

ASSESSMENT OF EFFECT OF ONDANSETRON AND LIGNOCAINE IN ATTENUATION OF PROPOFOL INDUCED PAIN DURING INDUCTION OF ANAESTHESIA

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Abstract

Background: To compare the effect of ondansetron and lignocaine in attenuation of propofol induced pain during induction of anaesthesia. **Materials and Methods:** 80 patients aged 18–60 years of both genders belonging to American Society of Anaesthesiologists (ASA) physical status I and II scheduled for various elective surgical procedures were randomly divided into 2 groups. Group I received 0.5 mg/kg of lignocaine and group II received 4 mg of ondansetron. Pain was assessed with a four-point scale. **Results:** Group I comprised of 22 male and 18 female and group II had 20 males and 20 females. The mean weight in group I was 56.3 kgs and in group II was 55.9 kgs. ASA status I and II was seen in 17 and 23 in group I and 18 and 22 in group II respectively. The difference was non-significant ($P > 0.05$). Pain score was 0 seen in 70% and 35%, score 1 in 20% and 34%, score 2 in 6% and 18% and score 3 in 4% and 13% in group I and II respectively. The difference was significant ($P < 0.05$). **Conclusion:** Pre treatment with lignocaine 0.5 mg/kg significantly reduced the propofol induced pain when compared to ondansetron 4 mg.

INTRODUCTION

Propofol, a widely used drug for induction, often causes local pain when administered into a peripheral vein. Propofol is a common intravenous (IV) anesthetic drug used for induction and maintenance during general anesthesia with rapid onset and short duration of action.^[1] However, the incidence of pain following propofol injection varies between 28 and 90% in adults if a vein on dorsum of hand is used. The quality of pain was described as extremely sharp, aching, or burning.^[2] It has been arranged as the seventh most important problem in current practice of clinical anesthesia by American anaesthesiologists. Many patients experience mild to moderate pain or even excruciating pain during propofol injection. Several methods have been described to reduce this pain, of which most effective and common are the use of a larger vein and mixing with lignocaine.^[3]

Methods to reduce the incidence of pain on injection include adding lidocaine to propofol, cooling or warming propofol, diluting the propofol solution,

injection of propofol into a large vein, and pre-treatment with IV injection of lidocaine, ondansetron, metoclopramide, an opioid, magnesium, or thiopental with or without tourniquet; all have been tried with variable results.^[4] It has been demonstrated that ondansetron, a specific 5-hydroxytryptamine (5HT₃) receptor antagonist, provided numbness when injected under the skin and is 15 times more potent than lidocaine.^[5]

Ondansetron is a serotonin 5HT₃ receptor antagonist and demonstrates superior efficacy and longer duration to granisetron. It is commonly used as an antiemetic and has been found to be effective in prevention of early PONV compared to ondansetron.^[6] The present study was conducted with the aim to compare the effect of ondansetron and lignocaine in attenuation of propofol induced pain during induction of anaesthesia.

MATERIALS AND METHODS

We selected 80 patients aged 18–60 years of both genders belonging to American Society of Anaesthesiologists (ASA) physical status I and II scheduled for various elective surgical procedures under general anaesthesia after obtaining approval from the ethical committee and written informed consent from the patients.

Patients were randomly divided into 2 groups. Group I received 0.5 mg/kg of lignocaine and group II received 4 mg of ondansetron. All the pretreatment drugs were made into 2 ml volume with normal saline. After intravenous (IV) pretreatment of study drug, manual occlusion of

venous drainage was done at mid arm with the help of an assistant for 1 min. This was followed by administration of propofol (1%) after release of venous occlusion. Pain was assessed with a four-point scale with the following values: None (no discomfort at the site of injection, 0 point), mild (the presence of pain without behavioural changes, 1 point), moderate (subjective symptoms or the concurrent presence of behavioural changes, 2 points), and severe (severe pain or the concurrent presence of such responses as making a face, hunching arms or shedding tears, 3 points). The results were compiled and subjected for statistical analysis using Mann Whitney U test. P value less than 0.05 was set significant.

RESULTS

Table 1: Patients distribution

Groups	Group I	Group II
Drug	0.5 mg/kg of lignocaine	4 mg of ondansetron
M:F	22:18	20:20

Group I comprised of 22 male and 18 female and group II had 20 males and 20 females [Table 1].

Table 2: Comparison of demographic data

Parameters	Group I	Group II	P value
Weight (Kgs)	56.3	55.9	0.98
ASA I/II	17:23	18:22	0.94

The mean weight in group I was 56.3 Kgs and in group II was 55.9 Kgs. ASA status I and II was seen in 17 and 23 in group I and 18 and 22 in group II respectively. The difference was non-significant ($P > 0.05$) [Table 2].

Table 3: Comparison of pain in all groups

Pain score	Group I	Group II	P value
0	70%	35%	0.05
1	20%	34%	0.82
2	6%	18%	0.05
3	4%	13%	0.17

Pain score was 0 seen in 70% and 35%, score 1 in 20% and 34%, score 2 in 6% and 18% and score 3 in 4% and 13% in group I and II respectively. The difference was significant ($P < 0.05$) [Table 3].

DISCUSSION

The pain frequently reported on induction of anaesthesia cannot be overlooked. Although it is not a serious complication, efforts are supposed to reduce the severity of the pain or discomfort.^[7] Propofol belongs to the group of phenols that can irritate the skin, mucous membranes, and venous intima.^[8] Injection pain associated with propofol characteristically occurs immediately or later after the drug injection with a delayed response of 10-20 seconds.^[9] The explanation for the pain includes endothelial irritation, osmolality differences, unphysiological pH, and the activation of pain mediators. It has been further demonstrated that ondansetron successfully relieved pain following propofol injection without any adverse effects in a significant number of patients.^[10] Ondansetron is routinely administered as premedication to prevent

postoperative nausea and vomiting (PONV) in patients scheduled for general anaesthesia. Ondansetron is a tetrahydro benzimidazole derivative structurally independent of previously developed drugs such as ondansetron, granisetron and tropisetron.^[11] Ondansetron is more potent and has longer lasting effects because of a slower rate of dissociation from the target receptor and higher binding affinity.^[12] The present study was conducted with the aim to compare the effect of ondansetron and lignocaine in attenuation of propofol induced pain during induction of anaesthesia.

Our results showed that group I comprised of 22 male and 18 female, group II had 20 males and 20 females. Sumalatha GB et al.^[13] compared the efficacy of ondansetron (group O), ramosetron (group R), and lignocaine (group L), in terms of attenuation of propofol induced pain during induction of anaesthesia. Hundred and fifty adult patients, aged 18–60 years, posted for various

elective surgical procedures under general anaesthesia were randomly assigned to three groups of 50 each. Group R received 0.3 mg of ramosetron, Group L received 0.5 mg/kg of 2% lignocaine and Group O received 4 mg of ondansetron. After intravenous (IV) pre treatment of study drug, manual occlusion of venous drainage was done at mid arm with the help of an assistant for 1 min. This was followed by administration of propofol (1%) after release of venous occlusion. Pain was assessed with a four point scale. The overall incidence and intensity of pain were significantly less in Groups L and R compared to Group O ($P \leq 0.001$). The incidence of mild to moderate pain in Groups O, R and L was 56%, 26% and 20%, respectively. The incidence of score '0' (no pain) was significantly higher in Group L (76%) and Group R (72%) than Group O (34%).

The mean weight in group I was 56.3 Kgs and in group II was 55.9 Kgs. ASA status I was seen in 17 and II in 23 in group I, 18 and 22 in group II respectively. Singh et al.^[14] evaluated whether pre-treatment with IV ramosetron, used for prophylaxis of postoperative nausea and vomiting (PONV), would reduce propofol-induced pain as an equivalent to lidocaine. 120 American Society of Anesthesiologists grade (ASA) I and II patients were randomly assigned into three groups (40 in each). Group N received 2 ml of 0.9% saline, Group L received 2 ml of lidocaine, and Group R received 2 ml of ramosetron. Mid forearm was occluded manually before injection and released after 1 min and then propofol was injected over 5 s. Patients were observed and questioned 15 s later if they had pain in the arm and pain was scored on a four-point scale: 0 = no pain, 1 = mild pain, 2 = moderate pain, and 3 = severe pain. The incidence of pain in groups N, L, and R were 65, 35, and 30%, respectively. Pain was reduced significantly in the groups L and R ($P < 0.05$). Two patients each in Groups L and R (5% each) had moderate and severe pain. This difference in pain was statistically insignificant, but when compared to Group N (25 and 30%, respectively) it was statistically significant.

Pain score was 0 seen in 70% and 35%, score 1 in 20% and 34%, score 2 in 6% and 18% and score 3 in 4% and 13% in group I and II respectively. Alipour et al.^[15] showed that pain caused by propofol had a significant difference between different groups. The number of patients without pain was 39 in lignocaine and granisetron group (69.64%), 29 in magnesium sulphate group (51.78%), 22 in ondansetron group (39.28%) and 16 in paracetamol group (28.57%), ($P \leq 0.001$). Ye et al.^[16] found in rats, that ondansetron is approximately 15 times more potent local anesthetic as lidocaine and this property probably contributes to its antiemetic action. Ondansetron had been shown to relieve pain by its multifaceted actions as a

Na channel blocker, a 5HT 3 receptor antagonist, and mu opioid agonist.

CONCLUSION

Pretreatment with lignocaine 0.5 mg/kg significantly reduced the propofol induced pain when compared to ondansetron 4 mg.

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