. An 18 G, intravenous cannula was passed on the superficial radial vein of each patient .After the venous outflow was occluded, the patients in group A were given 40mg of lidocaine. The patients in group B were infused 50 mg of acetaminophen and the patients in group C were pretreated with only 5ml of normal saline. The results of the study depicted that the incidence of propofol induced pain was 8%, 22% and 64% in group A, B and C respectively. They came to conclusion that premedication with intravenous acetaminophen was found to be quite effective in reducing the intensity of pain induced by propofol injection[14].

Yadav M, Durga P and Gopinath R conducted a randomized double blind study including 72 patients of ASA class I or II in which they compared the efficacy of hydrocortisone and lidocaine in reducing the intensity of pain followed by injection propofol for the induction of general anesthesia. They randomly divided the subjects into four groups on the basis of received pretreatment into four groups (A,B,C&D) each having 18 patients**.**Thirty second prior to the propofol injection, group A received 2 ml of normal saline, group B received 2% lidocaine 2ml, group C received 10 mg / 2ml of hydrocortisone and the group D was pretreated with 25 mg / 2ml hydrocortisone. The intensity of patients' pain was assessed by a blind researcher according to verbal rating scale of pain. They concluded that there was no role of low dose hydrocortisone premedication in attenuating the intensity of pain caused by propofol injection for the induction of general anesthesia[15].

In an another randomized, double blind study including 130 subjects, Hwang I ,Noh JI, et all, compare the efficacy of injection ketamine alone and the mixture of injection ketamine and injection lidocaine in reducing the propofol induced pain in patients undergoing elective surgical procedures under general anesthesia. On the basis of the drugs pretereated with, these patients were divided into three groups. One minute before the propfol injection, a rubber tourniquet was applied on the forearm where propfol is to be infused. First group was given the mixture of 40mg of lidocaine and 25mg of ketamine. Second group was pretreated with 40mg of lidocaine and the third group received 25mg of ketamine. After the release of torniquete, 30mg of propofol was injected to induce the anesthesia. 10 second after the propofol injection, pain score was calculated using verbal rating scale of pain. They concluded that the mixture of 40mg of lidocaine and 25 mg of ketamine was more effective in decreasing the intensity of pain induced by propofol injection[16]. In our study, one group received the mixture ofl40 mg of lidocaine and propofol and the other droup received

the mixture of lidocaine, metochlopramide and propofol. The pain score was also calculated by verbal rating scale of pain.

Lembert N, Wodey E Geslot D and Ecoffey Conducted a randomized double blind study to compare the pain reducing properties of nitrous oxide and lidocaine before the the injection of propfol for the induction of general anesthesia. Their study included 48 children older than five years and were divided into two groups on the basis of the type of pretreatment received. Before the injection of propofol for the induction of general anesthesia, the patients in the first group, inhaled the mixture of 50% nitrous oxide and 50% oxygen while the patients in the second group, breathed 100 % oxygen and lidocaine mixed with propofol. Behavioural scale was used to evaluate the intensity of pain during the propofol injection while verbal rating scale was used to score the pain intensity in the recovery room. The study concluded that the inhalation of nitrous oxide before the induction of general anesthesia with propofol injection, is quite cost effective and efficient means of reducing the pain experienced by the patient during propofol injection and its amnesic properties are quite advantageous in the paediatric patients[17].

In our study Group A received LID 20 mg mixed with propofol and Group B received LID/MET 20/10 mixed with propofol. However our results revealed that the incidence of pain was much less in Group A, who received LID 20 mg only, compared to Group B who received LID/MET 20/10.

All the above cited studies were performed to provide benefit to patients or in other sense to make induction of anaesthesia pain free and making the patient comfortable, because it is said that if the Medicine is a universe then the patient is the axis of this universe

CONCLUSION

Comparison of efficacy between group A and group B shows that lignocaine alone when mixed with propofol was more efficacious to reduce pain of propofol injection compared to the combination of lignocaine and metoclopramide. This difference of efficacy was statistically significant.

REFERENCES

1. Vasileiou I, Xanthos T, Koudouna E, Perrea D, et al: Propofol: A review of its non- anaesthetic effects. Eur J Pharmacol2009 ,20(3):9-12
2. Fischer MJ, Leffler A, Niedermirtl F, Kistner K, Eberhardt M, Reeh PW, Nau C. TheGeneral Anesthetic Propofol excites nociceptors by activating TRPV1 and TRPA1 ratherthan GABBA Receptors. J BiolChem, 2010,7(4):75-81._
3. Cui M, Honore P, Zhong C, Gauvin D, et al. TRPV1 receptors in the CNS play a key role in broad-spectrum analgesia of TRPV1 antagonists. J. Neurosci 2006, 26 (37): 9385–93.
4. Kang HJ, Kwon MY, Choi BM, Koo MS, Jang YJ, Lee MA: Clinical factors affecting the pain on injection of propofol.Korean J Anesthesiol, 2010,58(3):239-43.
5. Sudo RT, Bonfá L, Trachez MM, Debom R, Rizzi MD, Zapata-Sudo G Anesthetic Profile of a Non-lipid PropofolNanoemulsion. Rev Bras Anestesiol,2010 ;60(5):475-83.
6. Tariq MA, Kamran M. Incidence of pain on Propofol injection and efficacy of addition of Lignocaine or selecting big vein or both combined in reducing it: A randomized control trial. J Postgrad Med Inst 2006,20(1):8-11.
7. Fujii Y, Itakura M. Pretreatment with flurbiprofenaxetil, flurbiprofenaxetil preceded by venous occlusion, and a mixture of flurbiprofenaxetil and propofol in reducing pain on injection of propofol in adult Japanese surgical patients: a prospective, randomized, double-blind, placebo-controlled study. ClinTher, 2009, 31(4):721-7.
8. Nyman Y, Von Hofsten K, Palm C, Eksborg S, Lönnqvist PA. Etomidate-Lipuro is associated with considerably less injection pain in children compared with propofolwith added lidocaine. Br J Anaesth, 2006,97(4):536-9.
9. Fujii Y, Itakura M. Comparison of lidocaine, metoclopramide, and flurbiprofenaxetil for reducing pain on injection of propofol in Japanese adult surgical patients: a prospective, randomized, double-blind, parallel-group, placebo-controlled study. ClinTher, 2008,30(2):280-6.
10. Chohedri A, Nikkho MH, Hosseini MA. Comparison of analgesic effects of Tramadol and Lidocaine in reduction of Propofol induced pains. Anesth Pain Intens Care 2006,10:13-7.
11. Fujii Y, Nakayama M. A lidocaine/metoclopramide combination decreases pain on injectionofpropofol. Can J Anaesth, 2005,52:474-7.
12. Seyedi M, MasjediM.ChohedriAH.Propofol induced pain; comparison between effects of LidocainePropofol mixture and Metoclopramide premedication. Professional Med J,2008,15(2):205-10.30. Miner JR, Burton JH. Clinical practice advisory: Emergency department procedural sedation with propofol. Annals of Emergency Medicine.2007 ;50(2):182–7, 187.
13. Zeidan A. Profound pain due to propofol injection triggered severe bronchospasm in a smoker--A case report. Middle East journal of anesthesiology. 2006;18(5):939-42.
14. O. Canbay*, N. Celebi, O. Arun, A. H. Karago¨z, F. Sarıcaog˘lu and S. O ¨ zgen Efficacy ofintravenous acetaminophen and lidocaineonpropofol injection pain. Br J Anaesth 2008; 100: 95–8.
15. Yadav M, Durga P, Gopinath R. Role of hydrocortisone in prevention of pain on propofolinjection. Journal of anaesthesiology, clinical pharmacology. 2011;27(4):470-4. .
16. Hwang J, Park HP, Lim YJ, Do SH, Lee SC, Jeon YT. Preventing pain on injection of propofol: a comparison between peripheral ketamine pre-treatment and ketamine added to propofol. Anaesthesia and intensive care. 2009;37(4):584-7.
17. Lembert N, Wodey E, Geslot D, Ecoffey C. [Prevention of pain on injection with propofol in children: comparison of nitrous oxide with lidocaine]. Annalesfrancaisesd'anesthesieet de reanimation. 2002;21(4):263-70. Epub 2002/05/30. Prevention de la douleur a l'injection du propofol chez l'enfant: comparaison de l'inhalation de protoxyded'azote a l'injection de lidocaine.