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# PREVENTION OF PAIN ON PROPOFOL INJECTION: A COMPARATIVE STUDY OF PRETREATMENT WITH LIGNOCAINE AND ONDANSETRON.

Anesthesiology

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## ABSTRACT

Propofol is induction of choice in most of the surgery, however it causes profound pain on injection lead patient dissatisfaction. Routinely, intravenous preservative free lignocaine is used for prevention of pain due to injection of propofol. In this study, ondansetron a specific 5HT3 receptor antagonist was used to compare the efficacy. 90adult patients belonging to ASA physical status I or II, scheduled for elective surgeries under general anaesthesia were randomly allocated into two groups A, B and C. Group A 5ml of 0.9% NS Group B received Inj lignocaine 50 mg and group B received Inj ondansetron 4mg as retreatment, before injection of propofol. Comparing pain during propofol injection Ondansetron 4mg pre-treatment reduces the incidence and less incidence of PONV.

## KEYWORDS

Ondansetron, Lignocaine, Pain On Injection, Propofol, Ponv.

### Introduction

Propofol providing a smooth induction and rapid recovery is now considered as an ideal intravenous anaesthetic agent. It has been widely used as an induction agent. However, it has been reported that it evokes considerable pain on injection in 28-98% of adult patients which is still a limiting factor for its use.[1]

Numerous methods have been studied and advocated to minimize this pain with variable success. McDonald and Jameson P used aspirated of blood before injection to alleviate the pain .Similarly numerous drugs have been used to minimize the pain such as aspirin , NSAIDS ,opioids ,ketamine metoclopramide local anaesthetics etc[2]

Ondansetron a 5HT3 antagonist, widely used as an anti-emetic drug which has got a local anaesthetic property it also used as pre-treatment for alleviation of pain on propofol injection. [3]

Pre-treatment with Lignocaine with venous conclusion was found to decrease the incidence and severity of pain on injection of Propofol. Lignocaine hydrochloride due to its membrane stabilizing action along with blocking of sodium channels was well accepted. Administration of lignocaine either before or premixed with propofol remains widely used.[4]

With the above background, we intended to compare efficacy of lignocaine and ondansetron pre-treatment in reducing the pain on injection of propofol during induction of anaesthesia.

### 2. Review of Literature.

Study conducted Prashant J et al, Lignocaine or Ondansetron can be used to alleviate incidence of pain on Propofol inj, incidence of pain was more in control group than study groups.[5]

Zahedi et al, concluded that, Ondansetron pre-treatment may be used to reduce the incidence of pain on injection of propofol, and advantage added to the useful prevention of postoperative nausea and vomiting. Amesh and coworkers et al, showed that ondansetron 4mg pretreatment was successful in relieving the pain on propofol injection 50%.[6]

### 3. Methodology

After the approval of institutional ethics committee, written and inform consent taken from all patient. ASA I or II, aged between 20 and 60 years presenting for elective surgery under general anaesthesia were included in the study. Patient refusal with difficulty in communication, difficult airway, Patients with a history of allergic response to propofol or $5HT_3$ receptor antagonist or lignocaine & pregnant women were excluded from the study.

In operation room, a 20G cannula was inserted into a vein on the dorsum of patient's non dominant hand and started on Ringers lactate solution. Monitors were connected, heart rate, non-invasive blood pressure, peripheral $O_2$ saturation and respiratory rate were recorded.

An arm tourniquet will be applied and inflated to 50mm of hg.5ml of pre-treatment solution will be administered over 20 seconds .After one minutes Tourniquet will be released .the calculate dose of propofol 2mg/kg at room temperature will be administered at the rate of 2ml for 5 second. During the injection, patients will be asked about the presence of pain or discomfort at every 5-10second.The verbal response and the behavior signs such as facial grimacing, arm withdrawal or tears will be noted and will be graded in accordance with the scale used by Mc crirrick and hunter.

Patients in GROUP A received 5ml of 0.9%NS Group B lignocaine (50mg diluted to 5ml) and GROUP C received ondansetron (4mg diluted to 5ml,) over a period of 5 seconds.

**Table 1:** Mc Crirrick and Hunter Scale of Evaluation of Propofol Injection Pain

| | |
|---|---|
| *0* | *none (negative response to questioning)* |
| 1 | mild pain (pain reported only in response to questioning without any behavioural signs) |
| 2 | moderate pain (pain reported in response to questioning and accompanied by a behavioural sign or pain reported spontaneously without questioning) |
| 3 | severe pain (strong vocal response or response accompanied by facial grimacing, arm withdrawal or tears) |

Anaesthesia was maintained using O2 in N2O and 1% Isoflurane uniformly in all cases. For muscle relaxation Inj.Vecuronium bromide 0.1 mg kg-1 was given as loading dose and one fourth of loading dose was used for maintenance. Patients were reversed with Inj.Neostigmine 0.05 mg kg-1 and Inj. Glycopyrrolate 0.01mg kg-1 both IV after ensuring adequate recovery from neuromuscular blockade. Oral cavity and throat were suctioned thoroughly prior to extubation, and extubated once extubation criteria was met.

### 4. Statistical Analysis:

The statically analysis of the resulting data will be done using chi square test and "t" test. The results are presented as mean +/- standard deviation. For all the tests P value of $\leq 0.05$ is considered as statistically significant

### 5. Results:

Data was collected and statistical analysis was performed as explained in the methodology of the study. The results and interpretations are as explained below.

**Table 2: Demographic Data**

| | Group A | | Group B | | Group C | |
|---|---|---|---|---|---|---|
| | mean | SD | mean | SD | mean | SD |
| Age | 38.93 | 10.092 | 39.93 | 10.748 | 36.93 | 10.799 |
| Weight | 61.83 | 10.235 | 65.93 | 12.169 | 64.93 | 10.976 |
| SEX (m/f) | 18/12 | | 20/30 | | 20/30 | |

Demographic data comparable in all the three group p values for age is 0.536, weight p values 0.437 and gender p value 0.824. Not statistically significant

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**Table 3: Heart Rate**

| Group | Pre-induction | Post-induction |
|---|---|---|
| A | 75.27 ±8.33 | 73.837.77 |
| B | 78.17±8.302 | 77.13±8.701 |
| C | 75.80±8.727 | 75.37±381 |

The change in pulse rate after induction was similar in all pre-treatment group p values 0.521 which is not statistically significant.

**Table: Painscore Distrubution**

| Pain score | Group A | Group B | Group C | Total |
|---|---|---|---|---|
| 0 | 5 | 24 | 17 | 46 |
| 1 | 12 | 4 | 10 | 26 |
| 2 | 8 | 2 | 2 | 12 |
| 3 | 5 | 0 | 1 | 6 |
| Total | 30 | 30 | 30 | 30 |

**Table 4: Prevelance Of Pain On Propofol Injection**

| | GROUP A | GROUP B | GROUP C | TOTAL |
|---|---|---|---|---|
| No pain | 5 | 24 | 17 | 46 |
| Pain | 25 | 6 | 13 | 54 |
| Total | 30 | 30 | 30 | 90 |

Incidence of pain in group a (placebo) was 83.3% compared to group B (lignocaine) and group c (ondansetron) which were 20% and 43.3% respectively.stasticallly analysis done using Chi square test. Showed that incidence of pain in group A was statistically significant (<0.01) than other two groups. The inter group comparison between lignocaine and ondansetron showed that both reduced pain on propofol injection but the incidence of pain relief in lignocaine was better than ondansetron group, statistical not significant.

Pain score in group A no pain 16.7%(Score o), mild pain 40%(score 1) moderate pain 8%(score 2) and severe pain 5%(score 3) respectively. In group B no pain 84% (score0), mild pain 13.3 %( score 1), moderate pain 6.7 %( score 2) and non-have severe pain. In group C no pain 56.7 %( score o) mild pain 33.3% (score 1), moderate pain 6.7 %( score 2) and 1 had severe pain.

Intensity of pain score was significantly less in group B and group C then group a(placebo) which is statistically significant p values<0.05 . Post-operative PONV less in group B and C compared to placebo.

And there were no significant adverse effect between the groups.

## 6. Discussion

Propofol commonly used intravenous induction agent especially day care surgery. Possess smooth induction and rapid recovery. However it often cause pain during injection. Incidence of pain varies from 28-90% .

Although the underlying mechanisms are still not fully understood, the explanation for the pain include endothelial irritation, osmolality differences, physiological pH and the activation of pain mediators.

Numerous methods have been studied and advocated to minimize this pain with variable success. McDonald and Jameson P used aspirated of blood before injection to alleviate the pain .Similarly numerous drugs have been used to minimize the pain such as aspirin , NSAIDS ,opioids ,ketamine metoclopramide local anaesthetics.[2]

Most commonly drug used for pre-treatment was lignocaine. Different concentrations and doses of lignocaine were tried to find optimal dosage of lignocaine. Addition of 1% lignocaine to 1% Propofol (1:10) caused propofol to migrate from the aqueous phase of emulsion into its lipid phase.

Ondansetron is selective 5- HT3 receptor antagonist .5HT3 receptor are present both peripherally on the vagal terminal and centrally on the chemoreceptor zone of the area postrema.Ondansetron may agonist the emetic effect of serotonin at either or both the receptor group.

Patient's demographic characters including age, gender and weight were comparable in all the three pre-treatment groups. There were no statistically difference among the groups.

Haemodynamic parameter heart rate, systolic and diastolic blood pressure before pre induction and post induction comparable in all group there were no statistically significant.

Prashant J et al, in 2014 done a studied, and concluded that pre-treatment with either Lignocaine or Ondansetron can be used to alleviate incidence of pain on Propofol injection with cardiovascular stability and minimal side effects. Incidence of pain was more in control group than study groups & difference was statistically significant

Incidence of pain in group a (placebo) was 83.3% compared to group B (lignocaine) and group c (ondansetron) which were 20% and 43.3% respectively.stasticallly analysis done using Chi square test. Showed that incidence of pain in group A was statistically significant (<0.01) than other two groups. The inter group comparison between lignocaine and ondansetron showed that both reduced pain on propofol injection but the incidence of pain relief in lignocaine was better than ondansetron group, statistical not significant[5]

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## 7. Conclusion

Ondansetron 4mg pre-treatment provides a simple and safe method of reducing the incidence of pain on injection of propofol .It has an added advantages of preventing post operative nausea and vomiting and can used as an alternative to lignocaine for reducing the pain on propofol injection.

## List of Abbreviations Used

- ASA - American society of anaesthesiologists
- DBP - Diastolic blood pressure
- ECG – Electrocardiogram
- HR - Heart rate
- PONV - Postoperative nausea and vomiting
- SBP - Systolic blood pressure
- SPO2 - Oxygen saturation by pulse oximetry
- VAS - Visual analogue scale 5HT3 - 5-hydroxy tryptamine

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