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Comparison of Cardiopulmonary Parameters with and without Midazolam Premedication during Propofol Sedation in Regional Anaesthesia.

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ABSTRACT

Background: Regional anaesthesia is a commonly used technique in orthopedic procedures. Sedation during regional anaesthesia reduces patients anxiety, increases patient comfort with improvement in operating conditions during surgery. The present study compared the cardiopulmonary parameters amongst subjects during regional anaesthesia with propofol sedation with or without midazolam premedication and effect of midazolam premedication on propofol requirement. **Methods:** A total of forty, ASA grade I- III patients aged 25 to 65 years who were scheduled for total hip or knee replacement surgery under combined spinal epidural were included in this study. Patients in group I (n= 20) were started on propofol infusion alone for sedation after giving regional anaesthesia and group II (n=20) patients were given Inj Midazolam 2 mg im 30 min before arrival in OT given regional anesthesia and then started on propofol infusion. This was followed by monitoring of blood pressure, pulse rate and oxygen saturation. All the data thus obtained was arranged in a tabulated form and analysed using SPSS software. Mean of all values was recorded. **Results:** In group I, the pulse rate preoperatively was 83.4±10.6 and in Group II it was 79.1±11.1. At 15 mins, the pulse rate in Group I and Group II was 64.4±10.0 and 85.9±12.9 respectively. In group I, the oxygen saturation preoperatively was 98.6±0.66 and in Group II it was 98.8±0.65. At 15 mins, the oxygen saturation in Group I and Group II was 99.7±0.45 and 99.6±0.47 respectively. At 60 mins, the blood pressure in Group I and Group II was 96.4±5.9 and 94.2±3.8 respectively. **Conclusion:** There was no significant difference in the hemodynamic parameters amongst both the groups. Therefore, midazolam can be safely used with propofol. The dose of propofol needed for sedation is also reduced.

Keywords: blood pressure, hemodynamic, pulse, Propofol.

INTRODUCTION

Regional anaesthesia, a commonly used technique during orthopedic procedures has many advantages for anaesthetist like cardiorespiratory stability, maintenance of intact airway protective reflexes, analgesia in postoperative period,[1,2] provides calm patient with better operating conditions for the surgeon and improved conditions for the patient who can have early food intake, early contact with the attendants and early ambulation. But the fear of needles, pain at puncture site,[3] noisy operating room environment provoking anxiety in patients leads to hemodynamic variability, increased requirement of anaesthesia drugs and decreased surgeon satisfaction. These factors stress the importance of sedation that provides anxiolysis, amnesia, may potentiate analgesia and make surgery under regional anaesthesia comfortable for the patient, the anaesthetist and the surgeon.[4] Although numerous methods have been used for sedation during regional anaesthesia, drugs via intravenous route are most reliable to produce rapid and titrable results. The anaesthetic agent used should have rapid onset, short duration of clinical effect, high clearance rate, minimal tendency for drug accumulation and inactive metabolites.[5] Propofol is one such anesthetic agent but has less reliable amnesic effect and has pain on injection.[1] It also has dose dependent depression of cardiovascular and respiratory system. Midazolam a benzodiazepine is also used for sedation but when compared with propofol the offset is significantly slower.[6,7]

Due to synergistic interaction seen between propofol and midazolam,[8,9] it is assumed that midazolam premedication could lead to propofol dose reduction and occurrence of cardiorespiratory side effects. Hence the present study was conducted to compare cardiopulmonary parameters in subjects during

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regional anesthesia with propofol sedation with or without midazolam premedication.

MATERIALS AND METHODS

This prospective randomized study was carried out following approval from the institutional ethical committee. The study included 40 patient of ASA grade I, II and III, between the age group of 25 to 65 years, of both genders scheduled for total hip or knee replacement surgery. Patients included in this study were informed about the procedure in their own language and written informed consent was obtained from them. Pre anesthesia evaluation and routine hematological investigation of all patients was done. Patients with history of psychiatric illness, use of anti-depressants, alcohol abusers, bleeding diathesis, hypersensitivity to any drug and pregnant patients were excluded from the study. Any drug for a coexisting disease, if being taken by the patient was continued on the day of operation.

Patients were randomly divided into group I (n=20) given sedation with propofol only and Group II (n=20) given midazolam 2 mg i m. 30 minutes before arriving in OT and then propofol for sedation. On arrival to OT a large bore IV needle was secured and ringer lactate, normal saline was initiated at 10 ml/Kg. This was followed by monitoring of the blood pressure, pulse and oxygen saturation. Supplemental oxygen @ 4l/min was started via facemask. Combined spinal epidural anaesthesia was administered. After placing the patient in the position required for surgery and confirming haemodynamic stability propofol sedation was started. In group 1 propofol was started at the rate of 6 mg/kg/hour until response to verbal command was diminished. Infusion rate was reduced to 3mg/kg/hour and adjusted to maintain sedation-score of 3. In group 2 patients, propofol was started at the rate of 3 mg/kg/hour and rate was adjusted to target sedation-score of 3. All the data thus obtained was arranged in a tabulated form and analyzed using SPSS software. Mean of all the values was recorded.

RESULTS

There were 40 subjects enrolled in the study. Table 1 illustrates the alterations in the pulse rate amongst the groups. In group I, the pulse rate preoperatively was 83.4±10.6 and in Group II it was 79.1±11.1. At 15 mins, the pulse rate in Group I and Group II was 64.4±10.0 and 85.9±12.9 respectively. At 30 mins, the pulse rate in Group I and Group II was 74.7±7.4 and 71 1±4.3 respectively. At 60 mins, the pulse rate in Group I and Group II was 65.3±.4.4 and 64.6±4.0 respectively. At 75 mins, the pulse rate in Group I and Group II was 70.1±3.2 and 69.8±3.8 respectively. At 120 mins, the pulse rate in Group I and Group II was 80.8±.4.9 and 80.7±.4.7 respectively.

Table 1: Changes in the pulse rate

Time (min)	Group I (mean± S.D.)	Group 11 (mean± S.D)
0	83.4±10.6	79.1±11.1
15	64.4±10.0	85.9±12.9
30	74.7±7.4	71.1±4.3
45	67.3±5.5	66.9±4.4
60	65.3±.4.4	64.6±4.0
75	70.1±3.2	69.8±3.8
90	75.6±3.6	76.1.±5.5
105	78.8±3.5	78.0±5 7
120	80.8±.4.9	80.7±.4.7
135	83.4±4.7	85.0±3.7

[Table 2] illustrates the alterations in the oxygen saturation amongst the groups. In group I, the oxygen saturation preoperatively was 98.6±0.66 and in Group II it was 98.8±0.65. At 15 mins, the oxygen saturation in Group I and Group II was 99.7±0.45 and 99.6±0.47 respectively. At 30 mins, the oxygen saturation in Group I and Group II was 99.8±0.4 and 99.7±0.44 respectively. At 60 mins, the oxygen saturation in Group I and Group II was 99.7±0.43 and 99.66+/-0.43 respectively. At 75 mins, the oxygen saturation in Group I and Group II was 99.6±0.47 and 99.72±0.44 respectively. At 120 mins, the oxygen saturation in Group I and Group II was 99.8±0.34 and 99.85±0.34 respectively.

Table 2: Alterations in the partial pressure of oxygen.

Time (min)	Group I (mean± S.D)	Group II (mean± S.D)
0	98.6±0.66	98.8±0.65
15	99.7±0.45	99.6±0.47
30	99.8±0.4	99.7±0.44
45	99.5±0.49	99.73±0.44
60	99.7±0.43	99.66+/-0.43
75	99.6±0.47	99.72±0.44
90	99.7±0.41	99.66±0.47
105	99.8±0.40	99.77±0.41
120	99.8±0.34	99.85±0.34
135	99.6±0.48	99.8±0.4

Table 3: Changes in the Blood pressure.

Time(min)	Group I (mean± S.D)	Group II (mean ± S.D)
0	124.5±11.9	119.5±8.2
15	114.2±6.2	112.1+/-1.57
30	100.7±7.9	101±7.0
45	88.6+/-5.2	87.8±5.8
60	96.4±5.9	94.2±3.8
75	99±5.6	99.3+/-4.2
90	104.3±5.5	103.3±5.2
105	113.8±4.1	111.5 +/-5.5
120	116.6±4.3	116.5±4.2
135	118.8±5.8	120.8±3.7

[Table 3] illustrates the alterations in the blood pressure amongst the groups. In group I, the blood pressure preoperatively was 124.5±11.9 and in Group II it was 119.5±8.2. At 15 mins, the blood pressure in Group I and Group II was 114.2±6.2 and 112.1+/-1.57 respectively. At 30 mins, the blood pressure in Group I and Group II was 100.7±7.9 and 101±7.0 respectively. At 60 mins, the blood pressure in Group I and Group II was 96.4±5.9 and 94.2±3.8 respectively. At 75 mins, the blood pressure in

Group I and Group II was 99±5.6 and 99.3+/-4.2 respectively. At 120 mins, the blood pressure in Group I and Group II was 116.6±4.3 and 116.5±4.2 respectively.

Secondary Result

Propofol sedation when preceeded by midazolam premedication reduces the incidence of intraoperative memory which is beneficial.

DISCUSSION

Sedation during regional anaesthesia increases patient and doctor satisfaction. An ideal anesthetic drug should have rapid onset of action, predictable dose-effect relationship with respect to sedative-hypnotic actions, anxiolysis, amnesia and rapid recovery on discontinuation of the drug. It should have minimal respiratory and cardiovascular depressant effect. The administration of intermittent bolus doses can result in transient respiratory depression but the use of continuous infusion can minimize cardiorespiratory depression and give a steady state of sedation.[10]

Propofol has a pharmacodynamics-kinetic profile that is ideally suited to administration by continuous infusion. It has a rapid onset of action, a short duration of effects, and minimal side-effects thus making it a suitable drug for sedation during regional anaesthesia. It is a potent hypnotic agent which may lead to respiratory depression and hypotension when used in high doses.[11,12]

This study was conducted to find out the cardiopulmonary parameters amongst subjects with midazolam premedication and propofol sedation. It was found in our study that the dose of propofol when used with midazolam pre-medication was lesser than when propofol was used as a single agent for sedation.[13,14]

In our study, midazolam premedication reduced the LD dose, SS rate and OA rate to 73.0%, 83.7% and 84.8% respectively, compared with the requirements when propofol alone was given for sedation ($P<0.05$). This was found to be statistically significant. Masashi Nakagawa et al investigated the effects of midazolam premedication on the propofol requirements for sedation and found that midazolam premedication reduced the LD dose, SS rate and OA rate to 83.1%, 82.4% and 83.4% compared with those of the control group. ($P<0.05$).[15]

Propofol and midazolam both are known to inhibit sympathetic activity and decrease systemic vascular resistance resulting in some amount of bradycardia and hypotension. (16,17) In this study, the pulse rate and systolic blood pressure differences between two groups were similar and statistically insignificant and thus it can be said that midazolam premedication has no effects on haemodynamics of patient given sedation with propofol infusion. There was no interference with haemodynamics of patients. The decrease in pulse-rate was maximum at 60 min which gradually returned to the baseline. This is found to be similar to the result seen in a study done by Nakagawa et al. where it was seen that the blood pressure and heart rate slightly decreased and gradually returned to the baseline at 50 minutes after the start of propofol infusion in both groups.[15]

Another study by E.Wilson, A.David, N.Mackenzie et al compared propofol and midazolam for sedation during regional anaesthesia in their study. There was a slight decrease in heart rate in both the groups, of approximately 5 beats /min during the first 1 hour of infusion. There were no significant differences between the agents with respect to systolic and diastolic pressures, there being a slight reduction in both variables of the order of 15% over the 1st hour.[7]

CONCLUSION

Propofol is used for sedation during regional anesthesia. Addition of midazolam to propofol significantly decreases the dose of propofol required. There was no significant difference in the hemodynamic parameters amongst both the groups. Therefore, midazolam can be safely used with propofol and also the dose of propofol needed for anesthesia is reduced.

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