



## An Observational Study to Compare Propofol with Midazolam plus Fentanyl Combination for Sedation in Gastrointestinal Endoscopies at Tertiary care Hospital in Katihar, Bihar

Authors

**Dr Rakesh Ranjan Singh<sup>1</sup>, Dr Ashmita Kiran<sup>2</sup>**

<sup>1</sup>Associate Professor, Department of Anaesthesia, Katihar Medical College & Hospital, Karimbagh, Katihar, Bihar

<sup>2</sup>Assistant Professor, Department of Gynaecology, Katihar Medical College & Hospital, Karimbagh, Katihar, Bihar

### Abstract

**Objective & Aim:** *In gastrointestinal (GI) endoscopy, Propofol has revolutionised sedation practices as it can be easily titrated and has a rapid recovery profile. This observational real-world study was initiated specially in patients who were undergoing GI endoscopy sedation to compare efficacy and safety of propofol with midazolam and fentanyl combination.*

**Methods:** *80 patients who are admitted at Katihar medical College and hospital and scheduled for gastrointestinal endoscopy process were recruited for this real word observational study. Patients was divided in two groups which contains either Group A (propofol alone) or Group B (combination of midazolam plus fentanyl). Efficacy was measured by the parameters like depth of sedation (Ramsays sedation scale), time of onset of sedation, amnesia and early recovery of sedation (Modified Aldrete Score). Cardiovascular and respiratory parameters were used to evaluate safety parameters. Adverse events like hypotension, hypoxia and bradycardia were recorded. For statistical analysis, PSPP software was used.*

**Result:** *With a mean RSS of 4.9, A group patients were more deeply sedated compared to 3.2 of the B group. At ten minutes after the end of the procedure, full recovery (Aldrete score 10) was seen in 73.33% of the patients of the A group compared to 50% of the B group which was insignificant. Significant haemodynamic changes (hypotension) had observed in A group as compared to B group. Few statistically non-significant respiratory complications were seen in both the groups.*

**Conclusion:** *Both the groups present with almost same efficacy and safe.*

**Keywords:** *Propofol, Midazolam plus Fentanyl Combination, GI endoscopy sedation.*

### Introduction

In gastrointestinal (GI) endoscopy, Propofol has revolutionised sedation practices as it can be easily titrated and has a rapid recovery profile. Relieve anxiety, diminish memory of the discomfort or pain is the main purpose of sedation in these patients. The drugs chosen for sedation

should provide a rapid return to clear headedness on completion of procedure and also ease of titration to the desired level of sedation. Propofol has largely replaced the traditional use of benzodiazepines gained overall popularity as the sedative agent of choice<sup>[1-3]</sup>

This observational real-world study was initiated specially in patients who were undergoing GI endoscopy sedation to compare efficacy and safety of propofol with midazolam and fentanyl combination.

### Methods

This study was conducted at Katihar Medical college and hospital, Bihar over a six-month period, after departmental review board approval. Patients informed consent was obtained before the procedure begins.

The endoscopic procedures included were endoscopic ultrasound (EUS), oesophagogastroduodenoscopy (OGD scopy), colonoscopy and endoscopic retrograde cholangiopancreatography (ERCP). Any patients who were under 18 years of age were excluded from the study. The other exclusion criteria include patients with active GI bleeding, pregnancy, allergic to egg or soya beans, mechanically ventilated patients and those with difficult airway.

80 patients who are admitted at DMCH and scheduled for gastrointestinal endoscopy process were recruited for this real word observational study. Patients was divided in two groups which contains either Group A (propofol alone) or Group

B (combination of midazolam plus fentanyl). Efficacy was measured by the parameters like depth of sedation (Ramsays sedation scale), time of onset of sedation, amnesia and early recovery of sedation (Modified Aldrete Score).

Heart rate (HR), diastolic blood pressure (DBP), systolic blood pressure (SBP), respiratory rate (RR) mean arterial pressure (MAP) and oxygen saturation (SpO<sub>2</sub>) were measured every five minutes till the end of procedure. Cardiovascular and respiratory parameters were used to evaluate safety parameters. Adverse events like hypotension, hypoxia and bradycardia were recorded.

Qualitative data was assessed by Chi square test and by Fisher's Exact test represented by using mean  $\pm$  SD and analyses between the groups were done by using unpaired t-test and Chi square test. For statistical analysis, PSPP software was used.

### Results

The demographic data of 80 patients who were studied in our trial was illustrated in Table 1. It was observed that the demographic details are matching with each other and almost identical in both the groups.

**Table 1:** Demographic characteristics

Characteristics	B Group (Mean $\pm$ SD)	A Group (Mean $\pm$ SD)	P value
Age (Yrs )	52.67 $\pm$ 18.21	53.1 $\pm$ 18.14	0.729
Weight (kg)	64.34 $\pm$ 10.22	65.07 $\pm$ 12.09	0.631
Duration of procedure (min)	25.32 $\pm$ 14.29	22.41 $\pm$ 15.29	0.285
* P < 0.05 significant, B Group - Midazolam + Fentanyl, A Group - Propofol			

63.3 mg was the mean induction dose of propofol in group A and 2.48mg and 129  $\mu$ g of midazolam and fentanyl was the mean dose in group B. 47.22 seconds was the mean onset time of action of group A as compare to group B which was 86.28 seconds and the difference was statistically significant. Fentanyl 173 $\mu$ g and midazolam 3.25 mg was total mean dose for maintenance required in Group B and 180.83 mg (6 mg/kg/hr) was total mean dose for maintenance required in Group A.

With a mean RSS of 4.9, A group patients were more deeply sedated compared to 3.2 of the B group. At ten minutes after the end of the procedure, full recovery (Aldrete score 10) was seen in 73.33% of the patients of the A group compared to 50% of the B group which was insignificant. In A group it has been observed that the time to awaken the patients was 2.51 min which was significantly more compared to 0.09 min in the B group. Recovery time in B

group was 11.5 min which was almost same in with A group (13.3 mins) and also was not significant (Table-2).

Visual analogue scale (VAS) was used to grade Endoscopists satisfaction. 80.67% was the mean VAS in the B group as compare to 77.5% in the A group. (Table 2)

**Table 2:** Comparison of efficacy between the two groups

Characteristics	B Group (Mean± SD)	A Group (Mean± SD)	P value
Onset of sedation (s)	86.28 ± 40.98	47.22 ± 25.61	<0.001*
Ramsays Sedation Scale	3.2 ± 1.21	4.9 ± 1.53	<0.001*
Awakening (Min)	0.09 ± 0.24	2.51 ± 2.21	<0.001*
Recovery Time (min)	11.5 ± 8	10.3 ± 5	0.48
Endoscopist Satisfaction (VAS %)	80.67 ± 10.73	77.5 ± 11.95	0.28
* P<0.05 is significant B Group - Midazolam+Fentanyl, A Group - Propofol, VAS - Visual analogue scale			

In A group of patients 47.2% had hypotension which was statistically significant. Severe hypotension was found in 6 patients whereas moderate hypotension observed in 13 patients. Bradycardia <50 /min or ECG changes was not observed with any patients. in the B group 11.3%

was the mean percentage decrease in the in SBP whereas the same was 23.26% in the A group. It has been observed that as per as diastolic blood pressures as well as heart rate between the groups is concern there was no change. (Table 3)

**Table 3:** Comparison of safety parameters

Characteristics	B Group (Mean± SD)	A Group (Mean± SD)	P value
SBP % decrease over baseline	11.03 ± 8.52	23.26 ± 13.06	<0.001*
HR % decrease over baseline	7.65 ± 8.45	6.37 ± 6.42	0.51
RR % decrease over baseline	20.03 ± 18.47	10.95 ± 15.45	0.043*
Saturation % decrease over baseline	1.37 ± 3.22	1.83 ± 5.62	0.69
*P<0.05 is significant, B Group - Midazolam + Fentanyl, B Group - Propofol; SBP - Systolic blood pressure, HR- Heart rate, RR- Respiratory rate			

## Discussion

Topical anaesthesia or its combination with sedation are the alternative two process used in anaesthetic management in gastro intestinal endoscopies. Propofol has a favourable pharmacokinetic profile due to its short-acting anaesthetic profile and also had a rapid induction of sedation, equivalent levels of amnesia and faster recovery in comparison to the benzodiazepines and opioids. For conscious sedation during GI endoscopy Midazolam is commonly used in synergy with opioid fentanyl as it is a benzodiazepine depressant of the central nervous system. This combination has some

limitations like a lingering sedative effects that delay discharge, delay of onset of action and prolonged recovery, and morbidity as a result of respiratory depression. This is the main reason for which further study is required for optimal propofol administration methods for gastrointestinal procedures.

In a study done by Christopher N, operating conditions, quality of sedation, and recovery profiles were similar in intermittent bolus injections, target controlled infusion and conventional syringe infusion<sup>[4]</sup>. Propofol has a narrow therapeutic window and absence of a reversal agent can lead to over sedation and

therefore does not have analgesic properties<sup>[5]</sup>. Combining a low dose of propofol with opioid analgesic and or benzodiazepine propofol sedation was proposed as a method that would provide safe and effective sedation reduce complications<sup>[6,7]</sup>.

68 % of midazolam group were amensic compared to 14 % of the propofol group was shown in K.W Patterson et al. study, which was almost similar findings as our study<sup>[8]</sup>. Like our findings, the depth of sedation was greater, mean time to sedation was significantly faster and also these patients recovered faster as observed in other study<sup>[9]</sup>. As per observation found by T.W. Weherman et al, propofol group achieved full recovery after 19 +/- 8 min compared to 29 +/- 8 min in the midazolam group<sup>[10]</sup>. In our study this was different may because of usage of higher dose of both the therapies.

With sedation in both groups (80.67% B vs 75.57% in A group), the endoscopists were very satisfied which was similar findings with Eszter Segó et al<sup>[11]</sup>. There were several limitations like sample size, use of older process of measuring amnesia and so many other high-tech diagnostic tools were not used. But despite that our trials brings similar finding with several other studies done in various other hospitals.

### Conclusion

Both the groups present with almost same efficacy and safe. Respiratory complications and Haemodynamic variations are seen with both groups.

### References

1. Trummel J. Sedation for gastrointestinal endoscopy: the changing landscape. *Current Opinion in Anesthesiology*. 2007;20:359-64.
2. Garewal D, Powell S, Milan SJ, Nordmeyer J, Waikar P. Sedative techniques for endoscopic retrograde cholangiopancreatography. *The Cochrane Library*. 2012 Jun 13.
3. Bo LL, Bai Y, Bian JJ, Wen PS, Li JB, Deng XM. Propofol vs traditional sedative agents for endoscopic retrograde cholangiopancreatography: a meta-analysis. *World J Gastroenterol*. 2011;17:3538-43.
4. Newson C, Joshi GP, Victory R, White PF. Comparison of propofol administration techniques for sedation during monitored anesthesia care. *Anesthesia and Analgesia*. 1995;81:486-91.
5. Shin S, Oh TG, Chung MJ, Park JY, Park SW, Chung JB, Song SY, Cho J, Park SH, Yoo YC, Bang S. Conventional versus Analgesia-Oriented Combination Sedation on Recovery Profiles and Satisfaction after ERCP: A Randomized Trial. *PloS one*. 2015;10:e0138422.
6. Cohen LB, Hightower CD, Wood DA, Miller KM, Aisenberg J. Moderate level sedation during endoscopy: a prospective study using low-dose propofol, meperidine/ fentanyl, and midazolam. *Gastrointestinal endoscopy*. 2004;59:795-803.
7. Mandel JE, Tanner JW, Lichtenstein GR, Metz DC, Katzka DA, Ginsberg GG, Kochman ML. A randomized, controlled, double-blind trial of patient-controlled sedation with propofol/remifentanyl versus midazolam/fentanyl for colonoscopy. *Anesthesia and Analgesia*. 2008;106:434-9.
8. Patterson KW, Casey PB, Murray JP, O'boyle CA, Cunningham AJ. Propofol sedation for outpatient upper gastrointestinal endoscopy: comparison with midazolam. *British journal of anaesthesia*. 1991;67:108-11.
9. Sipe BW, Rex DK, Latinovich D, Overley C, Kinser K, Bratcher L, Kareken D. Propofol versus midazolam/ meperidine for outpatient colonoscopy: administration by nurses supervised by endoscopists.

Gastrointestinal endoscopy. 2002;55:815-25.

10. Wehrmann T, Kokabpick S, Lembcke B, Caspary WF, Seifert H. Efficacy and safety of intravenous propofol sedation during routine ERCP: a prospective, controlled study. *Gastrointestinal endoscopy*. 1999;49:677-83.
11. Szegô E, Iványi Z, László A, Gál J. Impact of anesthesia on patient and endoscopist satisfaction after colonoscopy—A pilot study. *Interventional Medicine and Applied Science*. 2011;3:203-6.