

Comparison of Propofol Injection Pain Pretreatment with Nalbuphine and Lidocaine

MUHAMMAD ABDUL AZIZ¹, ZIA UDDIN AHMED², ABDUL SHAKOOR³, RABIA WAHEED⁴, YAASIR IJAZ AHMED⁵, NADEEM AKHTAR⁶, AMMAR ZIA⁷

^{1,2}Consultant Anesthetist, Indus Hospital, Lahore

³Post Graduate Trainee Anesthesia Shalimar Hospital Lahore.

⁴Consultant Gynecologist & head of Gynae Obstetric Department, Indus Hospital, Kahna, Lahore.

⁵Post Graduate Trainee Anesthesia Shaukat Khanum Memorial Cancer Hospital & Research Centre Lahore

⁶APMO Psychiatry Dept Services Hospital, Lahore

⁷Student M.B.B.S. 4th year CMH Lahore Medical College & Institute of Dentistry, Lahore.

Correspondence to Dr. Muhammad Abdul Aziz, E-Mail: muhammad_abdulaziz@yahoo.com, Cell: 03334205617

ABSTRACT

Background: There is no local study available comparing frequency of pain after intravenous injection of propofol with pretreatment with nalbuphine versus lidocaine in the patients undergoing elective surgical procedures requiring general anesthesia.

Aim: To compare the frequency of pain on intravenous injection of propofol with pretreatment with nalbuphine versus lidocaine in the patients undergoing elective surgical procedures requiring general anesthesia.

Study design & setting: Randomized control trial, Gen. Surgery operating rooms of Shalimar Hospital, Lahore.

Duration of study: 6 months i.e. from 27th august 2015 26th February 2016.

Methods: 520 patients were selective and allocated into two groups; Group A (Nalbuphine) and Group B (Lidocaine). Pain was assessed using a four-point scale.

Results: The mean age of 53.3±6.7years. About 118 patients (22.7%) had pain postoperatively. Post-operative pain was present in 31 (11.9%) cases with lidocaine and 87 (33.5%) cases with nalbuphine. The difference was significant (p=0.001).

Conclusion: It is concluded that incidence of pain on intravenous injection of propofol with pretreatment with nalbuphine versus lidocaine in the patients undergoing elective surgical procedures requiring general anesthesia is significantly different. Lidocaine was found superior.

Keywords: Elective general surgery, General anesthesia, Lidocaine, Nalbuphine

INTRODUCTION

Propofol is the most commonly used intravenous anesthetic for induction and maintenance of anesthesia and for sedation in and outside the operating room due to its rapid onset and offset¹. The incidence of postoperative nausea and vomiting (PONV) in PACU is lower with propofol anesthesia.² But the risk of pain from propofol injection alone is about 60%.³

The incidence and severity of pain during propofol injection is related to the formulation of the drug.⁴ Many studies have explored strategies to obtund propofol-induced pain but it still represents a clinical problem. Various drugs have been used to decrease propofol injection pain. Lidocaine pretreatment more effectively eliminates injection pain as compared to admixing lidocaine with propofol. The incidence of pain was 22% in the lidocaine pretreatment group and 44% in lidocaine-propofol mixture group⁵.

Pretreatment with a small dose of ketamine (0.3 mg/kg) reduced the frequency and intensity of propofol injection pain without severe adverse effects.⁶ When given as venous retention pretreatments 1 min before propofol, paracetamol 1 mg /kg and lidocaine 0.5 mg/ kg were equally effective in attenuating pain during intravenous (i.v.) injection of propofol whereas pretreatment with paracetamol 2 mg/ kg was shown to be the most effective

treatment⁷. Pretreatment with dexamethasone was more effective than saline and had a similar efficacy as lidocaine prior to propofol injection⁸.

The frequently used method to reduce pain at propofol injection is the administration of lidocaine, either before propofol injection, with or without tourniquet or added to propofol⁵. Despite pretreatment using lidocaine in conjunction with venous occlusion (modified Bier's block) as the most effective intervention for preventing this pain, the technique failed to gain widespread popularity, possibly because of the time needed to apply tourniquet⁹.

Tramadol is a weak opioid agonist and is used to treat moderate and severe pain. Pretreatment with tramadol 60 seconds before propofol injection and propofol-lidocaine mixture were significantly reduced propofol injection pain when compared to placebo in children. The incidence of overall pain was 79.4% in the control group, 35% in tramadol group, 25% in lidocaine group respectively. Propofol induced pain was assessed using a four point behavioral scale: 1= no pain (no reaction); 2= mild pain (grimace); 3= moderate pain (grimace+cry); 4= severe pain (cry+ withdrawal)¹⁰.

On comparing the pain scores between the two groups (Saline versus lignocaine pretreatment groups), it was observed that in Group A (Saline pretreatment group) incidence of pain was 57.33%, while in Group B (Lignocaine pretreatment group) the incidence of pain was

Received on 15-06-2018

Accepted on 11-10-2018

25.23%¹¹. So pain following intravenous injection of propofol continues to be an intriguing problem. None of the commonly used methods completely attenuate the pain. Nalbuphine is an agonist-antagonist opioid commonly used in our hospital to treat perioperative pain. Role of pretreatment with nalbuphine in attenuating pain on intravenous injection of propofol has not been evaluated in our population.

Rationale of current study is to compare the frequency of pain on intravenous injection of propofol after pretreatment with nalbuphine versus lidocaine in the patients undergoing elective surgical procedures requiring general anesthesia, so that better of two techniques could be utilized in future.

The objective of the study was to compare the frequency of pain on intravenous injection of propofol with pretreatment with nalbuphine versus lidocaine in the patients undergoing elective surgical procedures requiring general anesthesia.

MATERIALS & METHODS:

This randomized control trial was conducted in Operating theatre, Department of Surgery, Shalamar Hospital, Lahore for a period of six months from 27th August 2015 to 26th February 2016. Estimated sample size is 520 patients (260 in each group) with 80% power of test, 5% level of significance and taking expected percentage of pain both groups i.e.; 35% in patients who received nalbuphine pretreatment and 25% in patients who received lidocaine pretreatment for attenuating the pain on intravenous injection of propofol in patient undergoing elective surgical procedures. Non probability Consecutive Sampling technique was used.

Inclusion criteria:

1. Patients belonging to the American Society of Anesthesiology status I & II
2. Age between 21 and 60 years
3. Patients of both sex (Male and Female)
4. Patients scheduled for elective general surgeries under general anesthesia e.g. hernia, gall bladder, breast and thyroid surgery.

Exclusion criteria

1. Patients with known hypersensitivity to nalbuphine, propofol or lidocaine based on history.
2. Patients requiring rapid sequence induction (full stomach and emergency surgeries).
3. Patients who were taking any analgesics before surgery.
4. Pregnant and lactating females.

Data collection procedure: After obtaining approval from the institutional ethical committee, the patients fulfilling inclusion criteria for study were selected. Written and informed consent was taken. Patients received any intravenous premedication. On arrival at operation theatre, routine monitoring was applied and an 18G cannula was inserted in the suitable vein of the dorsum of non-dominant hand. Intravenous fluid (lactated ringer or 0.9% saline) was started at 100 mL / hour. Patients were allocated into two groups based on random number table; Group A (Nalbuphine) and Group B (Lidocaine). Nalbuphine 10 mg was prepared in 10 mL syringe in normal saline to make 1

mg/mL dilution and 1% propofol (10 mg/mL) without addition of any other drug. Group A received the calculated dose (0.1 mg/kg) of nalbuphine in cannula port and after 60 seconds calculated dose (2 mg/kg) of 1% propofol at an approximate rate of 2 ml per 10 seconds by the observer until the loss of eyelash reflex. Group B received 2 mL of 1% lidocaine (20 mg) and after 60 seconds calculated dose (2 mg/kg) of 1% propofol at an approximate rate of 2 ml per 10 seconds by the observer until the loss of eyelash reflex. Pain was assessed using a four-point scale: Score 0-1 was taken as NO PAIN while Score 2-3 was taken as PAIN. The pain score along with demographics of the patient was entered into the Proforma.

Data analysis: Data was analyzed on SPSS version 10. Mean ± SD was calculated for the numerical variables like age, weight while nominal data as gender, ASA status and presence or absence of pain was presented on frequency and percentage. Independent sample t test was applied to know the efficacy. P<0.05 was considered significant. Data was stratified for age, gender, weight and ASA class. Post stratification significance and difference in pain frequency was determined by chi square test. A value of p ≤ 0.05 was considered as significant.

RESULTS

The mean age of patients was 53.29±6.7years. There were 270(51.9%) males and 250(48.1%) females. In the sample, 298(57.3%) had normal BMI, 174(33.5%) were overweight and 48(9.2%) were obese. Among ASA classes, 299(57.5%) patients had ASA I and 221(42.5%) patients had ASA II (Table 1).

Postoperative pain occurred in 118 patients, in 31(11.9%) cases with lidocaine and 87(33.5%) cases with nalbuphine. The difference was significant (p=0.001) (Table 2).

Table 1: Baseline characteristics of patients (n=520)

| | |
|--------------|-------------|
| Age (years) | 53.29±6.7 |
| Gender | |
| Male | 270 (51.9%) |
| Female | 250 (48.1%) |
| BMI | |
| Normal | 298 (57.3%) |
| Overweight | 174 (33.5%) |
| Obese | 48 (9.2%) |
| ASA class I | 299 (57.5%) |
| ASA class II | 221 (42.5%) |

Table 2: Comparison of postoperative pain in both groups

| Pain | Group | | Total |
|-------|-------------|-------------|-------------|
| | Lidocaine | Nalbuphine | |
| Yes | 31 (11.9%) | 87 (33.5%) | 118 (22.7%) |
| No | 229 (88.1%) | 173 (66.5%) | 402 (77.3%) |
| Total | 260 (100%) | 260 (100%) | 520 |

Pvalue = 0.001

DISCUSSION

Propofol is the most commonly used intravenous anesthetic for induction and maintenance of anesthesia and for sedation in and outside the operating room due to its rapid onset and offset¹. The incidence of postoperative

nausea and vomiting (PONV) in PACU is lower with propofol anesthesia.²

In our study, out of 118 patients with pain, 31 were in lidocaine and 87 were in nalbuphine group. When we cross tabulated study groups regarding postoperative pain result came up significant ($p=0.001$). It implies that lidocaine pretreatment is superior to nalbuphine regarding incidence of pain on intravenous injection of propofol in the patients undergoing elective surgical procedures requiring general anesthesia.

Our results are different from previous studies. In the previous study, the incidence of pain was 22% in the lidocaine pretreatment group and 44% in lidocaine-propofol mixture group⁵. It was observed that in Group A (Saline pretreatment group) incidence of pain was 57.33%, while in Group B (Lignocaine pretreatment group) the incidence of pain was 25.23%.¹¹ The difference in results may be secondary to difference in demographic profile of included patients. Similarly in our study, 118 patients (22.7%) had developed postoperative pain. But in a previous study, But the risk of pain from propofol injection alone was mentioned about 60%³.

The implication that lidocaine pretreatment is superior to nalbuphine regarding incidence of pain on intravenous injection of propofol in the patients undergoing elective surgical procedures requiring general anesthesia did not hold true for age 50 years and above ($p=0.295$) and for obese persons. In older patients and obese patients, lidocaine pretreatment was found similar to nalbuphine regarding incidence of pain on intravenous injection of propofol in the patients undergoing elective surgical procedures requiring general anesthesia.

Limitations of current study includes single center trial and different surgical procedures.

CONCLUSION

It is concluded that incidence of pain on intravenous injection of propofol with pretreatment with nalbuphine versus lidocaine in the patients undergoing elective surgical procedures requiring general anesthesia is significantly different. Lidocaine was found superior except in older and obese patients. At current sample size we reject the null hypothesis and accept the alternate hypothesis that there is a difference in incidence of pain on intravenous injection of

propofol with pretreatment with nalbuphine versus lidocaine in the patients undergoing elective surgical procedures requiring general anesthesia.

REFERENCES

1. Lubarsky DA, Glass PS, Ginsberg B, de Dear GL, Dentz ME, Gan TJ, et al. The Successful Implementation of Pharmaceutical Practice Guidelines Analysis of Associated Outcomes and Cost Savings. *The Journal of the American Society of Anesthesiologists* 1997;86(5):1145-60.
2. Deng X, Zhu T. Clinical comparison of propofol-remifentanyl TCI with sevoflurane induction/maintenance anesthesia in laparoscopic cholecystectomy. *Pakistan journal of medical sciences* 2014;30(5):1017.
3. Jalota L, Kalira V, George E, Shi Y-Y, Hornuss C, Radke O, et al. Prevention of pain on injection of propofol: systematic review and meta-analysis. *Brj* 2011;342:d1110.
4. Sim JY, Lee SH, Park DY, Jung JA, Ki KH, Lee DH, et al. Pain on injection with microemulsion propofol. *British journal of clinical pharmacology* 2009;67(3):316-25.
5. Walker BJ, Neal JM, Mulroy MF, Humsi JA, Bittner RC, McDonald SB. Lidocaine pretreatment with tourniquet versus lidocaine-propofol admixture for attenuating propofol injection pain: a randomized controlled trial. *Regional anesthesia and pain medicine* 2011;36(1):41-5.
6. Zhao G-y, Guo Y, Bao S-m, Meng L-x, Zhang L-h. Prevention of propofol-induced pain in children: pretreatment with small doses of ketamine. *Journal of clinical anesthesia* 2012;24(4):284-8.
7. Borazan H, Erdem TB, Kececioglu M, Otelcioglu S. Prevention of pain on injection of propofol: a comparison of lidocaine with different doses of paracetamol. *European Journal of Anaesthesiology (EJA)* 2010;27(3):253-7.
8. Ahmad S, De Oliveira GS, Fitzgerald PC, McCarthy RJ. The effect of intravenous dexamethasone and lidocaine on propofol-induced vascular pain: a randomized double-blinded placebo-controlled trial. *Pain research and treatment* 2013;2013.
9. Wijesundera DN, Kavanagh BP. Prevention of pain from propofol injection. *BMJ: British Medical Journal (Online)* 2011;342.
10. Borazan H, Sahin O, Kececioglu A, Uluer MS, Et T, Otelcioglu S. Prevention of propofol injection pain in children: A comparison of pretreatment with tramadol and propofol-lidocaine mixture. *International journal of medical sciences* 2012;9(6):492.
11. Malik A, Ganie M, Kumar A. *Buffalo Bulletin* (Apr-Jun 2017) Vol. 36 No. 2-International Buffalo. *Buffalo Bulletin* (April-June 2017) 2017;36(2).