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Efficacy of Ondansetron and Ramosetron in controlling propofol-induced pain: A comparative study

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Abstract
Background: The present study was conducted to compare efficacy of ondansetron and ramosetron in controlling propofol-induced pain.
Materials & Methods: The present study was conducted on 56 patients of both genders. Patients were divided into 2 groups of 28 each. Group I received 4 mg of ondansetron and group II received 0.3 mg of ramosetron. All the pre-treatment drugs were made into 2 ml volume with normal saline. After intravenous (IV) pre-treatment of study drug, manual occlusion of venous drainage was done at mid-arm for 1 min. This was followed by administration of propofol (1%) after release of venous occlusion. Pain was assessed with a four-point scale.
Results: Out of 56 patients, group I received ondansetron and group II received ramosetron. Pain score 1 was seen in 4 in group I and 7 in group II, score 2 was seen in 8 in group I and 12 in group II, score 3 was seen in 10 in group I and 7 in group II and score 4 was seen in 6 in group I and 2 in group II. The difference was significant ($P< 0.05$).
Conclusion: Authors found that 0.3 mg of Ramosetron is better than 4 mg of ondansetron in controlling propofol induced pain.

Keywords: Ondansetron, propofol, ramosetron

Introduction
Propofol is becoming the intravenous anesthetic of choice for ambulatory surgery in outpatients. It is extensively metabolized, with most of the administered dose appearing in the urine as glucuronide conjugates [1]. Propofol is a 2, 6-diisopropylphenol and is a lipophilic weak acid (pKa¼11). It is very insoluble in water, so is formulated as 1% aqueous solution in an oil-in-water emulsion containing soya bean oil, glycerol, and egg lecithin [2].
Favorable operating conditions and rapid recovery are claimed as the main advantages in using propofol, whereas disadvantages include a relatively high incidence of apnea, and blood pressure reductions. The action of propofol involves a positive modulation of the inhibitory function of the neurotransmitter gamma-aminobutyric acid (GABA) through GABAA receptors [3].
Many patients experience mild to moderate pain or even excruciating pain during propofol injection. Numerous studies have been conducted to know the better among them for prevention of post‑operative nausea and vomiting (PONV) but less for reducing propofol‑induced pain [4]. Ondansetron has been proved to have a local anaesthetic effect, other than antiemetic property. Ramosetron is one of the potent 5‑HT3 antagonist commonly used as an antiemetic and has been found to be effective in prevention of early PONV compared to ondansetron [5]. The present study was conducted to compare efficacy of ondansetron and ramosetron in controlling propofol‑induced pain.

Materials and Methods
The present study was conducted in the department of Oral & Maxillofacial surgery. It comprised of 56 patients of both genders. All were informed regarding the study. Ethical approval was obtained from institute prior to the study.
General information such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 28 each. Group I received 4 mg of ondansetron and group II received 0.3 mg of ramosetron. All the pre-treatment drugs were made into 2 ml volume with normal saline. After intravenous (IV) pre-treatment of study drug, manual occlusion of venous drainage was done at mid-arm for 1 min. This was followed by administration of propofol (1%) after release of venous occlusion. Pain was assessed with a four-point scale.

Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table 1: Distribution of patients

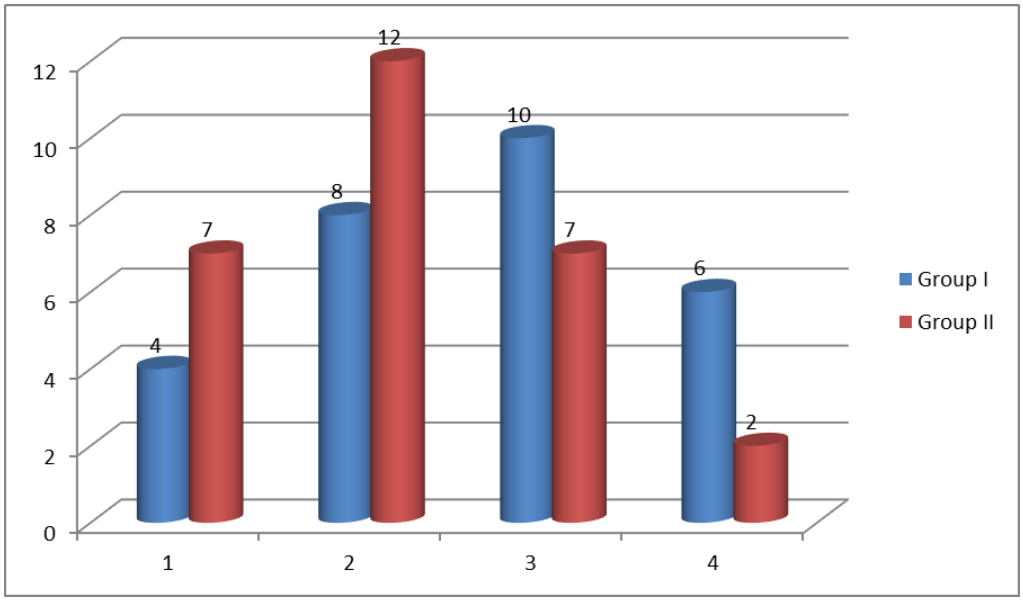
Total- 56		
Groups	**Group I (ondansetron)**	**Group II (Ramosetron)**
Number	28	28

Table 1 shows that out of 56 patients, group I received ondansetron and group II received Ramosetron.

Table 2: Assessment of pain score in both groups

Pain score	Group I	Group II	P value
1	4	7	0.01
2	8	12	0.05
3	10	7	0.02
4	6	2	0.01

Table 2, graph I shows that pain score 1 was seen in 4 in group I and 7 in group II, score 2 was seen in 8 in group I and 12 in group II, score 3 was seen in 10 in group I and 7 in group II and score 4 was seen in 6 in group I and 2 in group II. The difference was significant ($P< 0.05$).



Graph I: Pain score in both groups

Discussion

Due to its high lipid-solubility, propofol was initially formulated as a solution with the surfactant Cremophor EL, but the occurrence of pain on injection and anaphylactoid reactions prompted to search for alternative formulations. Results from using cyclodextrins, water-soluble prodrugs, and adopting Bodor's approach to the site-specific chemical delivery system (CDS), as well as the advantages provided by computer-controlled infusion systems, are examined in some detail.

This can be conducive to bacterial growth, but addition of the chelating agent disodium edetate has reduced this [6].

Propofol can cause pain during injection which may be attenuated by co-administration of lidocaine or by formulation in medium chain, rather than long-chain triglycerides. It has a short initial distribution half-life. Propofol is rapidly metabolized in the liver by conjugation to glucuronide and sulphate, producing water-soluble compounds which are excreted mainly by the kidneys. Clearance of propofol is extremely high [7]. The present study was conducted to compare efficacy of ondansetron and ramosetron in controlling propofol-induced pain.

In this study, out of 56 patients, group I received ondansetron and group II received ramosetron.

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Hwang *et al*. [8] conducted a study on hundred and fifty adult patients, aged 18-60 years, posted for various elective surgical procedures under general anaesthesia which 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. 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%).

Kim *et al*. [9] 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%). In a study by Ahmed *et al*, [10] the incidence of propofol injection pain was reduced from 60% to 15% after granisetron pre-treatment. In another study, severity but not the incidence of pain on injection was significantly reduced by dolasetron (50%) compared with placebo, and there was no significant difference between dolasetron and lignocaine [11].

Conclusion

Authors found that 0.3 mg of ramosetron is better than 4 mg of ondansetron in controlling propofol induced pain.

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