Original Article

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Use of Oral Paracetamol as Premedication to Reduce Propofol Induced Pain During Induction of General Anesthesia

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ABSTRACT

Introduction: Propofol is the most frequently used intravenous anesthestic agent for induction of anesthesia in spite of pain on injection. Various pharmacological and non-pharmacological methods have been used to alleviate propofol induced pain. Paracetamol(PCM) is the most common analgesic used, which is inexpensive, easily available and with minimal side-effects. This study was done to observe the degree of pain reduction induced by injection of propofol with use of oral paracetamol preoperatively

Methods: It is a descriptive, cross-sectional study conducted at operation theater of Kist Medical College, Lalitpur, Nepal. The sample size of 80 individuals was calculated using Cochrane Formula, which was divided into two groups equally. One group received oral PCM preoperatively, while other did not receive. This study was conducted from July 2021 to December 2021. Patients from 18-60 years of age and within American Soceity of Anesthesiologists(ASA) grade I-II undergoing elective surgery, who did not have any contraindication to paracetamol were included in the study.

Results: Out of 40 patients who received PCM 57.5% had mild pain, 20 % had moderate pain, 2.5% had severe pain whereas 20 % of them had no pain. Among those who did not receive PCM, 2.5% had mild pain, 52.5% had moderate pain and 45% had severe pain. The average pain score on Numerical Rating Scale(NRS) score was 2.32 among oral PCM received group and 6.32 among those who did not receive oral PCM.

Conclusion: It was found that premedication with oral paracetamol is helpful to alleviate pain induced by propofol injection during induction of general anesthesia.

Keywords: General Anesthesia; Pain; Paracetamol; Propofol.

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INTRODUCTION

Propofol is the most frequently used intravenous anesthestic agent for induction of anesthesia despite of pain on injection as its most common adverse effect.[1] Pain from propofol injections may be generated by a kinin cascade effect.[2] Anothermechanism of pain suggested was the stimulation of the nociceptive receptors at the free nerve endings located between the intima and the media layers of the venous wall.[3] Due to its irritating pain effects during injection, there has been negative experience even after good anesthetic effect of propofol.[4]

Various pharmacological and non-pharmacological methods have been used to alleviate propofol induced pain.[5] Among them lidocaine pretreatment and veinous occlusion or injection in antecubital vein are most commonly preferred.[6] Nevertheless, there are various international studies which showed that paracetamol also reduced the propofol induced pain.[7-9] This study was conducted with an aim to determine the reduction of propofol induced pain by oral PCM.

METHODS

This study is a descriptive, cross-sectional conducted by department of Anesthesiology, in the operating room of KIST Medical College and Teaching Hospital. The ethical clearance was obtained from Institutional Review Committee (Ref. No.: 2078/79/17). The study was conducted from July 2021 to December 2021 (6 months duration). The total sample size was 80, which was calculated by using Cochrane formula.

$N=Z^2pq/e^2$

Where, Z=1.96 for CI 95%

e= error with 10% tolerable value

p= population proportion

q= 1-p

Here, p=70.41

Hence, N=80

The samples were selected using non probability convenience sampling method. Those subjects aged between 18 to 60 years of age, who gave consent and belonging to ASA I and II and undergoing elective surgical procedures under general anesthesia were included in the study. Patients with history of chronic pain, renal failure, chronic lung disease, deranged liver function tests, allergy to PCM and with reduced consciousness level (Glasgow Coma Score<15) were excluded from the study.

Patients for the study were grouped on the basis of those who were administered 1 gram of PCM 2hours prior to surgery and those that were not given any analgesics preoperatively. Each group had 40 patients. Patients were counseled regarding the pain induced by propofol during induction of general anesthesia and requested to grade the severity of such pain. The pain was assessed after infusion of 25% of the dose of propofol (600mg/min) using Numerical Rating Scale (NRS) for pain.[10] The severity of pain was assessed after 10 seconds of receiving the 25% of calculated dose. The NRS score 0 indicates no pain, score1-3 indicates mild pain, score 4-6 indicates moderate pain and score 7-10 indicates severe pain. The NRS score was compared in both groups receiving paracetamol and not receiving paracetamol. The patients were followed up till post-operative period for any adverse effects related with PCM.

The collected data were entered in Microsoft Excel. Statistical analysis was performed using SPSS version 23. The result was expressed as frequencies, percentages, mean and standard deviation. Data are represented as tables and bar diagrams.

RESULTS

Out of 40 patients who received PCM 23(57.5%) had mild pain, 8(20%) had moderate pain, 1(2).5% had severe pain whereas 8(20) % of them had no pain. Among those who did not receive PCM, 1(2.5%) had mild pain, 21(52.5%) had moderate pain and 18(45%) had severe pain. The average pain score on NRS score was 2.32 among PCM received group and 6.32 among those who did not receive PCM. The severity and incidence of pain during propofol injection in group that received oral PCM and that did not receive oral PCM is shown in Figure 2.

The heart rate and mean arterial pressure, 1 min after propofol injection in PCM received group was 83.75±13.67 beats per minute and 88.3±11.91 mm of Hg and in PCM not received group was 94.1±13.76 beats per minute and 92.2±13.67mm of Hg. In the recovery room, there

were no problems such as rashes or tissue edema in any of the groups.The demographic characteristics of the patient are shown in Table 1.

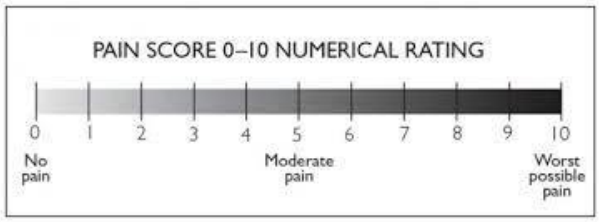

Figure 1. Numerical Rating Score for Pain

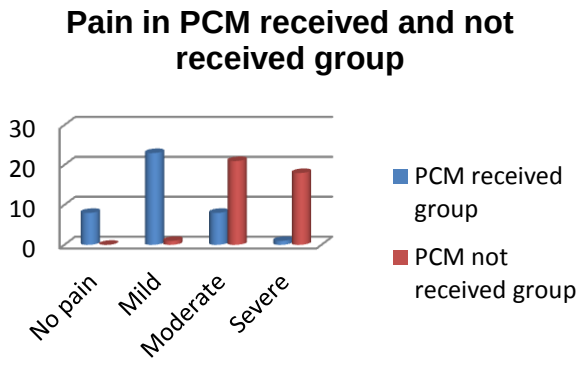

Figure 2. Severity and incidence of pain during propofol injection

Table 1. Socio-demographic characteristics of patient

	PCM received group	PCM not received group
Age in years	42.5±11.65	38.45±14.42
Gender		
Male	17	17
Female	23	23
ASA I	23	26
ASA II	17	14
Weight	65.5±9.64	60.40±9.28

DISCUSSION

In this study, we found that the oral PCM is also efficacious in decreasing the intensity of pain induced by propofol during induction of anesthesia, when used as premedication. Other studies showed the incidence of pain to be around 70.41% when oral PCM premedication was used, compared with that of saline (99.1%) which was showed results almost similar to our study, where the incidence of pain among oral PCM received group was 80% and that too, most had mild pain and very few had severe pain.[9]

In a double-blinded randomized controlled trial with 150 patients, Canbay et al. found that the incidence of propofol injection pain was 64% in the control group and 22% in the intravenous paracetamol pretreatment group.[11] In another study done by Khouadja et al, the incidence of propofol injection pain was found to be 36% in those receiving intravenous paracetamol compared with 85% in placebo groups.[3] The overall incidence of pain during propofol injection in our study was higher than in prior studies.[3, 11, 12] These studies used intravenous PCM and not oral PCM as in our study. In comparison to the intravenous form, the oral form of paracetamol has different pharmacokinetics and pharmacodynamics. This is why, in terms of the incidence and severity of propofol injection pain, our findings (using oral paracetamol) differed from those of previous studies (using intravenous paracetamol). Moreover the intravenous PCM infused has earlier and higher plasma levels compared with oral route.[13, 14] Other reasons might be the use of venous occlusion techniques in prior studies. As venous occlusion technique helps in the effective analgesic action of PCM in reducing propofol induced pain.[12]

Our differing results on the degree of propofol injection pain may be due to different methods of measuring pain severity. We used a Numerical Rating Score ranging from 0 to 10 (11 points) to measure our patients' pain. All the patients in our study quantified the degree of pain after injection of propofol, while in other studies, the pain score was reported by the observer depending upon patient's pain behaviors in a 4 point scale. 0 = none (negative response to questioning), 1 = mild pain (pain reported only in response to questioning with no behavioral signs), 2 = moderate pain (pain reported in response to questioning and accompanied by a behavioral sign or pain reported spontaneously without

questioning), and 3 = severe pain (strong vocal response or response accompanied by facial grimacing, arm withdrawals or tears). The NRS is a pain measurement system that is reliable, valid, change-sensitive, and simple to use.[15]

Oral paracetamol is generally available, relatively simple and convenient to use and cost-effective, the findings of this study are clinically valuable and applicable to daily practice. The results of this study can be therapeutically used in general because the protocol is simple to follow and early administration of oral paracetamol is pharmacologically rational. There were no complications related to paracetamol in our study.

CONCLUSION

Use of oral PCM preoperatively reduces the intensity of propofol induced pain during injection.

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