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A Comparative Study of Lignocaine with Ondansetron as Pretreatment to Prevent Pain on Injection of Propofol

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Abstract: ***Introduction and Objectives: On injection, propofol is known to elicit strong, acute, stinging, or burning pain, which can be unpleasant for the patient. This study is undertaken to decrease the pain caused by Propofol injections during anaesthesia induction. To compare the drug efficacy of Lignocaine and Ondansetron in reducing the pain on injection of Propofol and to detect an agent with minimal side effects. Material and Methods: 100 patients of age group 18 to 60 years of age of ASA Grade 1 and 2 posted for elective surgeries under General anaesthesia were selected and randomly divided into two groups of 50 patients in each group. Group 1 received lignocaine (0.1mg /kg) and group 2 received ondansetron (0.1mg/kg) as pretreatment. parameters like pain during induction, PR, BP, SPO2, ECG , postoperative nausea, vomiting, myoclonus, post operative pain recal were studied and compared. Results: Thecomparision of mean differences of HR, SBP, DBP, SPO2, between group 1 &2 at different intervals of before induction, duringinduction, intraoperatively at 5, 10, 15 minutes and post operative was shown statistically not significant (P>0.05). the association between the groups with the pain score level (P = 0.370), pain recall (P = 0.074), and PONV (P= 0.334). was shown statistically not significant. Conclusion: Ondansetron 0.1 mgkg - 1 decreases the injection pain significantly. Both Ondansetron 0.1 mgkg - 1 and lignocaine 0.1 mg kg - 1 were shown similarly effective pre - treatment drugs for the prevention of propofol injection - induced pain. Ondansetron has the added advantage of reducing PONV. No significant hemodynamic changes are caused by both the drugs.***

Keywords: Propofol, Pain on Injection, Ondansetron, Lignocaine. Pre Treatment

1. Introduction

"A painful sensory and emotional experience connected with, or mimicking, actual or potential tissue injury, "
- International Association for the Study of Pain (IASP).[1]

Because of its appealing kinetic properties, such as the titratable quantity of anaesthetic, absence of cumulation, speedy and clear - headed recovery, and few side effects, propofol is a good medicine for inducing anaesthesia.[2, 3] Kay and Rolly proved its anaesthetic potential, and it has been utilized in clinical settings since 1982.[4]

On injection, it is known to elicit strong, acute, stinging, or burning pain, which can be unpleasant for the patient. This discomfort is regarded as clinically inappropriate since it might create agitation and prevent a smooth anaesthetic induction. In individuals, the likelihood of experiencing pain after receiving a propofol injection ranges from 3 to 85%. The discomfort from a propofol injection might be immediate or delayed. The acute pain is most likely caused by direct irritating action, but the delayed pain is caused by an indirect impact caused by the kinin cascade, which takes 10 - 20 seconds.[5]

Intravenous lignocaine, a local anaesthetic, has been found to reduce the incidence and severity of pain following propofol administration.[3, 6, 7] Although it is thought to be better to other medicines, it cannot always minimize the occurrence and degree of discomfort caused by intravenous propofol injections.

Antiemetic medication ondansetron is frequently used. Intrathecally given Ondansetron lowers the nociceptive responses of dorsal horn neurons in animals.[8] Ye et al. (1997) [9] found that Ondansetron is around 15 times more effective as a local anaesthetic than lignocaine, which is likely why it has anti - emetic properties in rats. Despite the fact that Ondansetron lacks this aromatic moiety, it can block sodium channels. Nociceptive pathways are involved with peripheral 5 - HT3 receptors.

Ondansetron has recently been shown to bind to the opioid mu receptors in humans and to have agonist action.[10]Ondansetron may be used to treat pain caused by a medicine comparable to propofol because of its multifarious activities as a sodium channel blocker, a 5 - HT3 receptor antagonist, and a mu - opioid agonists.

In this present study, we are comparing lignocaine and ondansetron as pretreatment to prevent pain on the injection of propofol during intravenous induction of anaesthesia.

2. Aims and Objectives

Aim:
The current goal of the study is to compare lignocaine to ondansetron as a pretreatment to avoid discomfort during propofol injection.

Objectives:
- To decrease the pain caused by Propofol injections during anaesthesia induction.
- To compare the drug efficacy of Lignocaine and Ondansetron in reducing the pain on injection of Propofol and to detect an agent with minimal side effects.

3. Materials and Methods

Study Design: A Tertiary Care Hospital - based Prospective Randomised Comparative study.

Study Subjects: Patients posted for elective surgical procedures under general anaesthesia at S. V. R. R. G. G. Hospital, Tirupati.

Study Setting: Department of Anaesthesiology and Critical care medicine at S. V. R. R. G. G. Hospital, Tirupati.

Study Period: One - year duration from the time of Scientific and Institutional Committee approval.

Source of Data: Patient takes admission in S. V. R. R. G. G. Hospital for various elective surgeries**.**

Sample Size: The study will be carried out in 100 patients scheduled for various elective surgical procedures under general anaesthesia belonging to ASA I and ASA II.

Inclusion Criteria:
Adult patients of age 18 to 60 years of ASA Grade I to ASA Grade II posted for elective surgeries under General anaesthesia.

Exclusion Criteria: -
Patients with ASA Grade III and Grade IV.
Patients history of drug abuse.
Patients undergoing emergency surgeries.

Study Methods:
- Patient fulfilling the inclusion and exclusion criteria is selected.
- Informed consent is taken from the patient.
- Demographic data like name, age, sex, occupation, economic status**,** the literary status of the family are noted.

4. Methodology

The study population is divided into two groups of 50 each randomly selected.
GROUP 1: Received Lignocaine (0.1 mg/kg) as pre - treatment.
GROUP 2: Received Ondansetron (0.1 mg/kg) as pre - treatment.

The evening before the intended operation, a full pre - anaesthetic evaluation will be performed, including a general, physical, and systemic examination. Pulse rate, blood pressure, airway assessment, and examination of the respiratory and cardiovascular systems are all part of the general examination.

All of the patients were subjected to the following tests. Percentage of haemoglobin, Bleeding Time and Clotting Time Fasting or Random Blood Sugar Levels Serum Blood Urea, Creatinine Urine Analysis for Albumin, Sugar, and Microscopy Electrocardiogram, and Chest X - ray.

TECHNIQUE: The American Society of Anaesthesiologists Classification was used to rate all of the patients. After describing the anaesthetic technique to the patients, they gave their writteninformed consent to participate in the study. The previous night, all patients were given 0.5 mg of alprazolam and 150 mg of ranitidine orally. Patients will be urged to refrain from eating or drinking anything after 10 p. m. on the day before surgery.

On arrival of the patient to the operating room, a 20 gauze i. v. cannula inserted at the dorsum of hand after ECG, non - invasive Blood Pressure and Pulse Oximeter monitoring will be instituted. No analgesic drugs were given before induction. A Pneumatic Tourniquet was placed on the same upper arm with pressure inflated to 70 mm of Hg to produce venous occlusion. Drugs used for pre - treatment are ondansetron0.1 mg/kg and lignocaine 0.1 mg/kg. Inform the patient regarding the procedure and pain scale. Secure 20 gauze i. v. line in the dorsum of the non - dominant hand. Pneumatic tourniquet tied to the upper arm and inflated to 70mm of Hg. Drugs for pretreatment (Ondansetron 0.1 mg/ kg or Lignocaine 0.1 mg/ kg injected intravenously). Tourniquet released after 1 minute. Induced with propofol, starting with 1/4th of the total dose (2.5 mg/ kg). The pain was assessed at 5, 10, 15 minutes during induction and post - operatively

5. Observation and Results

In the present study, the comparison of mean heart rate at different time intervals between the ondansetron group and the lignocaine group was inferred that the mean heart rate at time intervals of before induction, during induction, intra - operatively at 5 minutes, 10 minutes, 15 minutes and postoperative period was shown statistically not significant (P>0.05).

Table 1: Comparison of Heart Rate at Different Intervals between the Study Groups

HR	Mean of Ondansetron Group	Mean of Lignocaine Group	P - Value
HR - PRE	75.0800	75.8400	0.4850
HR - INDUC	74.5200	76.2400	0.3408
HR - 5M	76.1800	77.7000	0.3320
HR - 10M	75.9000	76.2200	0.8306
HR - 15M	74.9400	75.2800	0.7233
HR - POST	74.9600	76.1400	0.2998

The comparison of the mean of SBP at different time intervals between the ondansetron group and the lignocaine group was inferred that the mean SBP at time intervals of before induction, during induction, intraoperatively at 5 minutes, 10 minutes, 15 minutes and postoperative period was shown statistically not significant (P>0.05).

Table 2: Comparison of Systolic Blood Pressure (SBP) at Different Time Intervals between the Study Group.

SBP	Mean of Ondansetron Group	Mean of Lignocaine Group	P - Value
SBP - PRE	125.6200	124.2200	0.4036
SBP - INDUC	114.5600	114.6600	0.9608
SBP - 5MIN	121.1800	117.6600	0.0687
SBP - 10MIN	116.6000	113.5600	0.0660
SBP - 15MIN	123.6600	122.0200	0.2686
SBP - POST	120.1000	118.9400	0.4248

The comparison of DBP rate at different time intervals between the ondansetron group and the lignocaine group was inferred that the mean DBP at time intervals of before induction, during induction, intraoperatively at 5 minutes, 10 minutes, 15 minutes, and postoperative period was shown statistically not significant (P>0.05).

Table 3: Comparison of Diastolic Blood Pressure (DBP) at Different Time Intervals Between The Study Groups

DBP	Mean of Ondansetron Group	Mean of Lignocaine Group	P - Value
DBP - PRE	76.3200	75.4600	0.3656
DBP - INDUC	72.3200	73.0800	0.5125
DBP - 5MIN	76.9800	75.3000	0.1132
DBP - 10MIN	72.9400	71.9400	0.3146
DBP - 15MIN	76.8000	75.2000	0.1269
DBP - POST	75.7000	74.6000	0.2432

The comparison of mean SPO2 at different time intervals between the ondansetron group and the lignocaine group was inferred that the mean SPO2 at time intervals of before induction, during induction, intraoperatively at 5 minutes, 10 minutes, 15 minutes, and postoperative period was shown statistically not significant (P>0.05).

Table 4: Comparision of SPO2 at different time intervals between the study group

SPO2	Mean of Ondanetron Group	Mean of Lignocaine Group	P - Value
SPO2 - PRE	99.8000	99.0200	0.0840
SPO2 - INDUC	100.0000	99.7200	0.1733
SPO2 - 5MIN	99.8000	100.0000	0.3198
SPO2 - 10MIN	100.0000	100.0000	1.0000
SPO2 - 15MIN	100.0000	100.0000	1.0000
SPO2 - POST	94.4600	98.8400	0.0880

In the ondansetron group (n=50), 60.0% of patients had no pain, 24.0% of patients had mild pain, 10.0% of patients had pain moderately, and 6.0% of patients had severe pain. Whereas in the lignocaine group (n=50), 66.0% of patients had no pain, 24.0% of patients had mild pain, 10.0% of patients had pain moderately, and none of the patients had severe pain. However, the association between the groups with the pain score level was shown statistically not significant (P = 0.370, Not sig.).

In the ondansetron group (n=50), 74.0% of patients had no pain during recall, 26.0% of patients had pain during recall. Whereas in the lignocaine group (n=50), 88.0% of patients had no pain during recall, 12.0% of patients had pain during recall. However, the association between the groups with the pain recall was shown statistically not significant (P = 0.074, Not sig.

In the ondansetron group (n=50), 82.0% of patients had no PONV, 18.0% of patients had PONV. Whereas in the lignocaine group (n=50), 74.0% of patients had no PONV, 26.0% of patients had PONV. However, the association between the groups with the PONV was shown statistically not significant (P = 0.334, Not sig.).

6. Discussion

Propofol is widely used in anesthetic Clinical Practice. Propofol is a fast - acting agent and its action wears off quickly making it useful for daycare procedures.1[1]It offers great sedation, amnesia, anxiolysis, and an overall sense of well - being at subhypnotic dosages. It possesses antiemetic properties, which contributes to its benefits. It helps patients with hypertension, epilepsy, or a hyperactive airway by suppressing upper airway reflexes in response to laryngoscopy and intubation. It reduces the stress reaction during intubation.

The most worrying side effect which has been most extensively studied is pain on injection of propofol. The incidence of pain varies from 30 - 90% of patients.3Despite the drug's appealing characteristics, early experts predicted that the high incidence of pain after injection would force it to take a back seat in time. Several research have been undertaken to reduce the discomfort associated with propofol injection.

Despite the fact that several strategies for easing or diminishing the amount of pain associated with propofol injection have been examined, lignocaine was the most commonly utilised pre - treatment medication. Several lignocaine dosages were investigated. It is shown that a dose of lignocaine 0.1 mgkg - 1 significantly decreased the incidence of pain & there was no improvement when the dose was increased.3

In an attempt to find out the optimal amount of lignocaine necessary to reduce pain, Tham et al. (1995) [12] showed that a

propofol emulsion containing 0.05% lignocaine is effective in reducing propofol injection pain. The dose of lignocaine used in our study was 0.1mg kg - 1 which was found to be effective.

Ondansetron is a strong and highly specific antagonist of the 5 - HT3 receptor. Ondansetron has both central and peripheral modes of action. It inhibits 5 - HT3 in the region postrema, nucleus tractussolitarius (NTS), and other brain areas associated with nausea and vomiting. It also inhibits 5 - HT3 receptors in the gastrointestinal tract's mucosal vagal afferents.

The present study was a tertiary care hospital - based prospective randomized comparative study and Patients were posted for elective surgical procedures under general anaesthesia at the Department of Anaesthesiology and Critical care medicine at S. V. R. R. G. G. Hospital, Tirupati In a total of 100 patients, the minimum age was18years, the maximum age was 60 years and a mean ± SD age was 35.76 ± 10.69 years.

The comparision of mean differences of HR, SBP, DBP, SPO2, between group 1 &2 at different intervals of before induction, duringinduction, intraoperatively at 5, 10, 15 minutes and post operative was shown statistically not significant (P>0.05). the association between the groups with the pain score level (P = 0.370), pain recall (P = 0.074), and PONV (P= 0.334). was shown statistically not significant.

In a study of Mohammadi et al. (2016) [13], 90.0% of patients had no pain, 9.0% of patients had mild pain, none of the patients had pain moderately, and severe pain in the Ondansetron group, and 95.0% of patients had no pain, 4.0% of patients had mild pain, none of the patients had pain moderately, & severe pain in the lignocaine group. The overall occurrence of pain on propofol injection was significantly lesser in lidocaine, ondansetron i. e., 9% of patients in the ondansetron group and 4% of patients in the lidocaine group had mild pain (P= 0.06).

In a study of Anitha Paul et al. (2020) [14], 76.0% of patients had no adverse effects regarding pain, 24.0% of patients had pain in the Ondansetron group and 100.0% of patients had no adverse effects regarding pain, none of the patients had adverse effects regarding pain in the lignocaine group. Moreover, the association between the groups with the pain score level was shown statistically significant (P = 0.001).

7. Summary

The present study was conducted at the Department of Anaesthesiology and Critical care medicine, S. V. R. R. G. G. Hospital, Tirupati, Andhra Pradesh.

This prospective randomized comparative study was consisting of 100 patients and was divided into two groups as
Group- 1: Received Lignocaine (0.1 mg/kg) as pretreatment and
Group - 2: Received Ondansetron (0.1 mg/kg) as pre - treatment was randomly selected.

The following summary of the results was made.

The comparison of mean differences of heart rate (HR) between the ondansetron group and the lignocaine group at different time intervals of before induction, during induction, intra - operatively at 5 minutes, 10 minutes, 15 minutes, and postoperative period was shown statistically not significant (P>0.05).

The comparison of mean differences of SBP between the ondansetron group and the lignocaine group at different time intervals of before induction, during induction, intra - operatively at 5 minutes, 10 minutes, 15 minutes, and postoperative period was shown statistically not significant (P>0.05).

The comparison of mean differences of DBP between the ondansetron group and the lignocaine group at different time intervals of before induction, during induction, intra - operatively at 5 minutes, 10 minutes, 15 minutes, and postoperative period was shown statistically not significant (P>0.05).

The comparison of mean differences of SPO2 between the ondansetron group and the lignocaine group at different time intervals of before induction, during induction, intra - operatively at 5 minutes, 10 minutes, 15 minutes, and post - operative period was shown statistically not significant (P>0.05).

40.0% of patients had pain [Mild pain (24.0%), Moderate pain (10.0%), and severe pain (6.0%)] in the ondansetron group. Whereas in the lignocaine group, 34.0% of patients had pain [Mild pain (24.0%), and Moderate pain (10.0%)]. However, the association between the groups with the pain score level was shown statistically not significant (P = 0.370).

26.0% of patients had pain during recall in the ondansetron group, and 12.0% of patients had pain during recall in the lignocaine group. However, the association between the groups with the pain recall was shown statistically not significant (P = 0.074).

18.0% of patients had PONV in the ondansetron group, and 26.0% of patients had PONV in the lignocaine group. However, the association between the study groups and the PONV was shown statistically not significant (P =0.334)

8. Conclusion

The purpose of a study is to compare the lignocaine and ondansetron as pretreatment to prevent pain on injection of propofol. They concluded that both ondansetron and lidocaine were similarly effective pretreatment drugs for the prevention of propofol - induced pain.

Propofol is an IV induction agent which produces a good quality of anaesthesia and rapid recovery. However, it often has the drawback of causing pain or discomfort on injection. Various procedures have been tried to alleviate the pain of propofol injection. In this study, we compared pretreatment

with lignocaine and ondansetron to decrease the injection pain.

We conclude that

- Ondansetron 0.1 mgkg - 1 decreases the injection pain significantly.
- Both Ondansetron 0.1 mgkg - 1 and lignocaine 0.1 mg kg - 1 were shown similarly effective pre - treatment drugs for the prevention of propofol injection - induced pain.
- Ondansetron has the added advantage of reducing PONV.
- No significant hemodynamic changes are caused by

References

[1] IASP Announces Revised Definition of Pain - International Association for the Study of Pain (IASP) [Internet].
[2] N. Boheimer M. Propofol infusion as main agent for day care surgery. Post Grad Med J.1985; 61 (3): 105–7.
[3] Gehan G, Karoubi P, Quinet F, Leroy A, Rathat C, Pourriat JL. Optimal dose of lignocaine for preventing pain on injection of propofol. Br J Anaesth.1991; 66 (3): 324–6.
[4] Kay B, Rolly. G, 35868 I. A new intravenous induction agent. ActaAnaesthesiolBelg.1977; 28: 303–16.
[5] Klement W, Arndt J. Pain on injection of propofol: effects of concentration and diluent. Br J Anaesth.1991; 67 (3): 281–4.
[6] Eriksson M, Englesson S, Niklasson F, Hartvig P, Zarmsky R. Effect of Lignocaine and pH on Propofol - Induced Pain. SurvAnesthesiol.1998; 42 (2): 113.
[7] King SY, Davis FM, Wells JE, Murchison DJ, Pryor PJ. Lidocaine for the prevention of pain due to injection of propofol. AnesthAnalg.1992Feb; 74 (2): 246–9.
[8] Ali Z, Gang W, Kozlov A, Barasi S. The role of 5HT3 in nociceptive processing in the rat spinal cord: Results from behavioural and electrophysiological studies. NeurosciLett.1996; 208 (3): 203–7.
[9] Ye J, Mui W, Ren J, Hunt T, … WW - A&, 1997 U. Ondansetron exhibits the properties of a local anesthetic. AnesthAnalg.1997; 85 (5): 1116–21.
[10] Gregory RE, Ettinger DS.5 - HT3 receptor antagonists for the prevention of chemotherapy - induced nausea and vomiting. A comparison of their pharmacology and clinical efficacy. Drugs.1998; 55 (2): 173–89.
[11] Picard P TM. Prevention of pain on injection with propofol: a quantitative systematic review. AnesthAnalg.2000; 90: 963–9
[12] Tham CS, Khoo ST. Modulating effects of lignocaine on propofol. Anaesth Intensive Care.1995; 23 (2): 154–7.
[13] Mohammadi S, Khosravi M, Shoeibi G. Comparing Intravenous Lidocaine, Ondansetron and Their Combination on Reducing Pain of Injection of Propofol. Arch AnesthesiolCrit Care.2016; 2 (1): 154–6
[14] Anitha Paul M, Venugopal A, Rachel Cherian K, Jagathnath K. A comparative study of Lignocaine and Ondansetron as pretreatment to prevent pain on injection of Propofol. J Med SciClin Res.2020; 8 (6): 110–7.