Original Article

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Comparison of Discharge Readiness Between Propofol Plus Dexmedetomidine Combination and Propofol Plus Ketorolac in Patients Undergoing Dilation and Curettage

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Author`s Contribution

[1,4]Substantial contributions to the conception or design of the work; or the acquisition, Active participation in active methodology, [2]analysis, or interpretation of data for the work, [3,5,6]Drafting the work or revising it critically for important intellectual content

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ABSTRACT

Objective: To evaluate the effect of combination of drugs on discharge readiness of the patient after dilation and curettage (D&C).

Methodology: Prospective randomized trial was conducted at department of Anaesthesia, Sahiwal Medical College/Sahiwal Teaching Hospital, Sahiwal from April 2022 to September 2022 in which we compare two randomized groups of patients. Group 1 received propofol and ketorolac while Group 2 received combination of propofol and dexmedetomidine. Female patients Undergoing D&C, having age 25-60 years and ASA I and II status were included. Patients with cognitive impairment, disabilities and ambulatory problems, drug allergy, diabetics, body weight more than 110 kg and patients with significant renal or hepatic impairment were excluded. Discharge readiness was measured as MPADSS score of ≥ 9 at 30 minutes from the last dose administered, MPADSS was measured by using scoring system as described in methodology.

Results: The study found a significant association between propofol and dexmedetomidine and discharge readiness, with a value of 0.01 for age and 0.02 for propofol consumption in mg. However, there was not a significant association between propofol and dexmedetomidine and discharge readiness, indicated by values of 0.252 for height, 0.465 for weight, and 0.08 for BMI. The value of >9 in 30 min of MPADSS scoring system in indicates that there was a significant association between the between the propofol and Dexmedetomidine and discharge readiness

Conclusion: Discharge readiness is higher in propofol plus dexmedetomidine group compared to propofol plus ketorolac group on MPADSS discharge scale.

Keywords: Discharge readiness, Dilation and curettage, Propofol Ketorolac, dexmedetomidine

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Introduction

Approximately 211 million pregnancies occur globally each year, of which an estimated 46 million result in abortion.[1] Abortion procedures are broadly categorized into pharmaceutical and mechanical therapies, with each approach chosen based on medical indications and patient preference.[2] Among mechanical methods, dilatation and curettage (D&C) is a commonly performed procedure. In this operation, the process of dilating the cervix to gain access to the uterine cavity is significantly more painful than the curettage itself, which involves the removal of uterine contents.[3]

The choice of anesthetic technique for D&C procedures can be either general anesthesia (GA) or regional anesthesia. However, GA is the most frequently used approach, often determined by the preferences of the surgeon and the patient.[4] The procedure is typically brief,

and most patients have a short hospital stay. Discharge is generally considered appropriate once the patient recovers from anesthesia and no immediate complications, such as excessive bleeding or signs of infection, are identified[5]. This streamlined approach aims to minimize hospital stays while ensuring patient well-being. To ensure faster patient recovery and awakening, the selection of drugs for general anesthesia must be carefully evaluated to identify the most suitable option.[6]

Propofol has undoubtedly established itself as the preferred choice for ambulatory anesthesia, often combined with short-acting opioids due to its rapid onset and offset, enabling early patient discharge. However, in countries like Pakistan, where opioid availability is a significant challenge, alternatives such as sedatives or anxiolytics become a necessity.[7] Both dexmedetomidine and ketamine, known for their sedative and analgesic properties, have been effectively combined with propofol to reduce its dosage while enhancing the hemodynamic profile.[8]

In our study, we used the Modified Post Anaesthetic Discharge Scoring System (MPADSS) to assess patients' discharge fitness. The MPADSS evaluates six criteria: vital signs (including blood pressure, pulse, temperature, and respiratory rate), ambulation, nausea/vomiting, pain, surgical bleeding, and fluid intake/output. Each criterion is scored from 0 to 2, with a total score of 9 or higher indicating readiness for discharge.[9]

Although some previous studies suggest a delayed recovery with the use of propofol in combination with other drugs, no study to date has clearly demonstrated any delay in discharge associated with this combination.[10.11] To address this gap, we investigated both recovery and discharge readiness, using validated criteria, in patients undergoing dilatation and curettage surgery, with dexmedetomidine or ketorolac as premedicants to propofol. Given that the success of an effective ambulatory anesthetic technique depends on the safe discharge of patients, our study aimed to determine the percentage of patients ready for discharge in each group one-hour post-surgery, based on the Modified Post Anesthesia Discharge Scoring System (MPADSS).

Methodology

Prospective randomized trial was conducted at department of Anaesthesia, Sahiwal Medical College/Sahiwal Teaching Hospital, Sahiwal from April 2022 to September 2022. After approval from hospital ethical committee and obtaining informed written consent from every patient. Non-probability consecutive sampling technique was used. Female patients Undergoing D&C, having age 25-60 years and ASA I and II status were included. ASA I. Normal healthy patient that is not obese. Non-obese. ASA II. A patient with mild systemic disease, without substantial functional limitations. Patients with cognitive impairment, disabilities and ambulatory problems, drug allergy, diabetics, body weight more than 110 kg and patients with significant renal or hepatic impairment were excluded.

Discharge readiness was measured as MPADSS score of ≥ 9 at 30 minutes from the last dose administered. The Modified Post-Anesthesia Discharge Scoring System (MPADSS) evaluates patients' readiness for discharge after anesthesia, with a total score of 12. A score of 9 or above, with no individual parameter scoring 0, is required for discharge readiness. The system assesses the following parameters:

1. Vital Signs: A score of 2 is given if blood pressure, pulse, and heart rate are within 20% of preoperative values, 1 for 20–40% deviation, and 0 for deviations exceeding 40%.
2. Ambulation: Patients who can walk steadily score 2, those with a toddling gait score 1, and those unable to walk score 0.
3. Post-Operative Nausea/Vomiting (PONV): Minimal symptoms score 2, moderate symptoms score 1, and severe symptoms score 0.
4. Pain: Minimal pain scores 2, moderate pain scores 1, and severe pain scores 0.
5. Surgical Bleeding: Minimal or absent bleeding scores 2, moderate bleeding scores 1, and severe bleeding scores 0.
6. Voiding: Normal voiding scores 2, difficulty voiding scores 1, and urinary retention scores 0.[5]

Hypotension was defined as systolic blood pressure <20% from the baseline or Mean arterial pressure <65 mmHg. Bradycardia was defined as heart rate of <50 beats/min respectively, during intraoperative and postoperative period. Cessation of breath for at least 10 seconds was labeled as apnea.

Sample size was calculated using select statistical service calculator comparing two proportions, using confidence interval 95%, power of study 80%, using discharge-

readiness in propofol-dexmedetomidine group 51%[12] and in propofol group 88%.[12] Actual sample size is 42 patients in order to avoid drop out we considered sample size of total 60 patients of either gender and divided into two groups, each group consisting of 30 patients.

Patient fulfilling the criteria of inclusion was categorized into two groups using a computer-generated random number table. All patients were undergone a pre-operative assessment on the day of surgery. They were

pre-medicated with IV midazolam0.02 mg/kg 10 mints before surgery. Group I patients received dexmedetomidine 0.5 µg/kg plus propofol 2 mg/kg and second group received propofol 2mg/kg along with ketorolac 0.5mg/kg. Maintenance of anesthesia for all patients was done with oxygen 2L/min, N_2O 2L/min and sevoflurane 1.2 MAC, breathing spontaneously with bag and mask throughout the procedure. Guedel airway of appropriate size was placed and assisted bag mask ventilation was provided if saturation falls below 92 percent. Bispectral Index (BIS) monitor was used to monitor the level of sedation in all patients keeping it between 40-60.

Patient's Intraoperative monitoring was including electrocardiogram leads II and V5, non-invasive blood pressure at 5 min intervals, oxygen saturation. Heart rate (HR) and mean arterial pressure (MAP) was maintained within 20% of the pre-operative value. Hypotension (MAP <20% of the baseline or <65 mmHg) was treated with infusion of normal saline and if required injection phenylephrine boluses 10mcg IV. Bradycardia (HR <50 beats/min) was treated with IV atropine 0.5mg bolus in both intraoperative and post-operative periods. All patients received paracetamol 15 mg/kg IV and ondansetron 0.1 mg/kg intra-operatively. After completion of procedure and having BIS score >90 patients were shifted to post anesthesia care unit (PACU).

Vitals was recorded every 5 minutes for first 30 minutes and then at 60, 90 and 120 minutes. Discharge readiness was assessed based on MPADSS using six parameters. A score of 9 or above at 30mints on MPADSS scale was set discharge readiness. Total propofol consumption in both groups, incidence of bradycardia, hypotension, nausea and vomiting was noted.

Data was analyzed using SPSS version 26. Quantitative variable like (height, weight, age and total dose of propofol) was presented by using mean± SD. Comparison of quantitative variable (height, weight, age and total dose of propofol) between groups was done using independent sample t-test. Comparison of qualitative variable like (Percentage of discharge to readiness, incidence of bradycardia, hypotension, nausea and vomiting) was presented with frequency and percentages. Chi-square test was used to compare both groups for discharge readiness on MPDDS scale in each stratum with p-value≤0.05 as significant.

Results

Patients in the group I were younger (mean age 31.80 years) compared to those in the group II (mean age 39.23 years; p=0.001). There were no significant differences in weight (p=0.252) or height (p=0.465) between the groups. However, patients in the group I had a slightly lower mean BMI (21.73 kg/m²) than those in the group II (22.21 kg/m²). Propofol consumption was significantly lower in the group I (mean 102.40 mg) compared to the group II (mean 106.60 mg; p=0.02).

The study found a significant association between group I and discharge readiness, with a value of 0.01 for age and 0.02 for propofol consumption in mg. However, there was not a significant association between group II and discharge readiness, indicated by values of 0.252 for height, 0.465 for weight, and 0.08 for BMI. Regarding physical status, in group I, 60% of patients were ASA 1 and 40% were ASA II, while in group II, 30% were ASA 1 and 70% were ASA II. Additionally, in group I, 66.7% had an MPADSS score of >9 in 30 minutes, whereas in group II, this percentage was 40%. Regarding post-operative outcomes, in group I, 23.3% experienced post-operative hypotension, 66.7% experienced post-operative bradycardia, 46.7% experienced post-operative nausea, and 26.7% experienced post-operative vomiting. In contrast, in group II, 46.7% experienced post-operative hypotension, 33.3% experienced post-operative bradycardia, 66.7% experienced post-operative nausea, and 63.3% experienced post-operative vomiting (Table-II).

Excessive surgical bleeding and complaint of pain was also higher 3.4% and 36.6% in group II. The value of >9 in 30 min of MPADSS score was found in 11(36.7%) of patent in group I and 9(30%) in group II which indicates that there was a significant association between MPADSS score and discharge readiness, p=0.584.

Table I: Baseline characteristics of women undergoing D & C. (n=60)

Characteristics	Group I (Propofol with Dexmedetomidine) Mean ± SD	Group II (Propofol with Mean ± SD	P value
Age	31.80±4.06	39.23±9.87	0.01
Weight	55.13±3.04	55.93±2.24	0.25
Height	159.20±2.86	158.80±0.80	0.46
BMI	21.73±1.22	22.21±0.88	0.08
Propofol Consumption in mg	102.40±8.34	106.60±5.01	0.02

Discussion

In our study the discharge readiness was higher in propofol plus dexmedetomidine group as compared to propofol plus ketorolac group. Bradycardia, hypotension, nausea and vomiting was also less in propofol plus dexmedetomidine group. The mean propofol consumption of patients with propofol with dexmedetomidine group was less compared to mean propofol consumption in mg of patients with propofol with ketorolac group.

In a study by Barends et al[13] reported that dexmedetomidine is a promising alternative to midazolam for use in procedural sedation. Dexmedetomidine provides more comfort during the procedure for the patient and clinician. If carefully titrated, the safety profiles are similar. According to the findings of a study conducted by Nishizawa T et al[14], there is no increase in the length of stay for patients when they get dexmedetomidine and ketamine prior to having propofol administered as anesthesia. Instead, ketamine is an excellent choice because it not only increases blood flow but also lessens the intensity of any discomfort that may be present.

Hough et al[15] utilization of this drug combination may not only decrease the occurrence of postoperative nausea and vomiting in patients having minor gynecologic surgery but also potentially shorten hospital stays and improve recovery from anesthesia. In a study examining post-operative outcomes with propofol combined with dexmedetomidine, 46.7% of patients' experienced post-operative nausea, while 26.7% experienced post-operative vomiting. Zhong et al[16] concluded that premedication with dexmedetomidine aided in reducing post-operative nausea and vomiting (PONV).

In propofol with dexmedetomidine, 66.7% patients experienced post-operative bradycardia, in contrast, in propofol with ketorolac, 33.3% experienced post-operative bradycardia. Dastan et al[17] double-blind controlled trial study on the effects of intravenous ketorolac, paracetamol, and morphine in patients undergoing video-assisted thoracoscopic surgery found that recipients of ketorolac had a higher heart rate compared to those in the other groups.

In a study by Rahimzadeh et al[18], they compared the impact of dexmedetomidine and remifentanil on recovery discharge rates among patients having posterior spinal fusion surgery. They divided 40 patients randomly into remifentanil (R) and dexmedetomidine (D) groups, finding that the dexmedetomidine group exhibited a lower incidence of hypoventilation. Similar results were was demonstrated in a randomized, comparative

Table II: Comparison of outcomes & side effects in women undergoing D & C. (n=60)

Characteristics	Group I (Propofol with Dexmedetomidine) n=30	Group II (Propofol with Ketorolac) N=30	Test of sig.
ASA Physical Status			
ASA I	18 (60%)	9 (30%)	χ^2=5.45, d.f=1, p=0.020
ASA II	12 (40%)	21 (70%)	
MDAPSS scoring			
Yes	20 (66.7%)	12 (40%)	χ^2=4.29, d.f=1, p=0.040
No	10 (33.3%)	18 (60%)	
Hypotension			
Yes	7 (23.3%)	14 (46.7%)	χ^2=3.59, d.f=1, p=0.060
No	23 (76.7%)	16 (53.3%)	
Bradycardia			
Yes	20 (66.7%)	20 (33.3%)	χ^2=0.00, d.f=1, p=1.000
No	10 (33.3%)	10 (66.7%)	
Nausea			
Yes	14 (46.7%)	20 (66.7%)	χ^2=2.44, d.f=1, p=0.120
No	16 (53.3%)	10 (33.3%)	
Vomiting			
Yes	8 (26.7%)	19 (63.3%)	χ^2=8.15, d.f=1, p<0.001
No	22 (73.3%)	11 (36.7%)	
Excessive Surgical Bleeding			
Yes	0 (0.0%)	1 (3.4%)	χ^2=1.02, d.f=1, p=0.313
No	30 (100.0%)	29 (96.6%)	
Pain			
Yes	6 (20.0%)	11 (36.6%)	χ^2=2.05, d.f=1, p=0.152
No	24 (80.0%)	19 (63.4%)	
Activity Time			
< 60 min	3 (10.0%)	7 (23.3%)	χ^2=1.92, d.f=1, p=0.166

experiment was carried out by Wang et al[19] in a clinical environment, and participants were asked to take part in it if they were between the ages of 25 and 60 and had undergone a colonoscopy while receiving supervised anesthetic care. Both propofol and dexmedetomidine were administered as sedatives to the individuals after they were randomly divided into two groups. In their meta-analysis conducted by Zhong et al[16] discovered that dexmedetomidine is superior to placebo in reducing the incidence of post-operative nausea and vomiting in patients undergoing gynecological surgeries.

In this study propofol consumption was significantly lower in the dexmedetomidine group (mean 102.40 mg) compared to the ketorolac group (mean 106.60 mg; p=0.02). According to a study conducted by Wo et al[20], it was found that among the patients who required re-injection for achieving an appropriate depth of anesthesia, 30% of those in the isoflurane-fentanyl (Isofol) group, 44% in the dexmedetomidine group, and 40% in the ketamine-propofol (ketofol) group needed such re-injection. Notably, the dexmedetomidine group had a higher percentage (44%) of patients requiring re-injection compared to the other groups. Abdel latif et al[21] included children >10 kg, divided into DP, DK, and D groups. DP showed significantly faster recovery, leading researchers to recommend its use.

Conclusion

Discharge readiness is higher in propofol plus dexmedetomidine group compared to propofol plus ketorolac group on MPADSS discharge scale and also less propofol consumption.

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