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Original Research Article

COMPARISON OF PROPOFOL AND DEXMEDETOMIDINE FOR SEDATION IN PATIENTS UNDERGOING COLONOSCOPY

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ABSTRACT

Background: Colonoscopy is a frequently used diagnostic and therapeutic test for the examination of the large bowel and terminal ileum. Because it is an invasive and frequently painful procedure, successful sedation is important for patient comfort and success of the procedure. Propofol is extensively utilized for sedation but has the disadvantage of causing respiratory depression. Dexmedetomidine, an α2-adrenergic agonist with sedative and analgesic effects, has been suggested as an alternative agent with superior hemodynamic and respiratory profiles. This research was undertaken to evaluate the effectiveness, safety, profile of recovery, and post-procedure analgesia of Propofol and Dexmedetomidine for patients undergoing colonoscopy. **Materials and Methods:** A randomized controlled trial was performed at the Department of Anaesthesiology & Critical Care, Gandhi Medical College, Secunderabad on 60 patients of age group 18 to 65 years belonging to ASA physical status I or II. The subjects were randomly placed in two groups: Group P (Propofol) and Group D (Dexmedetomidine), each containing 30 patients. Sedation was started with routine loading and maintenance doses of the agents through infusion. Rescue analgesia with fentanyl (0.5 µg/kg) was used when necessary. The following parameters were measured and compared: time to reach adequate sedation (RSS-3), hemodynamic parameters (heart rate, mean arterial pressure), respiratory rate, oxygen saturation (SpO_2), time of recovery (Aldrete score of 10), requirement for breakthrough analgesia, and post-procedure pain (VAS score). **Result:** Demographic parameters and procedural times were similar between the two groups. Time to reach satisfactory sedation was much less with Propofol (mean 10.07 min) compared with Dexmedetomidine (mean 18.0 min; $p < 0.0001$). Dexmedetomidine was accompanied by marked lower heart rate and mean arterial pressure during the procedure. Respiratory rate was significantly higher in Group D after 10 minutes, reflecting superior respiratory preservation. SpO_2 remained consistent and similar in both groups. The demand for fentanyl was not different among both groups. The recovery was much quicker in the Propofol group (mean 14.16 min) than in Dexmedetomidine (mean 22.13 min). Pain scores following the procedure were significantly reduced in the Dexmedetomidine group at all intervals until 2 hours, reflecting better analgesic action. **Conclusion:** Both Propofol and Dexmedetomidine are effective and safe for sedation in patients undergoing colonoscopy when combined with fentanyl. Propofol offers the advantage of faster onset of sedation and quicker recovery, but with notable respiratory depression. Dexmedetomidine, on the other hand, provides more stable hemodynamic and respiratory profiles along with superior post-procedural analgesia. Its use may be particularly beneficial in patients where respiratory preservation and pain control are priorities.

INTRODUCTION

Colonoscopy is both a diagnostic and therapeutic endoscopic procedure that plays a critical role in the evaluation of the large intestine, which includes the colon, rectum, and anus, as well as the distal segment of the small intestine, particularly the terminal ileum. This process is performed using a hand-held, flexible instrument known as a colonoscope, which has a high-definition camera attached to its distal end.[1] Apart from offering real-time visualisation of the mucosa of the intestine, the colonoscope also has accessory channels in which therapeutic devices and cleaning solutions are passed. These attributes not only allow the clinician to examine the mucosal surface for pathology but also conduct guided biopsies and therapeutic procedures like polypectomy, cauterization, and mucosal resection.[2,3]

With its very high diagnostic yield and therapeutic benefit, colonoscopy is the gold standard for the screening for colorectal cancer, surveillance for inflammatory bowel disease, and assessment for lower gastrointestinal bleeding.[4] Colonoscopy has played an important role in the decline in incidence and mortality of colorectal cancer through the possibility of early detection and excision of precancerous lesions. Even with its benefits, however, colonoscopy is an invasive and painful process. Patients commonly complain of abdominal cramping, bloating, and discomfort caused by air insufflation and manipulation of the colonoscope and require use of sedation and analgesia for comfort, cooperation, and procedure success.[5,6]

Sedation is used routinely to relieve pain and anxiety while undergoing colonoscopy. The classic sedation protocols have comprised benzodiazepines such as midazolam, dissociative drugs such as ketamine, and hypnotic drugs such as propofol.[7] Although propofol has become increasingly popular because of its onset time and short duration of action, its use is linked with possible side effects like hypotension, bradycardia, and notably respiratory depression when used in conjunction with opioids. These restrictions have led to the investigation of novel agents that provide effective sedation with an improved safety profile.[8]

Dexmedetomidine, a highly selective alpha-2 adrenergic agonist, has shown a lot of promise as a procedural sedative. Initially designed for use in intensive care units as an agent for light to moderate sedation, it provides several benefits such as anxiolysis, analgesia, and sedation with minimal respiratory depression.[9] Its pharmacology renders it a suitable candidate for a procedure such as colonoscopy, where airway reflexes and spontaneous respiration need to be preserved. In addition, Dexmedetomidine's analgesic action can decrease the requirement for supplemental opioids, reducing opioid-related side effects.[10]

Given these factors, the current research was aimed at comparing the safety and efficacy of Dexmedetomidine compared with Propofol, both given together with fentanyl, for conscious sedation in colonoscopy. Important parameters like time to onset of sedation, hemodynamic stability, respiratory pattern, recovery time, and post-procedure analgesia were assessed to identify the best agent for sedation in this context.

MATERIALS AND METHODS

Study Design

This was a randomized controlled study conducted to compare the sedative efficacy and safety profile of Dexmedetomidine and Propofol in patients undergoing colonoscopy.

Study Location

Department of Anaesthesiology & Critical Care, Gandhi Medical College, Secunderabad.

Sample Size

A total of 60 patients were enrolled in the study and randomly divided into two equal groups (n=30 each).

Inclusion Criteria

1. Age between 18 to 65 years
2. American Society of Anesthesiologists (ASA) Physical Status I and II

Exclusion Criteria

1. Patients with difficult airway
2. Altered mental status
3. History of seizure or any neurological deficit
4. Bleeding or coagulation disorders
5. Severe cardiovascular, renal, respiratory, or hepatic diseases
6. History of obstructive sleep apnea
7. Known allergy to any study drug
8. Lack of written informed consent
9. Patient refusal
10. Patients below 18 years of age

Materials and Equipment

Laboratory Investigations: Hemoglobin, platelet count, blood sugar, urea, creatinine, bleeding time, and clotting time

1. **Monitoring Devices:** ECG, non-invasive blood pressure (NIBP), SpO_2
2. 18G intravenous cannula (venflon)
3. Intravenous fluids: Normal saline, Ringer lactate
4. Study drugs: Inj. Dexmedetomidine, Inj. Propofol
5. 50 mL syringe and infusion pump
6. Anaesthesia workstation (Boyle's anaesthesia machine)
7. Oxygen supply with nasal prongs
8. **Emergency drugs:** Atropine, Ephedrine, Dopamine, Furosemide (Lasix), Noradrenaline, Dexamethasone, Hydrocortisone, Lignocaine
9. **Emergency airway equipment:** Oropharyngeal and nasopharyngeal airways, laryngeal mask airway (LMA), cuffed endotracheal tubes, and surgical airway instruments

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Study Procedure

Following institutional ethics committee approval and written informed consent from all participants, the study was initiated. Patients were randomly assigned into two groups:

- **Group P (Propofol group):** Received Propofol at a loading dose of 25–100 µg/kg/min via infusion pump.
- **Group D (Dexmedetomidine group):** Received Dexmedetomidine at a loading dose of 1 µg/kg over 10 minutes using an infusion pump.

After administration of the loading dose, the time taken to achieve adequate sedation, defined as a Ramsay Sedation Score (RSS) of 3, was recorded. To maintain adequate sedation throughout the colonoscopy, drug infusions were continued as follows:

- **Group P:** Maintenance dose of Propofol at 0.5–2 mg/kg/hr, titrated according to sedation needs.
- **Group D:** Maintenance dose of Dexmedetomidine at 0.2–0.6 µg/kg/hr, titrated accordingly.

Lignocaine jelly was used at the start of the procedure for lubrication and local anaesthesia. Breakthrough analgesia, if required, was managed with Inj. Fentanyl at 0.5 µg/kg, and the time of administration was recorded.

Vital parameters including heart rate, blood pressure, and oxygen saturation were monitored every 5 minutes for the first 10 minutes and then at 10-minute intervals until the end of the procedure. Post-procedural monitoring continued every 10 minutes for 30 minutes.

Post-operative pain was assessed using the Visual Analogue Scale (VAS) at baseline and then every 30 minutes for a duration of 2 hours. The VAS is a 10 cm linear scale ranging from 0 (no pain) to 10 (worst possible pain), and patients were asked to mark a point on the line that best represented their pain intensity at each time point.

RESULTS

A total of 60 patients undergoing colonoscopy were enrolled in the study and randomly divided into two equal groups: Group D (Dexmedetomidine) and Group P (Propofol), with 30 patients each. Baseline demographic parameters such as age, sex distribution, and ASA physical status were found to be comparable between both groups. The duration of the colonoscopy procedure was evenly distributed across 20, 30, and 40-minute intervals in both groups without significant difference. However, the time required to achieve adequate sedation (Ramsay Sedation Score 3) was significantly longer in the Dexmedetomidine group, while Propofol resulted in a faster onset of sedation.

Hemodynamic parameters revealed that heart rate and mean arterial pressure were consistently lower in Group D compared to Group P, with statistically significant differences at most time points. Respiratory rate was better maintained in the Dexmedetomidine group, remaining significantly higher throughout the procedure compared to Propofol. In contrast, oxygen saturation (SpO_2) levels were comparable across both groups, with no significant differences at any interval.

Regarding analgesic supplementation, a slightly higher proportion of patients in Group D required fentanyl, though the timing of administration was nearly similar in both groups. Recovery profiles differed notably, with patients in the Propofol group achieving an Aldrete score of 10 significantly earlier than those in the Dexmedetomidine group. Pain assessment using the Visual Analog Scale (VAS) demonstrated that patients in the Dexmedetomidine group consistently reported significantly lower pain scores at the end of the procedure and at all subsequent intervals up to 120 minutes.

Overall, while Propofol allowed for quicker onset of sedation and earlier recovery, Dexmedetomidine offered better hemodynamic stability, preserved respiratory function, and superior post-procedure analgesia.

Table 1. Demographic characteristics of study subjects

Table 1 illustrates the comparison of demographic characteristics including age, sex distribution, and ASA physical status (ASA PS) between the two groups. The mean age of subjects in Group D was 38.7 ± 7.94 years, while in Group P it was 38.26 ± 10.5 years, indicating no statistically significant difference. The male-to-female ratio was comparable between the two groups (17:13 in Group D and 16:14 in Group P). ASA physical status classification was also similar, with 16 patients classified as ASA I and 14 as ASA II in both groups.

Table 1: Demographic characteristics of study subjects

Parameter	Group D (n=30)	Group P (n=30)
Age (years)	38.7 ± 7.94	38.26 ± 10.5
Sex (M/F)	17 / 13	16 / 14
ASA PS (I/II)	16 / 14	16 / 14

Table 2 presents the distribution of colonoscopy procedure duration among the two groups. In Group D (Dexmedetomidine), 10 patients had a procedure duration of 20 minutes, 8 patients had 30 minutes, and 12 patients underwent a 40-minute procedure. Similarly, in Group P (Propofol), 9 patients had a 20-minute duration, 8 had 30 minutes, and 13 underwent the procedure for 40 minutes. The distribution of procedural duration was comparable between the groups, indicating no significant difference in the length of the colonoscopy procedures between the sedation protocols. [Table 2]

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Table 2. Distribution of duration of procedure

Duration of Procedure	Group D (n=30)	Group P (n=30)
20 minutes	10 (33.3%)	9 (30.0%)
30 minutes	8 (26.7%)	8 (26.7%)
40 minutes	12 (40.0%)	13 (43.3%)

Table 3. Time taken to achieve adequate sedation

Table 3 compares the time required to reach an adequate sedation level (Ramsay Sedation Score of 3) from the start of infusion in both groups. The mean time to achieve RSS-3 in Group D (Dexmedetomidine) was 18.0 minutes with a standard deviation of 5.01, whereas Group P (Propofol) achieved the same sedation level significantly faster, with a mean time of 10.07 minutes and a standard deviation of 4.30. The difference was statistically significant with a p-value of <0.0001, indicating a slower onset of sedation in the Dexmedetomidine group compared to the Propofol group.

Table 3: Time taken to achieve adequate sedation

Parameter	Group D (n=30)	Group P (n=30)
Mean Time to Achieve RSS-3 (minutes)	18.0	10.07
Standard Deviation (SD)	5.01	4.30
P value		<0.0001

Table 4. Heart rate

Table 4 shows the comparison of heart rate at various time intervals during the procedure between Group D (Dexmedetomidine) and Group P (Propofol). At 5 minutes, the mean heart rate was 80.43 ± 6.88 bpm in Group D and 81.08 ± 7.48 bpm in Group P, with a statistically significant p-value of 0.0001. At 10 and 20 minutes, Group D continued to show lower mean heart rates (75.5 and 73.8 bpm respectively) compared to Group P (78.15 and 77.42 bpm), with significant p-values of 0.0045 and 0.0079. At 30 minutes, although Group D had a slightly lower mean heart rate (73.52 vs. 75.63 bpm), the difference was not statistically significant (p = 0.06). By 40 minutes, Group D maintained a lower heart rate (72.0 bpm vs. 75.36 bpm), and the difference became statistically significant again (p = 0.01). This indicates that Dexmedetomidine is associated with a greater reduction in heart rate over time.

Table 4: Heart rate

Time Point	Group D Mean ± SD (bpm)	Group P Mean ± SD (bpm)	P value
5 mins	80.43 ± 6.88	81.08 ± 7.48	0.0001
10 mins	75.5 ± 6.30	78.15 ± 7.90	0.0045
20 mins	73.8 ± 6.43	77.42 ± 8.23	0.0079
30 mins	73.52 ± 7.94	75.63 ± 4.53	0.06
40 mins	72.0 ± 5.20	75.36 ± 4.73	0.01

Table 5. Mean arterial pressure

Table 5 presents the mean arterial pressure (MAP) readings at different time intervals during the procedure for both groups. At all observed time points—5, 10, 20, 30, and 40 minutes—the MAP was significantly lower in Group D (Dexmedetomidine) compared to Group P (Propofol). At 5 minutes, the MAP in Group D was 77.56 ± 5.42 mmHg versus 87.4 ± 5.91 mmHg in Group P (p < 0.0001). This trend continued consistently with statistically significant differences observed at 10 minutes (73.21 vs. 81.7 mmHg), 20 minutes (71.20 vs. 79.8 mmHg), 30 minutes (73.57 vs. 78.89 mmHg), and 40 minutes (73.18 vs. 78.81 mmHg), all with p-values <0.0001. These findings indicate that Dexmedetomidine produces a more pronounced reduction in MAP compared to Propofol during colonoscopy.

Table 5: Mean arterial pressure

Time Point	Group D Mean ± SD (mmHg)	Group P Mean ± SD (mmHg)	P value
5 mins	77.56 ± 5.42	87.4 ± 5.91	<0.0001
10 mins	73.21 ± 4.99	81.7 ± 5.47	<0.0001
20 mins	71.20 ± 4.48	79.8 ± 5.16	<0.0001
30 mins	73.57 ± 4.40	78.89 ± 4.31	<0.0001
40 mins	73.18 ± 3.93	78.81 ± 3.53	<0.0001

Table 6. Respiratory rate

Table 6 compares the intra-procedural respiratory rate at various time intervals between Group D (Dexmedetomidine) and Group P (Propofol). At the 5-minute mark, there was no statistically significant difference in respiratory rate (15.69 ± 1.47 in Group D vs. 15.5 ± 0.67 in Group P; p = 0.5). However, from 10 minutes onward, Group D consistently demonstrated significantly higher respiratory rates compared to Group P. At 10, 20, 30, and 45 minutes, Group D maintained respiratory rates ranging from 16.1 to 16.81 breaths per minute, while Group P exhibited lower rates between 13.18 and 14.2 breaths

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per minute. All these differences were statistically significant with p-values <0.0001. These findings suggest that Dexmedetomidine preserved respiratory rate better than Propofol during the procedure.

Table 6: Respiratory rate

Time Point	Group D Mean ± SD (breaths/min)	Group P Mean ± SD (breaths/min)	P value
5 mins	15.69 ± 1.47	15.5 ± 0.67	0.5
10 mins	16.2 ± 0.86	14.2 ± 1.15	<0.0001
20 mins	16.1 ± 1.55	13.33 ± 1.12	<0.0001
30 mins	16.63 ± 0.87	13.47 ± 0.59	<0.0001
45 mins	16.81 ± 0.71	13.18 ± 0.38	<0.0001

Table 7. SpO_2 concentration

Table 7 shows the intra-procedural oxygen saturation (SpO_2) levels at various time intervals in Group D (Dexmedetomidine) and Group P (Propofol). At all observed intervals5, 10, 20, 30, and 40 minutesthe mean SpO_2 values remained within normal limits for both groups. At 5 minutes, the SpO_2 was 99.0 ± 0.36 in Group D and 99.1 ± 0.65 in Group P, with no significant difference (p = 0.46). Similarly, no statistically significant differences were noted at 10 minutes (p = 0.07), 20 minutes (p = 0.25), 30 minutes (p = 0.2), or 40 minutes (p = 1.0). These findings indicate that both Dexmedetomidine and Propofol maintain stable and comparable oxygen saturation throughout the procedure, with no clinically or statistically significant variation.

Table 7: SpO_2 concentration

Time Point	Group D Mean ± SD (%)	Group P Mean ± SD (%)	P value
5 mins	99.0 ± 0.36	99.1 ± 0.65	0.46
10 mins	98.06 ± 0.86	98.43 ± 0.62	0.07
20 mins	98.2 ± 0.80	98.43 ± 0.67	0.25
30 mins	98.5 ± 0.59	98.7 ± 0.61	0.2
40 mins	98.36 ± 0.59	98.36 ± 0.88	1.0

Table 8. Fentanyl administration

Table 8 summarizes the proportion of patients in both groups who required supplemental fentanyl during the colonoscopy procedure. In Group D (Dexmedetomidine), 12 out of 30 patients (40%) received fentanyl, whereas in Group P (Propofol), 10 patients (33.33%) required fentanyl. Conversely, 60% of patients in Group D and 66.66% in Group P did not require fentanyl. The proportion of fentanyl usage was slightly higher in Group D, although this difference was not statistically assessed in the provided data.

Table 8: Fentanyl administration

Fentanyl Administration	Group D (n=30)	%	Group P (n=30)	%
Given	12	40.00	10	33.33
Not Given	18	60.00	20	66.66
Total	30	100	30	100

Table 9. Time of fentanyl administration

Table 9 presents the average time at which fentanyl was administered to patients who required it during the procedure. In Group D, the mean time of fentanyl administration was 9.58 minutes (±3.20), whereas in Group P, it was slightly delayed at 10.77 minutes (±1.13). Although no p-value was provided to assess the statistical significance, the timing of administration appears comparable between the groups.

Table 9: Time of fentanyl administration

Parameter	Group D (n=12)	Group P (n=10)
Mean Time (minutes)	9.58	10.77
Standard Deviation (SD)	3.20	1.13
P-Value		0.05

Table 10. Time taken to achieve Aldrete score of 10

Table 10 presents the recovery profile in terms of time taken to achieve an Aldrete score of 10 post-procedure. The mean time was significantly longer in Group D (Dexmedetomidine) at 22.13 ± 4.81 minutes compared to 14.16 ± 3.07 minutes in Group P (Propofol). The difference in recovery times between the two groups was statistically significant (p < 0.05), indicating a faster recovery profile in the Propofol group.

Table 10. Time taken to achieve Aldrete score of 10

Parameter	Group D (n=30)	Group P (n=30)
Mean Time to Aldrete Score 10 (min)	22.13	14.16
Standard Deviation (SD)	4.81	3.07

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Table 11. Post-procedure pain assessment using Visual Analog Scale (VAS)

Table 11 displays post-procedure pain levels assessed using the Visual Analog Scale at multiple time intervals. Group D (Dexmedetomidine) consistently exhibited significantly lower pain scores at all time points compared to Group P (Propofol). At the end of the procedure, Group D had a mean VAS score of 1.33 ± 0.60 versus 3.13 ± 1.21 in Group P ($p = 0.0001$). Similar trends were observed at 30, 60, 90, and 120 minutes, with all p-values indicating high statistical significance (<0.0001). This shows that Dexmedetomidine provided superior post-procedural analgesia as compared to Propofol, with a mean difference of 2.26 in pain scores.

Table 11: Post-procedure pain assessment using Visual Analog Scale (VAS)

Time Point	Group D Mean ± SD	Group P Mean ± SD	P value
End of Procedure	1.33 ± 0.60	3.13 ± 1.21	0.0001
30 minutes	1.56 ± 0.50	3.46 ± 1.20	<0.0001
60 minutes	2.0 ± 0.58	4.26 ± 1.30	0.0001
90 minutes	2.36 ± 0.62	5.0 ± 1.03	<0.0001
120 minutes	2.80 ± 0.48	5.43 ± 0.61	<0.0001

Table 1 showed that demographic characteristics such as age, sex, and ASA physical status were comparable between Group D and Group P, with no significant differences observed. Table 2 revealed that the duration of the colonoscopy procedure was similarly distributed across 20, 30, and 40-minute intervals in both groups. Table 3 demonstrated a significantly longer mean time to achieve adequate sedation (RSS-3) in Group D compared to a significantly shorter time in Group P ($p < 0.0001$). Table 4 indicated that Group D experienced lower heart rates at most time intervals, with statistically significant differences at 5, 10, 20, and 40 minutes. Table 5 showed that mean arterial pressure was significantly lower in Group D than Group P at all recorded time points, with $p < 0.0001$. Table 6 highlighted that while the respiratory rate at 5 minutes was comparable between groups, subsequent readings at 10, 20, 30, and 45 minutes were significantly higher in Group D, indicating better respiratory preservation. Table 7 showed no significant differences in SpO_2 concentration between the two groups at any time point, confirming comparable oxygenation. Table 8 illustrated that a slightly higher percentage of patients in Group D received fentanyl (40%) compared to Group P (33.33%), though without statistical analysis. Table 9 reflected that the mean time of fentanyl administration was slightly earlier in Group D than in Group P. Table 10 revealed that the time taken to achieve an Aldrete score of 10 was significantly longer in Group D, indicating slower recovery, while Group P achieved faster post-procedure recovery. Table 11 showed that post-procedure pain scores were significantly lower in Group D at the end of the procedure and at 30, 60, 90, and 120 minutes, indicating better analgesic efficacy of Dexmedetomidine compared to Propofol.

DISCUSSION

Colonoscopy is a widely used diagnostic and therapeutic procedure for various colorectal conditions, yet it is inherently uncomfortable and often painful, necessitating optimal sedation and analgesia to ensure patient comfort and procedural efficacy.[11] Sedative agents not only provide anxiolysis and amnesia but also contribute to patient cooperation, procedural ease, and safety. Among commonly used agents, Propofol is a sedative-hypnotic favored for its rapid onset and short duration of action, while Dexmedetomidine, a selective α2-adrenergic agonist traditionally used in ICU settings, has emerged as a promising alternative for conscious sedation owing to its minimal respiratory depression and inherent analgesic properties.[12,13]

In the present study, the time required to achieve an adequate sedation level (Ramsay Sedation Score of 3) was significantly shorter with Propofol compared to Dexmedetomidine. This can be attributed to Propofol's rapid onset of action, often within seconds, due to its lipophilic nature and direct action on GABA receptors.[14,15] In contrast, Dexmedetomidine, although effective, requires a longer time to exert sedative effects, which may be a limiting factor in settings where rapid onset is desirable.

The cardiovascular parameters observed during the procedure revealed a consistent trend of lower heart rate and mean arterial pressure in the Dexmedetomidine group.[16,17] These effects are linked to Dexmedetomidine's central sympatholytic action via selective α2-receptor agonism. Importantly, although heart rate reductions were significant, no patient in the present study required pharmacologic intervention, underscoring the clinical safety of the agent when used at appropriate dosing.[18,19] A notable difference in respiratory effects was observed between the two agents. Propofol led to a significant reduction in respiratory rate throughout the procedure, a finding explained by its depressant action on central respiratory centers. In contrast, Dexmedetomidine maintained more stable respiratory rates, reflecting its respiratory-sparing profile, a key advantage in non-intubated procedural sedation.[20,21]

Recovery characteristics were assessed using the modified Aldrete score. Patients sedated with Propofol achieved full recovery significantly faster than those receiving Dexmedetomidine. The slower

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recovery with Dexmedetomidine is attributable to its pharmacokinetics, particularly its longer elimination half-life of approximately 2 hours.[22]

Post-procedural analgesia, as assessed by Visual Analog Scale (VAS), favored Dexmedetomidine, with significantly lower pain scores recorded up to 2 hours post-procedure. These analgesic benefits are attributed to Dexmedetomidine's spinal and supraspinal antinociceptive actions. In contrast, patients in the Propofol group consistently reported higher pain levels, reflecting the lack of inherent analgesic properties with Propofol.[23,24]

In terms of breakthrough analgesic requirement using fentanyl supplementation, both groups demonstrated nearly similar proportions, suggesting comparable efficacy in initial pain control. However, the sustained analgesic benefit in the Dexmedetomidine group reinforces its potential as a dual-purpose agent for sedation and analgesia.[25]

Overall, the study highlights the distinct pharmacodynamic profiles of Propofol and Dexmedetomidine. While Propofol offers rapid sedation and quicker recovery, it is associated with significant respiratory depression and lacks analgesia. Conversely, Dexmedetomidine provides hemodynamic stability, preserves respiratory function, and offers extended analgesia, albeit with delayed onset and slower recovery.

These findings emphasize the importance of individualized sedation strategies based on clinical context, procedural duration, and patient comorbidities. Both agents are effective but cater to different procedural needs, and their appropriate selection can optimize safety and comfort during colonoscopic interventions.

CONCLUSION

In patients undergoing colonoscopy, dexmedetomidine provides a relatively satisfactory level of post-procedural analgesia without causing a decrease in respiratory rate. Hence, to conclude, the administration of dexmedetomidine and propofol along with fentanyl has been found to be safe, and dexmedetomidine has shown a notable benefit in terms of lower occurrence of respiratory depression and enhanced post-procedural analgesia, making it a valuable choice for sedation in patients undergoing colonoscopy.

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