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Original Article

Arousal Time from Sedation during Spinal Anaesthesia Given with Propofol and Midazolam for Elective Infraumbilical Surgeries

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Abstract

Background: *Arousal time is variable after sedation with spinal anesthesia after infraumbilical surgeries. Propofol and midazolam have been studied individually using the Observer's Assessment of Awareness/Sedation (OAA/S) score and different other ways. So this present study was designed to compare the arousal time of sedation for propofol and midazolam using OAA/S scores.*

Materials and methods: *A total of 60 patients were randomly assigned to receive either propofol (Group A, n =30) or midazolam (Group B, n = 30). All patients of Group A received bolus of propofol (1 mg/kg) followed by infusion at 3 mg/kg/h, Group B received bolus of midazolam (0.05 mg/kg), followed by infusion at 0.06 mg/kg/h. OAA/S score was noted at beginning and again during recovery. The time to achieve OAA/S score 5 was noted. Changes of pulse rate, O_2 saturation and satisfaction score were noted.*

Results: *Among the 60 patients gender distributions where male and female distributed evenly. Age group distributions revealed more patients were gathered in age group 31- 40 years and >51 years. Regarding physical status most of the patients were at ASA physical status 1. It was found that propofol had better outcome than midazolam in terms of arousal time score and patient's satisfaction score after surgery.*

Conclusions: *A shorter arousal time from sedation during spinal anaesthesia can be achieved using propofol than arousal time with midazolam.*

Key words: Arousal time Midazolam; Propofol; Sedation.

INTRODUCTION

Peroperative sedation is an important component of regional and local anesthetic techniques. Sedation allows the smooth conduct of surgery and improves patient satisfaction by allaying fear and anxiety during procedures under regional and local anesthesia Inadequate intraoperative sedation may cause patient movement that can interfere with the surgical procedure. Furthermore, it may cause physical and mental stress, discomfort, and anxiety among patients.[1]

Among the different common methods of monitoring the depth of sedation are patient based (e.g. Visual analogue scale) observer based (e.g. Observer's Assessment of Awareness/Sedation (OAA/S) score) and machine based (e.g. Bispectral Index Score (BIS)).[2-4] The OAA/S score has the disadvantage of frequent patient stimulation, which may alter the actual level of sedation.

Propofol, a non-barbiturate anaesthetic agent, can produce rapid onset of sedation after i.v. administration in proper sub-hypnotic dose. Midazolam, a benzodiazepine, has a property of rapid onset of action after Intravenous (i.v.) injection.[5,6] There are studies comparing sedation with propofol and midazolam during regional

anaesthesia. The two drugs have been evaluated with respect to arousal times from sedation (Primary outcome). As BIS is not suitable in our aetting correlation between the Observer's Assessment of Awareness/Sedation (OAA/S) scores was also analysed.

MATERIALS AND METHODS

Present study was a comparative experimental study done in a tertiary care hospital during a study period of one year from January 2020 to December 2020. It compared the two drugs propofol and midazolam for intra-operative sedation during spinal anaesthesia in respect to 'arousal time from sedation' following stoppage of infusion. The arousal times were assessed by utilizing OAA/S score Mean arterial pressure and heart rate results were noted. The patient's satisfaction with the sedation was assessed by the 7-point 'Likert-like verbal rating scale' with some questions like 'where will you put your experience with this sedation on this scale?' in a language which the patient understands, at a point of time when the patient had a mental state suitable for communication. Type of surgery were also recorded. Observed data were entered into Microsoft Excel Workbook and analyzed using the SPSS 20.0 for Windows. Numerical data were analyzed using the independent sample t test. The categorical data were analyzed using the Chi-square test. A $p<0.05$ was taken to be of statistical significance.

RESULTS

Table I Gender distribution of the study patients

Sex of Respondents		Groups		Total
		Propofol	Midazolam	
	Female	14(46.6%)	16(53.4%)	30
	Male	16(53.4%)	14(46.6%)	30
Total		30	30	60

Table showing gender distributions where male and female distributed evenly.

Table II Age group distributions of respondents

Age groups	Groups		Total
	Propofol	Midazolam	
<20 years	2	0	2
21- 30 years	8	8	16
31- 40 years	9	9	18
41- 50 years	2	4	6
>51 years	9	9	18
Total	30	30	60

Table II showing age group distributions where more patients were gathered in age group 31- 40 years and >51 years.

Table III Types of surgery done

Name of Surgery	Groups		Total
	Propofol	Midazolam	
Abdominal hysterectomy	4	0	4
Bladder Tumor	0	2	2
Ectopic pregnancy	1	1	2
Fixation of Patella	0	2	2
Fracture shaft of tibia	0	2	2
Inguinal Hernia	3	3	6
K.wire fixation of pattela	0	2	2
Ovarian cyst	1	1	2
Ovarian cystectomy	0	2	2
Ovarian tumour	2	0	2
Plate and screw removal	2	0	2
Plate removal	2	0	2
Skin Grafting	2	0	2
Skin grafting of left leg	0	2	2
TAH	4	4	8
Tendon repair	2	2	4
TURP	5	1	6
Uninary bladder stone	0	2	2
URS	2	0	2
Vaginal Hysterectomy	0	4	4
Total	30	30	60

Table III showing different types of surgery providing anesthesia by propofol and midazolam.

Table IV ASA physical status

ASA Physical Status	Groups		Total
	Propofol	Midazolam	
ASA Physical status 1	24	28	52
ASA Physical status 2	6	2	8
Total	30	30	60

Table IV showing most of the patients were at ASA physical status 1.

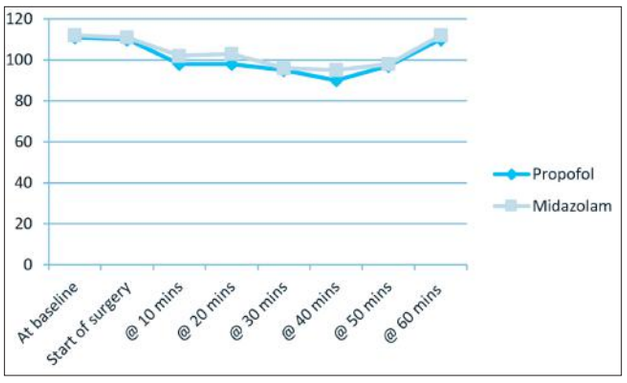

Figure 1 Mean arterial pressure in both groups

Figure 1 sowing MAP in both groups where it was found higher in midazolam group

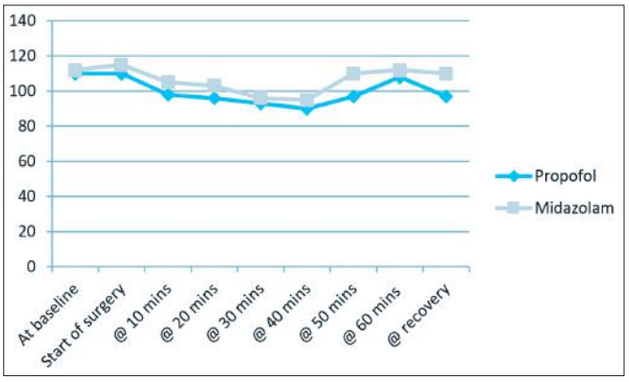

Figure 2 Changes of heart rate in both groups

Figure 2 showing changes of heart rate where it was found higher in midazolam group

Table V Analysis of duration of operation, Satisfection score and Arousal time score

	Group	n	Mean	Std. Deviation	p value
Duration of operation	Propofol	30	72.33	10.063	>0.05
	Midazolam	30	75.67	14.308	
Satisfaction score	Propofol	30	6.20	.484	>0.05
	Midazolam	30	4.47	.937	
Arousal time score	Propofol	30	4.17	.648	<0.05
	Midazolam	30	5.97	.809	

Table V showing propofol has better outcome than midazolam in terms of arousal time score.

DISCUSSION

In the present study, arousal time from sedation was lower with injection propofol than midazolam. Yaddanapudi et al.[7] found that the recovery was quicker with propofol (8.9 ± 2.8 min) than with midazolam (12.5 ± 3.5 min), monitoring sedation clinically. They also found the incidence of hypotension to be greater with propofol.[7] Khurana et al found a recovery at 10.1 min with propofol compared with 18.6 min with midazolam. They also reported a greater fall in the MAP.[6]

In our study we found that the reversibility of sedation is more rapid with cessation of infusion of propofol. This may be due to the higher clearance rate of propofol (Around 30 ml/kg/min) with respect to that of midazolam (6- 11 ml/kg/min), which is claimed to be a result of extrahepatic metabolism of propofol. Furthermore, the concentration of propofol in the brain falls rapidly owing to its redistribution, leading to quick recovery In comparison, the concentration of midazolam inthe brain tissue has an initial phase of rapid decrease due to redistribution, which is followed by a slower phase resulting from the metabolism of the drug. midazolam on metabolism in the liver produces an active metabolite, 1hydroxy midazolam, which may be responsible for its delayed offset of action. The emergence time from sedation may thus depend on the total dose of midazolam infused as the metabolite accumulates on prolonged infusion. The metabolites of propofol have not been reported to have any such sedative-hypnotic activity. The context-sensitive halftime, which depends on the clearance of the drug from the body compartments when an infusion is given, is much lower for propofol than for midazolam. This perhaps explains the earlier recovery from sedation with propofol when compared with midazolam.[8,10]

In the present study age group distribution, gender differences and types of infraumbilical surgeries were distributed evenly in both groups. As study sampling was purposive those may not represent the actual population scenario of the country.

The MAP and HR were found to be lower in patients receiving propofol. Bradycardia and hypotension are possible due to cephalic spread of spinal anaesthesia. Propofol does not change HR significantly and has a minimal action on the sinus node or atrioventricular node. Propofol may however blunt the reflex tachycardia in response to fall in blood pressure.[9]

CONCLUSION

With the use of propofol a shorter arousal time from sedation during spinal anaesthesia can be achieved compared with midazolam. Monitoring the depth of sedation with arousal time score in absence of BIS score.

DISCLOSURE

All the authors declared no competing interest.

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