Original Article

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Evaluation of Propofol as Procedural Sedative Agent for Ease of Induction of Spinal Anesthesia in Patients Undergoing Abdominal Surgeries

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Abstract

Background: Sometimes it is difficult to position the patients for spinal anaesthesia. Poor positioning causes discomfort to both anesthesiologist and patient. It may also lead to, autonomic fluctuations. Providing procedural sedation may alleviate those undesired difficulties. In this study, we are evaluating propofol as procedural sedative agent for ease of induction of spinal anaesthesia. **Subjects and Methods:** This prospective study was conducted among 60 patients who were randomly divided into 2 groups. Group A received Inj Propofol 0.7mg/kg as procedural sedative agent prior to spinal anaesthesia, Group C did not receive any procedural sedative drugs. Ease of identification of space, time to induce spinal anaesthesia, number of attempts, patient comfort score, patient satisfaction score were recorded and analyzed. **Results:** Demographic data were comparable between the groups, there was no statistically significant difference between the groups in terms of ease of identification of space, number of attempts, patient comfort score and patient satisfaction score. Time to induce spinal anaesthesia was longer in Group A (35.53 ± 15.39) and it was statistically significant compared to Group C. **Conclusion:** Using Propofol as procedural sedative agent may not significantly ease the induction of spinal anesthesia in patients undergoing abdominal surgeries compared to patients without sedation

Keywords: Procedural Sedation, Propofol, Spinal Anaesthesia.

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Introduction

Patient positioning during administration of spinal anesthesia is very important, at times it is difficult for some patients to optimally flex their hips and knees making traditional position for induction of spinal anaesthesia difficult to achieve. Poor positioning itself can induce anxiety and cause autonomic fluctuations.[1] There is an evolving trend towards the judicious implementation of sedation during regional anesthesia providing increased patient's comfort and satisfaction.[2]

Procedural sedation is not a routine during neuraxial blocks, but it is advisable that anesthesiologists should provide their blocks comfortably. Sedation also alleviates anxiety thereby reducing autonomic fluctuations and eases induction of spinal anaesthesia and improves its quality.[3] In the past, there are limited studies in evaluating these procedural agents as sedatives for ease of induction of spinal anaesthesia. Propofol is one of the commonest sedative used in various day care procedures because of its immediate onset, shorter duration and clear headed recovery.[4]

In our study, we are evaluating propofol as procedural sedative agent before administration of spinal anesthesia in patients undergoing lower abdominal surgeries.

Subjects and Methods

This randomized controlled study was carried out in tertiary hospital, after obtaining approval from the Institutional Ethics Committee and written informed consent from the patients. Sixty patients of the American Society of Anaesthesiologists physical status 1 of either sex and of age 18–60 years of age posted for abdominal surgery were randomly divided into two groups (n = 30) using computer-generated table.

Inclusion Criteria

All American Society of Anaesthesiologists Physical Status-1 patients aged between 18 years to 60 years, undergoing elective surgeries under spinal anaesthesia, who can understand and willing to give consent were included.

Exclusion Criteria

Obese patients BMI≥ 30

Patients having any spinal deformity

Patients having history of allergy to the study drugs and local anaesthetics

Patients with history suggestive of GERD

Patients having coagulation abnormalities, bleeding diathesis.

Patients with hemodynamic instability/fixed output cardiac disorder

Patients who are having features suggestive of raised ICP

Detailed pre-anaesthesia check-up and appropriate investigations were carried out day prior to the surgery. The anaesthesia technique was explained to the patient and written informed consent was taken.

Patients were kept nil per oral overnight prior to surgery and were premeditated with Tab Ranitidine 150mg on the night prior to surgery.

In operation theatre, after performing standard pre-use checks of anaesthesia workstation and ancillary equipment, patients were shifted to OT, basal vital parameters were noted (Heart rate, bp spo2, Respiratory rate).

In GROUP A, the patients received Inj.Propofol 0.7mg/kg IV with increments of 20mg till they achieved Ramsay sedation score of 4 along with oxygen via venti mask at 6-8ltr/min. In Group C, the patients did not receive any sedative medications

Time to achieve Ramsay sedation score 4 was be noted and considered as onset of sedation in group A.[5] All patients were maintained on spontaneous Respiration.

Patients were placed with their back parallel to edge of the operating table, thighs flexed into the abdomen with neck flexed to allow the forehead to be as close as possible to knees with the help of an assistant in OT.

Under all aseptic precautions, Using landmark technique, desired space for insertion of spinal needle was identified. Ease of identification of space was assessed using ordinal scale as: easy, difficult, or impossible to palpate the lumbar spinous processes,[1] Later, spinal anaesthesia was performed by introducing the 25G Quinke spinal needle into preferred interspinous space until tactile sensation was felt. Correct placement of spinal needle into the subarachnoid space was judged by appearance of cerebrospinal fluid (CSF) in the hub of the needle.[6]

When there was no CSF in the needle hub or there was only a small amount of CSF with poor flow, the needle was rotated clockwise 90° and wait for 5 seconds. The sequence of rotation continued for another 3- quadrant rotation of 90° and would wait 5 seconds after each rotation. Despite this manoeuvre, if there was absence of CSF or its free flow, the needle was further advanced approximately by 2 mm. The number of times for needle re-directions and bony contacts were documented.

Thus, considering all the above-mentioned manipulations, each attempt was considered as a failed attempt if there was no CSF in the hub, despite advancement, three redirections coupled with 360 manoeuvre of the needle.[6]

Appearance of free flow of CSF confirmed a successful needle insertion and the study was complete whenever the subarachnoid space was confirmed by observation of free flow of CSF. Thus the time duration from the time of insertion of needle in first attempt till appearance of CSF was noted as time to induce spinal anaesthesia,[7] the number of attempts were noted.

Patient's comfort during the procedure was analysed by an independent observer using 10cm VAS scale (10cm denotes maximal comfort while 0cm denotes minimal comfort).[8]

Patient satisfaction score was also recorded in a subjective scale of 0-100. Additional data including any adverse or notable events were documented.

Statistical Analysis

All the data obtained were analysed using SPSS software version 16

Results

All 60 patients enrolled have completed the study with nil dropouts. Demographic data were comparable in both the groups with respect to Age, Gender and BMI. [Table 1]. All patients belonged to ASA Physical status 1.

Ease of identification of space was comparable among the two groups [Table 2].

Time to induce spinal in group A was 35.53 ± 15.39 seconds and it was 18.17 ± 13.62 seconds in group C. Thus time to induce spinal was longer in group A than group C and it was statistically significant. [Table 2]

Number of spinal attempts among the groups were comparable and was not statistically significant. However, about 40% of the cases in group A had attempts more than 1 while in group C it was 20 %. [Table 2]

Patient comfort score in group A was 7.50 ± 1.61 and 7.13 ± 1.20 in group C.

Patient satisfaction score in group A was 77.50 ± 13.50 and 71.67 ± 12.27 in group C. There was no statistical significance among the groups in terms of patient comfort score and patient satisfaction score. [Table 2]

The onset of sedation, ie the time taken to achieve Ramsay sedation score of 4 in group A was 72.40 ± 13.53 seconds.

There was a significant difference between the two groups in terms of Heart rate, Mean arterial pressure and Saturation. However, one patient in group A had airway obstruction after sedation, was managed with appropriate sized nasopharyngeal airway. No other adverse events noted.

Discussion

Propofol (2,6 di-isopropyl phenol) is a very short acting non-opioid sedative–hypnotic agent. It is thought to work by potentiating the binding of γ-amino butyric acid to receptor sites in the central nervous system (CNS).[9]

It is one of the commonest sedative used in various day care procedures because of its advantageous pharmacokinetic properties, which include a quick onset and recovery.[4] It has no analgesic properties and at higher doses it can lead to the loss of protective airway reflexes, hypotension, and bradycardia.[10]

Most of the patients are anxious regarding the surgical procedure and anaesthetic technique. This may result in poor positioning, hemodynamic variations and may also hinder the ease of induction of anesthesia or anaesthetic technique.

Sedation has been shown to increase patient satisfaction during Regional anaesthesia and it is a valuable tool to make it more convenient for patient, anaesthesiologist and the surgeon. It also reduces postoperative recall.[11]

There are studies to compare the ease of induction of spinal in different positions but till date,[1,6,12] there are limited studies done to know the usefulness of procedural sedation for the ease of spinal induction. In our study, we used propofol as procedural sedative drug prior to induction of spinal anaesthesia.

Surprisingly in our study, the time taken to induce spinal anaesthesia was longer in patients who were sedated with propofol compared to control group without any sedation. This may be attributed to the lack of analgesic property of propofol which in turn increased the time and number of attempts.

However, there was no statistical significance among the groups with regard to the number of attempts even though around 40% of patents in group A required more than 1 attempt as the patients would move while spinal needle is pricked due to pain. In non-sedated patients, verbal instructions were given prior to the prick and hence only 20% of patients required more than 1 attempts. In our study repeated bolus doses of propofol was required to maintain Ramsay sedation score of 4.Instead of bolus doses, infusion of propofol would have been a better choice to maintain a steady concentration.

Most anaesthesiologists may omit the procedural sedation to avoid drug side effects.

Dunn T et al conducted a study on 48 patients and found that Propofol is effective and safe for procedural sedation in the emergency department.[13] Bagchi et al found that the MAP and HR were significantly lower in patients receiving Propofol than Midazolam for sedation in spinal anaesthesia.[14]

Cheng et al. used pre-spinal propofol 0.3 mg/kg bolus, then 3 mg/kg/h infusion. It was safe for mothers and

babies. There was no hypoxemia or hypotension compared to non-sedation patients.[15] Similar results obtained in our study as well where there is no hemodynamic variation among the two groups. However, one patient had airway obstruction due to tongue fall once sedated and was managed with nasopharyngeal airway. This can be attributed to deeper plane of sedation due to administration of high dose of propofol as the patient's BMI was high.

Judicious use of sedation these days has markedly increased patient's comfort, satisfaction and acceptance towards regional anaesthesia.[1,16]

Alaa Mazy et al conducted a study on 216 parturients, the first decision for anaesthesia, either spinal or general, was recorded. Then, patients who refused SA and preferred general anaesthesia (GA) were consulted again as regards SA under propofol sedation for painless and comfortable spinal procedure. The use of propofol procedural sedation was effective in increasing the acceptance rate of spinal anaesthesia during CS with safety and high patient's satisfaction in their study.[16]

But in our study, there was no significant differences in patient comfort or patient satisfaction score among the groups. This may be attributed to absence of analgesics in either group.

Although it was not statistically significant, we observed higher number of patients in propofol group showed increased comfort and satisfaction. A large scale study may be needed to assess the significance of the same.

Conclusion

Propofol when used as pre-procedural sedative agent before induction of Spinal anaesthesia did not ease induction of spinal anesthesia significantly. However, we observed higher number of patients in propofol group showing increased comfort and satisfaction which was statistically insignificant. Pre-procedural sedation with propofol although safe to use, should be watched for deeper plane of sedation and its complications. Whether co-administration of analgesic with

Table 1: Demographic data, (Wilcoxon-Mann-Whitney U Test)

Parameters	Group		P-value
	A (n = 30)	C (n = 30)	
Age (Years)	36.13 ± 13.28	40.03 ± 12.21	0.237[1]
Gender			0.069[2]
Male	10 (33.3%)	17 (56.7%)	
Female	20 (66.7%)	13 (43.3%)	
BMI (Kg/m^2)	26.79 ± 2.76	25.70 ± 2.72	0.058[1]

Table 2: Parameters to evaluate ease of induction of spinal,patient comfort and satisfaction

Parameteters	Group A	Group C	P value	Statistical test used
Ease To Identify Space			0.542[2]	Chi-Squared Test
Easy	22 (73.3%)	24 (80.0%)		
Difficult	8 (26.7%)	6 (20.0%)		
Time to Induce Spinal (Seconds)***	35.53 ± 15.39	18.17 ± 13.62	0.013[1]	Wilcoxon-Mann-Whitney U Test
Number of Spinal Attempts	1.63 ± 1.00	1.27 ± 0.58	0.093[1]	Wilcoxon-Mann-Whitney U Test
More Than 1 Attempt (Yes)	12 (40.0%)	6 (20.0%)	0.091[2]	
Patient Comfort Score	7.50 ± 1.61	7.13 ± 1.20	0.160[1]	Wilcoxon-Mann-Whitney U Test
Patient Satisfaction Score	77.50 ± 13.50	71.67 ± 12.27	0.085[4]	t-test
Onset of Sedation (Seconds)	72.40 ± 13.53	-	-	

Inj.propofol would result in better pain relief and ease of induction of spinal anaesthesia needs to be evaluated.

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