e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2024; 16(8); 340-345

Original Research Article

Comparison of Postoperative Pain and Side Effects Associated with the Buprenorphine Vs Midazolam among Patients Undergoing Abdominal Surgeries

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Received: 25-05-2024 / Revised: 23-06-2024 / Accepted: 26-07-2024

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Conflict of interest: Nil

Abstract:

Background: Pain associated with the surgical procedure is the major dreadful aspect for the patients. Postoperative pain and side effects impart significant strain on the recovery of the patients and tends to increase the hospital stay. Evaluation of analgesics is essential to identify the efficient analgesic that can provide effective pain management with minimum side effects.

Objective: The present study was aim to analyze and compared the pain and side effects associated with the buprenorphine and midazolam drugs among the patients undergoing the abdominal surgeries.

Methodology: Total 56 patients undergoing the abdominal surgeries (ASA grade I & II) were enrolled in the study. Total patients were randomly divided into the two groups of 28 patients each using the block randomization. In first group, patients received the buprenorphine drug and in second group patients received the midazolam drug. duration of analgesia, pain and side effects of drugs were compared between the two groups.

Results: The mean duration of analgesia was 19.29 ± 2.94 hours in midazolam group which is significantly higher than the buprenorphine group in which mean duration was 14.50 ± 5.49 hours. VAS score was found to be decrease significantly over the duration of 24 hours in midazolam group as compared to the buprenorphine group. The midazolam group observed to have fewer side effects as compared to the buprenorphine group but the difference was not statistically significant.

Conclusion: Midazolam was found to be more effective analgesic as compared to the buprenorphine for abdominal surgeries as it provides prolonged duration of anesthesia with lower pain and side effects. Further studies are needed to be conducted to validate the findings of this study.

Keywords: Midazolam, Buprenorphine, Anesthesia, Sedation, Pain.

Introduction

Pain associated with the surgical procedure is the major dreadful aspect for the patients which affect the patients both physically and psychologically. Postoperative pain could become a lifelong psychological trauma for patients if not managed properly. Thus, relieving the operative pain remains a major challenge in the anesthesia. An estimated 20–40% of patients suffered from severe postoperative pain. Chronic pain can also be seen if day first pain is not treated well.

A proper analgesia in post-surgical period decreases the amount of respiratory and cardiac complications, enhances early recovery and ambulation that lead to return of bowel motility. Effective patients recover reduces the duration of hospital stay, thus reducing the financial burden on patients and healthcare system [1]. A significant proportion of the population has undergone one or the other forms of surgical procedures at one or more points in the life time of an individual. Surgery has become an integral part of global health care, with an estimated 234 million operations performed yearly. Abdominal surgeries are the second most common surgeries occurred in India following the obstetrics and gynecology related surgeries [2].

Currently, multimodal analgesia is considered the best suitable method of pain relief; however, opioid therapy is still most practiced in many clinical settings. Despite effective outcomes, these therapies also become a reason for adverse drug effects with frequently reported cases of nausea, vomiting, constipation, and urinary retention. High doses of opi-

oids enhanced the risk of drug side effects and were vastly reported in previous studies [3]. Buprenorphine is a lipophilic opioid that is a mixed agonist antagonist with high affinity at both m(mu) and kappa opiate receptors. It has a high MOP receptor affinity with slow dissociation, providing long-lasting analgesia. [4,5]. Midazolam is water soluble, imidazobenzodiazepine derivative. The discovery of analgesic property of midazolam in spinal anesthesia through its action on GABA A receptor located in substansia gelatinosa opens the gate for experimenting this drug for intrathecal usage as spinal adjuvant replacing opioids due to its minimal to nil complications [6,7]. Common adverse drug reactions associated with the opioids include: nausea and vomiting, drowsiness, dizziness, headache, itch, dry mouth, miosis, orthostatic hypotension, male ejaculatory difficulty, decreased libido and urinary retention [4,5].

The present study was aim to analyze and compared the pain and side effects associated with the buprenorphine and midazolam drugs among the patients undergoing the abdominal surgeries. Present study also aims to record and compare the duration of analgesia in both the drugs.

Methodology

Study design: Present study was a prospective hospital-based study conducted over the duration of 6 months in the host institute. Total 56 patients undergoing the abdominal surgeries (ASA grade I & II) were enrolled in the study.

All the patients received the standard premedication as per the standard protocol of our institution and no sedatives or analgesics apart from the study drugs were administered. Total patients were randomly divided into the two groups of 28 patients each using the block randomization. In first group, patients received the Buprenorphine drug and in second group patients received the midazolam drug. Duration of analgesia, pain and side effects of drugs were compared between the two groups. Written informed consent was taken from the patients and standard ethical guidelines were followed throughout the study.

Pain and Side effects: Visual analogue scale (VAS) score was used to analyze the magnitude of the pain. The overall VAS score ranges from 0 to 10 with 0 mean no pain and 10 mean severe pain. The VAS score was analyzed after postoperative duration of 0 hrs, 6 hrs, 12 hrs, 18 hrs and 24 hrs and was compared between the two groups. Side effects including the nausea sedation, vomiting, retention of urine, and pruritus was analysed between the two groups.

Statistical analysis: Data was analyzed using the SPSS 27.0 software. Mean and standard deviation was calculated for the quantitative variables whereas qualitative variables were presented as number and percentages. Unpaired t-test was used to compare the means of two quantitative variables whereas chi-square test was used to compare qualitative variables. All statistical tests were carried out by taking the p value<0.05 as statistically significant.

Results

The mean of the patients in the buprenorphine group was 35.39 ± 8.91 years and was 34.71 ± 9.29 years in the midazolam group with no significant difference between the mean age of the two groups. Most of patients belong to the age group of 20-30 years (35.7% vs 39.3%) followed by 31-40 years (32.1% vs 35.7%) and 41-50 years (32.1% vs 25%) in both group with no significant difference in the age groups (Table 1 and Figure 1).

Table 1: Age distribution of the patients

Age groups	Buprenorphine group		Midazolam group		P Value
	Number	Percentage	Number	Percentage	
Mean age	35.39 ± 8.91		34.71 ± 9.29		0.781
20-30 Yrs	10	35.7	11	39.3	0.839
31-40 Yrs	9	32.1	10	35.7	
41-50 Yrs	9	32.1	7	25	
Total	28	100	28	100	

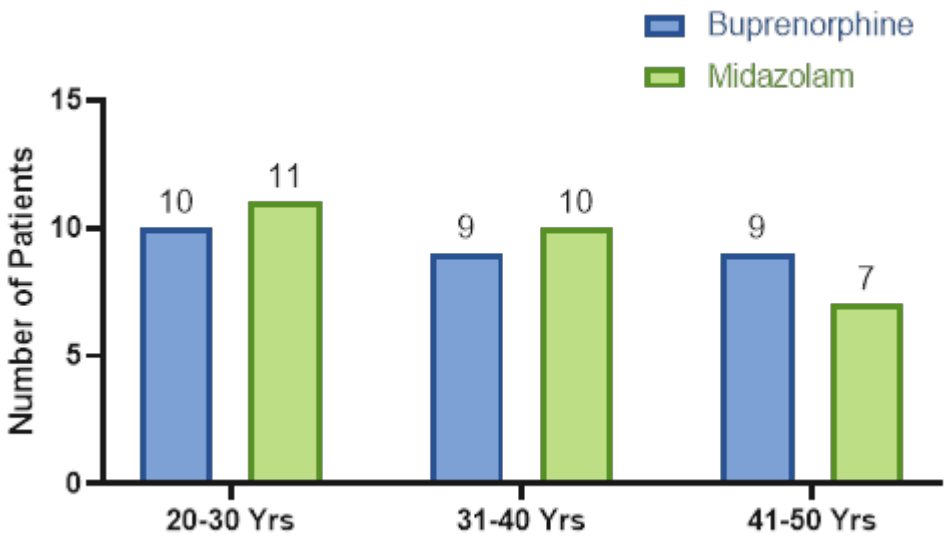

Figure 1: Age distribution of the patients

The mean duration of analgesia was 19.29 ± 2.94 hours in midazolam group which is significantly higher than the buprenorphine group in which mean duration was 14.50 ± 5.49 hours. Most of patients (57.1%) in the midazolam group have the duration of analgesia 19-24 hours whereas in buprenorphine group most of patients have the duration of analgesia 6-12 hours with difference being statistically significant between the two groups (Table 2 and Figure 2).

Table 2: Duration of analgesia

Duration of analgesia	Buprenorphine group		Midazolam group		P Value
	Number	Percentage	Number	Percentage	
Mean duration	14.50 ± 5.49		19.29 ± 2.94		0.001*
6-12 Hrs	11	39.3	0	0	0.001*
13-18 Hrs	8	28.6	12	42.9	
19-24 Hrs	9	32.1	16	57.1	
Total	28	100	28	100	

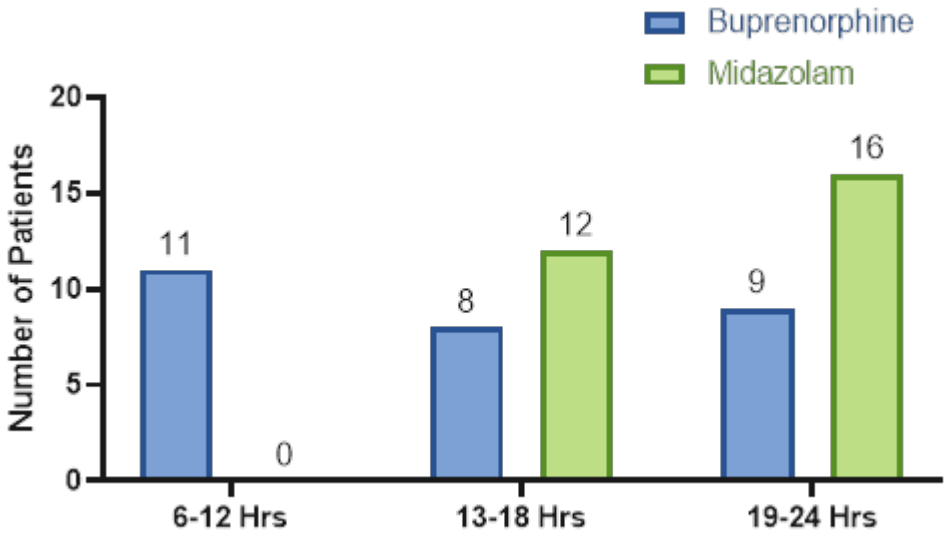

Figure 2: Duration of analgesia

VAS score was found to be decrease significantly over the duration of 24 hours in midazolam group as compared to the buprenorphine group. After 18 hours of postoperative duration, VAS score was 0 in all cases of midazolam group (Table 3 and Figure 3).

Table 3: VAS Score

VAS Score	Buprenorphine group		Midazolam group		P Value
	Mean	SD	Mean	SD	
0 hour	2.39	1.066	2.18	0.819	0.781
6 hours	1.64	0.621	1.50	0.638	0.001*
12 hours	0.86	0.651	0.56	0.57	0.030*
18 hours	0.32	0.476	0	0	0.001*
24 hours	0.11	0.315	0	0	0.001*

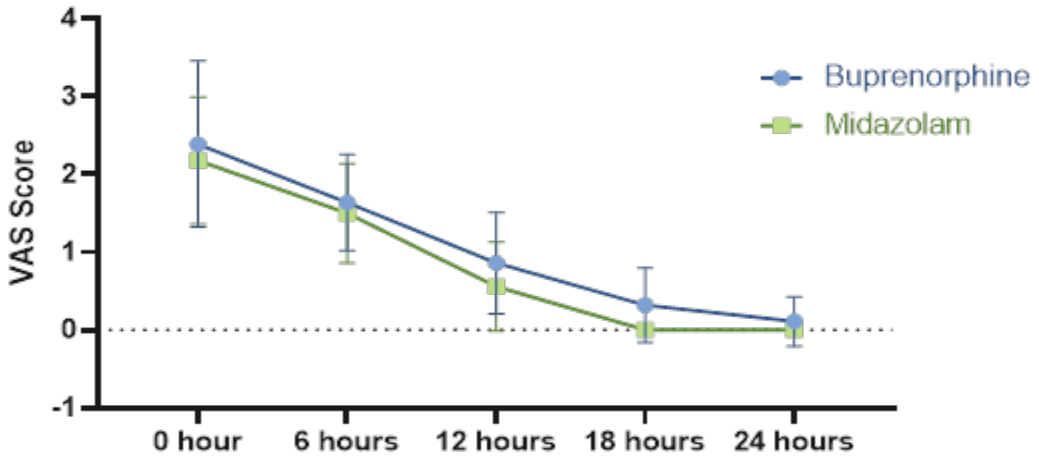

Figure 3: VAS Score

In the buprenorphine group nausea was occurred in 6 (21.4%) patients, sedation reported in 2 (7.1%) patients, vomiting occurred in 3 (10.7%) patients, retention of urine occurred in 2 (7.1%) patients and pruritus was observed in 1 (3.6%) patient. In the midazolam group, nausea was occurred in 2 (7.1%) patients; sedation reported in 3 (10.7%) patients, vomiting occurred in 1 (3.6%) patient. The midazolam group observed to have fewer side effects as compared to the buprenorphine group but the difference was not statistically significant (Table 4 and Figure 4).

Table 4: Side effects

Side effects	Buprenorphine group		Midazolam group		P Value
	Number	Percentage	Number	Percentage	
Nausea	6	21.4	2	7.1	0.467
Sedation	2	7.1	3	10.7	
Vomiting	3	10.7	1	3.6	
Retention of urine	2	7.1	0	0	
Pruritus	1	3.6	0	0	

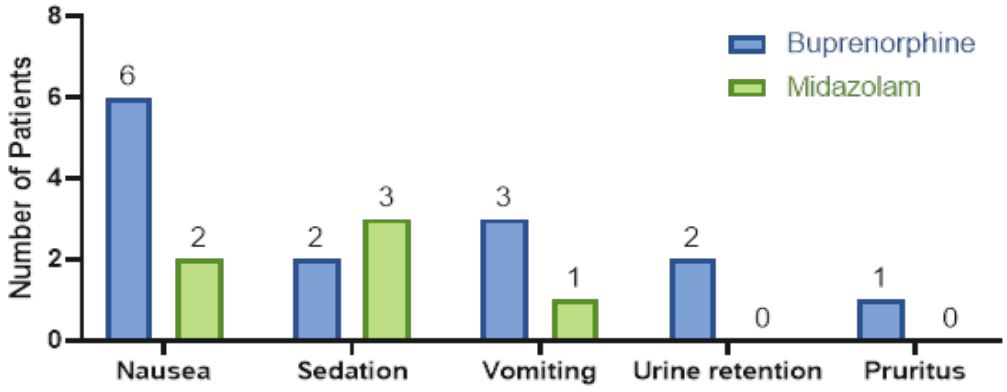

Figure 4: Side effects

Discussion

In the present study, mean of the patients in the buprenorphine group was 35.39 ± 8.91 years and was 34.71 ± 9.29 years in the midazolam group with no significant difference between the mean age of the two groups. In the previous study by Shah et al., 29.1 ± 8 years which is similar to the present study [8]. In the study by Muruganantham and Azar, mean of the patients in the buprenorphine group was 30 ± 11.39 years and was 30 ± 9.56 years in the midazolam group [3].

In the present study, the mean duration of analgesia was 19.29 ± 2.94 hours in midazolam group which is significantly higher than the buprenorphine group in which mean duration was 14.50 ± 5.49 hours. Similarly in the previous study by Patel and Desai, mean duration of analgesia in midazolam group (23.74 ± 1.0 hours) was significantly higher than the buprenorphine group (16.35 ± 7.98 hours) [9].

In the previous study by Shah et al., duration of postoperative analgesia in the in the midazolam group was 21.33 ± 12.69 h which is significantly higher as compared to the bupivacaine plus buprenorphine group (9.24 ± 2.57 h) [8]. Batra et al found that addition of midazolam to bupivacaine produces better postoperative analgesia (up to 6 hours) without prolonging recovery [10].

In the present study, VAS score was found to be decrease significantly over the duration of 24 hours in midazolam group as compared to the buprenorphine group. After 18 hours of postoperative duration, VAS score was 0 in all cases of midazolam group. Similar observations have been made in the study by Patel and Desai. The mean VAS score was significantly lower in the midazolam group as compared to the buprenorphine group over the postoperative duration of 24 hours [9]. In the previous study by Shah et al., VAS score was found to be decrease significantly over the duration of 24 hours in the midazolam group as compared to the bupivacaine plus buprenorphine group [8]. However, in the study by Muruganantham and Azar, the duration of analgesia was significantly higher in buprenorphine than fentanyl and midazolam groups (446±16.99 mins Vs 225±19.37 mins and 263 ± 14.63 mins) [3]. Batra et al found a significantly higher VAS score in bupivacaine group as compared to midazolam group [10].

In the present study, nausea was occurred in 6 (21.4%) patients, sedation reported in 2 (7.1%) patients, vomiting occurred in 3 (10.7%) patients, retention of urine occurred in 2 (7.1%) patients and pruritus was observed in 1 (3.6%) patient in the buprenorphine group. In the midazolam group, nausea was occurred in 2 (7.1%) patients, sedation reported in 3 (10.7%) patients, vomiting occurred in 1 (3.6%) patient. The midazolam group observed to have less side effects as compared to the buprenorphine group but the difference was not statistically significant. In the study by Patel and Desai, side effects including nausea (46.67%) and vomiting (20%) were observed in the buprenorphine group whereas only sedation (13.33%) was observed in the midazolam group [9]. In the previous study by Shah et al., the midazolam group observed to have less side effects as compared to the bupivacaine plus buprenorphine group [8].

Capogna et al observed nausea and vomiting during post-surgical period in 34 % and 40% of patients who received 30 mcg and 45 mcg of buprenorphine with hyperbaric bupivacaine 0.5% respectively [11]. Sen et al studied on elderly patients who undergone various lower limb surgeries and he observed nil adverse effects except nausea and vomiting during post-surgical period in 33% of patients with higher doses of 300 mcg of buprenorphine with one ml of hyperbaric bupivacaine 0.5% intrathecally [12]. Kim et al found no episodes of hypotension, bradycardia, sedation or dizziness in any patient receiving intrathecal midazolam [13].

There are few limitations of the present study which need to be highlighted. First limitation is the small sample size of the study population. Further studies with ample sample size are needed to be conducted to validate the findings of this study. Another limitation is that we do take any control group and duration of follow was only 24 hours. Postoperative complication beyond this period, duration of hospital stay and cost of therapy are further needed to be compared.

Conclusion

The mean duration of analgesia was significantly higher in midazolam group than the buprenorphine group. Pain found to be decrease significantly over the duration of 24 hours in midazolam group as compared to the buprenorphine group. The midazolam group observed to have less side effects as compared to the buprenorphine group.

Midazolam was found to be more effective analgesic as compared to the buprenorphine for abdominal surgeries as it provides prolonged duration of anesthesia with lower pain and side effects. Further studies are needed to be conducted to validate the findings of this study.

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