E-ISSN2250-0944
ISSN2250-1150
doi:10.48047/ijprt/16.01.627

Research Article

A COMPARATIVE EVALUATION OF DEXAMETHASONE VERSUS MAGNESIUM SULPHATE AS ADJUVANTS WITH BUPIVACAINE IN ULTRASOUND−GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK FOR POST−OPERATIVE ANALGESIA IN OPEN UNILATERAL INGUINAL HERNIA SURGERIES.

Dr.Jalaja Praveena Badugu[1*], Dr.Lakshmi Sakunthala Vattikuti[2], Dr Cheekatla Srivallika[3]

[1*]Assistant Professor, Department of Anaesthesia, Rangaraya Medical College, Kakinada.

[2]Assistant Professor, Department of Anaesthesia, Rangaraya Medical College, Kakinada.

[3]MDAnaesthesia.

Corresponding Author: Dr.Jalaja Praveena Badugu
Assistant Professor, Department of Anaesthesia, Rangaraya Medical College, Kakinada.

Date received: 01-04-2025, Date of acceptance:04-04-2025, Date of Publication: 15-04-2025.

Abstract

Introduction: Inguinal hernia repair stands out as one of the most often performed surgeries and is commonly associated with moderate to severe postoperative pain, especially within the first postoperative day. Inadequate control of this pain can hinder recovery, prolong hospital stay, and potentially contribute to the development of chronic post-surgical pain.

Materials and methods: The study, approved by the Institutional Ethics Committee and with written informed consent obtained from all participants, involved 60 patients with ASA status I and II scheduled for elective open unilateral Inguinal hernia surgery patients, all receiving spinal anaesthesia, were enrolled in the study. Sample size is calculated on the basis of preliminary pilot study with ten patients in each group. There is a clinically significant difference in 24 hours between two groups. Based on this finding, we estimated minimum sample size with 95% level of confidence and 80% power of study and type 1 error of 0.05 to be 60 patients, 30 in each study group.

Results: the age-wise distribution of participants in Group BM and Group BD. Group BM had a total of 30 participants, with 7(23.3%) in the 20-30 age range, 9(30%) in 31-40, 7(23.3%) in 41-50, and 7(23.3%) in 5-60 years. Group BD also had 30 participants, of which 2(6.7%) were aged 20–30, 11(36.7%) were aged 31-40, 9 (30%) were in the41–50 age group, and 8 (26.7%) in the 51–60 bracket. The total sample of 60 subjects had the most representation from the 31–40 years age group(33.3%), followed by 41–50 (26.7%), 51–60(25%), and 20–30(15%).The mean age was 40.13±12.63 years in Group BM, 44.16±10.91 years in Group BD, and 42.15±11.88 years overall.

Conclusion: The present study concludes that Dexamethasone is superior to Magnesium sulphate as adjuvant to bupivacaine in ultrasound-guided transversus abdominis plane (TAP) block for postoperative analgesia in open unilateral inguinal hernia surgeries. Patients who received dexamethasone experienced a significantly longer duration of analgesia and delayed requirement for the first rescue analgesic.

Key Words: Inguinal hernia repair, ultrasound-guided trans versus abdominis plane, analgesia.

INTRODUCTION

Inguinal hernia repair stands out as one of the most often performed surgeries and is commonly associated with moderate to severe postoperative pain, especially within the first postoperative day. Inadequate control of this pain can hinder recovery, prolong hospital stay, and potentially contribute to the development of chronic post-surgical pain.[1]

The TAP block is a regional anaesthesia technique in which a local anaesthetic is deposited Along the fascial interface internal oblique and transversus abdominis muscles targeting the thoracolumbar nerves (T10–L1). Although this technique primarily provides somatic pain relief, Various investigations have supported its effectiveness in extending postoperative analgesia and Lessening dependence on opioid analgesics during the initial 24–48 hours after lower abdominal surgery.[2]

To enhance and prolong the analgesic effects of TAP blocks, various adjuvants have been combined with local anaesthetics, including dexamethasone, magnesium sulphate ($MgSO_4$), adenosine, buprenorphine, and dexmedetomidine, with mixed outcomes.[3]

Magnesium sulphate acts as a non-competitive antagonist of N-methyl-D-aspartate (NMDA) receptors, which are involved in pain modulation and central sensitisation. By inhibiting voltage-dependent calcium channels, magnesium plays a significant role in reducing pain transmission and inflammation.[4]

Dexamethasone, a long-acting corticosteroid, exerts its analgesic effect through multiple mechanisms. It inhibits nociceptive C-fibre activity by binding to glucocorticoid receptors, suppresses inflammatory pathways, and induces local vasoconstriction, all of which contribute to prolonged pain relief.[4]

Despite the proven efficacy of both agents, there is a lack of direct comparative studies evaluating dexamethasone versus magnesium sulphate as adjuvants in TAP utilized in open inguinal hernia operations. Consequently, this investigation was undertaken to compare the duration of analgesia provided by bupivacaine combined with either dexamethasone or magnesium sulphate in TAP block for unilateral open inguinal hernia surgeries. The study also aimed to assess postoperative analgesic consumption, side effect profiles, and overall patient satisfaction.

MATERIALS AND METHODS

The study, approved by the Institutional Ethics Committee and with written informed consent obtained from all participants, involved 60 patients with ASA status I and II scheduled for elective open unilateral Inguinal hernia surgery patients, all receiving spinal anaesthesia, were enrolled in the study.

Study design: Prospective randomized double blinded study.

Duration of the study: 18 months (May 2023 to October 2024).

Sample size: The sample size of the present study is 60(30 per group)

Source of the data: Patients who are undergoing inguinal hernia surgeries in GGH, Kakinada.

Inclusion Criteria:

1. Age range between 20 and 60 years.

2. ASA physical status of I-II according to American Society of Anaesthesiologists classification.

3. Patients' willingness to participate in the research.

Exclusion Criteria:

1. History of allergy to drugs used in the study

2. History of substance abuse

3. BMI of>35

4. ASA physical status of III–IV

5. Patients with psychosis and gross neurological disorders.

Sample size:

Sample size is calculated on the basis of preliminary pilot study with ten patients in each group. There is a clinically significant difference in 24 hours between two groups.

Based on this finding, we estimated minimum sample size with 95% level of confidence and 80% power of study and type 1 error of 0.05 to be 60 patients, 30 in each study group.

A computer-generated randomization list was used to randomly assign patients to one of the two treatment groups. A double-blind method was followed, where an anaesthesiologist not involved in the study prepared the solution according to the assigned group. The prepared solution was then handed to the investigator, who The TAP block was administered following spinal anesthesia, and the investigator was blinded to the group assignment.

Method of Study

Pre-anaesthetic assessment was conducted during the pre-operative visit, and the anaesthesia procedure along with the (NRS) for pain was explained to the patients. The NRS, ranging from

0 (no pain) to 10 (worst pain), is widely used for pain assessment. Patients adhered to standard nil per oral guidelines.

In the operating room, intravenous access was established, and IV fluids were initiated. Standard ASA monitoring, including SpO2, ECG, and NIBP, was implemented, and baseline parameters recorded. Under sterile conditions, spinal anesthesia was administered with 3 ml of 0.5% heavy bupivacaine at the L3–L4 or L4–L5 level, employing a 25 G 'Quincke' spinal needle. Targeting a sensory level of T6.

During surgery, continuous vital sign monitoring was performed, with NIBP measured every 5 minutes. Post-surgery, "a USG-guided unilateral TAP block was administered on the surgical side with an 80 mm 22 G Stimuplex needle. The BD group received 20 ml of 0.25% bupivacaine with 8 mg of dexamethasone, while the BM group received 20 ml of 0.25% bupivacaine mixed with 250 mg of magnesium sulphate (MgSO4), ensuring equal total volume in both groups".

Monitoring

Each patient received 15 mg/kg of paracetamol intravenously every 8 hours. Tramadol was used for rescue analgesia at a dose of 2 mg/kg IV, either on request from the patient or when the NRS score reached ≥4. The analgesic duration was determined by the time after the local anesthetic was administered and before the first dose of tramadol.

Observations included the time of the first tramadol demand, total tramadol consumption with in the first 24 hours post-surgery, NRS scores during rest and movement, patient satisfaction with pain management (measured on a three-point scale:0=not satisfied,1=some what satisfied, 2= fully satisfied), and any side effects. Patients experiencing nausea and/or vomiting received rescue antiemetics, specifically on dansetron at 4 mg IV.

Haemodynamic parameters such as Heart rate, systolic and diastolic blood pressure, mean arterial pressure, and peripheral oxygen saturation were regularly checked during the procedure over a 24-hour period.

Primary Outcome& Statistical Analysis

The key outcome of this study is to compare the duration of analgesia between MgSO4 and dexamethasone when used as adjuvants to bupivacaine. Our pilot study, which included 20 patients (10 in each group), found that the BM group had a mean analgesia duration of 389±31 minutes, compared to 422 ± 44 minutes in the BD group. A sample size of 30 patients per group was calculated, ensuring a 95% confidence interval and 95% power. For statistical analysis, continuous variables will be assessed using the independent samples Student's t-test, while the Chi-square test will be used for discrete variables. Data will be presented as mean ± standard deviation or as numbers (percentages). Time to the first dose of pain relief will be analyzed via Kaplan-Meier survival analysis and log-rank test. A p-value of < 0.05 will be considered significant. Baseline characteristics such as age, sex, height, weight, and surgery duration will be compared between groups.

RESULTS

Table 1: Distribution based on Age in years

	Group BM		Group BD		Total	
	N	%	N	%	N	%
20–30	7	23.3%	2	6.7%	9	15%
31–40	9	30%	11	36.7%	20	33.3%
41–50	7	23.3%	9	30%	16	26.7%
51–60	7	23.3%	8	26.7%	15	25%
Total	30	100%	30	100%	60	100%
Mean Age	40.13±12.63		44.16±10.91		42.15±11.88	
Chi square test=3.29, p=0.34,Not statistically significant						

This table displays the age-wise distribution of participants in Group BM and Group BD. Group BM had a total of 30 participants, with 7 (23.3%) in the 20–30 age range, 9(30%) in 31–40,7(23.3%) in 41–50, and 7(23.3%) in 51–60 years. Group BD also had 30 participants, of which 2(6.7%) were aged 20–30, 11(36.7%) were aged 31-40, 9 (30%) were in the 41–50 age group, and 8 (26.7%) in the 51–60 bracket. The total sample of 60 subjects had the most representation from the 31–40 years age group (33.3%), followed by 41–50 (26.7%), 51–60(25%), and 20–30(15%).The mean age was 40.13±12.63 years in Group BM, 44.16±10.91 years in Group BD, and 42.15±11.88 years overall.

Table 2: Distribution based on Gender

	Group BM		Group BD		Total	
	N	%	N	%	N	%
Male	13	43.3%	18	60%	31	51.7%
Female	17	56.7%	12	40%	29	48.3%
Total	30	100%	30	100%	60	100%
Chi square test=1.64,p=0.20, Not statistically significant						

This table outlines the gender distribution among the two groups. Group BM consisted of 13 males (43.3%) and 17 females (56.7%), where as Group BD had 18 males (60%) and 12 Females (40%). The overall sample of 60 participants included 31 males (51.7%) and 29 Females (48.3%).

Table 3: Distribution based on ASA status

	Group BM		Group BD		Total	
	N	%	N	%	N	%
ASAI	16	53.3%	14	46.7%	30	50%
ASAII	14	46.7%	16	53.3%	30	50%
Total	30	100%	30	100%	60	100%
Chi square test=0.26,p=0.60, Not statistically significant						

The table categorizes patients by ASA (American Society of Anesthesiologists) physical status classification. In Group BM, 16 individuals (53.3%) were ASAI and 14 (46.7%) were ASAII. Group BD had 14 (46.7%) participants in ASAI and 16 (53.3%) in ASAII. The total population had an equal division with 30 individuals each in ASAI and ASA II, representing 50% respectively.

Table 4: Distribution based on Weight

	Group BM	Group BD	P value
Weight in Kg	52.40±4.32	52.43±4.73	0.97
Height in cm	166.54 ±7.82	165.21 ±6.54	0.56
BMI in kg/m2	23.12 ±1.45	23.02 ±1.76	0.37
p>0.05, not statistically significant			

This table presents average values for weight, height, and BMI in both groups. Group BM had a mean weight of 52.40±4.32 kg, mean height of 166.54±7.82 cm, and BMI of 23.12±1.45kg/m². Group BD reported a mean weight of 52.43±4.73kg, height of 165.21±6.54 cm, and BMI of 23.02±1.76 kg/m².

Table 5: Duration of surgery

	Group BM	Group BD	P value
Duration of surgery	51.4±7.89	53.7±8.12	0.56
p=0.56, not statistically significant			

The table shows the mean duration of surgery in both groups. Group BM had a mean surgical duration of 51.4±7.89 minutes, while Group BD had a slightly longer duration at 53.7 ± 8.12 minutes.

Table 6: Total Duration of Analgesia (Mins)

	Group BM	Group BD	P value
Total Duration of Analgesia (Mins)	408±14.10	525.33±18.89	0.001*
p=0.001,statistically significant			

This table indicates the total duration for which analgesia lasted post operatively. Group BM had mean analgesia duration of 408±14.10 minutes, where as Group BD had a higher average of 525.33 ± 18.89 minutes.

Table 7: Time of First Rescue Analgesia (Mins)

	Group BM	Group BD	P value
Time Of First Rescue Analgesia (Mins)	417.67 ±15.01	535.33±18.89	0.001*
p=0.001,statistically significant			

The table presents the time at which patients first required rescue analgesia. Group BM had a mean time of 417.67±15.01 minutes, while in Group BD it was535.33±18.89 minutes.

Table 8: NRS score

	Group BM		Group BD		P Value
	Mean	SD	Mean	SD	
At movement	1.67	0.76	0.30	0.47	0.001*
At rest	2.23	0.90	0.60	0.50	0.001*
p=0.001,statistically significant					

This table displays the Numeric Rating Scale (NRS) pain scores at rest and during movement. At rest, Group BM reported a mean score of 2.23±0.90, while Group BD had 0.60±0.50.

During movement, Group BM had a mean score of 1.67 ±0.76, and Group BD had 0.30 ± 0.47.

Table 9: Complications

	Group BM		Group BD		Total	
	N	%	N	%	N	%
Yes	0	0%	0	0%	0	0%
No	30	100%	30	100%	60	100%
Total	30	100%	30	100%	60	100%

This table reports the occurrence of complications. Both Group BM and Group BD had 0 cases of complications (0%) out of 30 patients each, indicating no complications were observed in the study population of 60.

Table 10: Patient satisfaction score

	Group BM		Group BD		Total	
	N	%	N	%	N	%
91– 100	6	20.00%	11	36.67%	17	28.33%
81– 90	7	23.30%	11	36.67%	18	30.00%
71– 80	2	6.70%	3	10.00%	5	8.33%
61– 70	8	26.70%	3	10.00%	11	18.33%
51– 60	1	3.30%	2	6.67%	3	5.00%
41– 50	6	20.00%	0	0.00%	6	10.00%
Total	30	100%	30	100.00%	60	100.00%
Chi square test=12.46,p=0.03*, statistically significant						

This table categorizes patients based on satisfaction scores ranging from 41 to 100. In Group BM, scores were distributed as follows: 6(20%) scored 91–100, 7(23.3%) Scored 81–90, 2(6.7%) scored 71–80, 8(26.7%) scored 61–70, 1(3.3%) scored51-60, and 6(20%) scored41–50.

In Group BD: 11(36.67%) scored 91–100, 11(36.67%) scored81–90, 3(10%) scored 71-80, 3(10%) scored 61–70, 2(6.67%) scored 51–60, and none scored 41–50.

Table 11: Total amount of rescued rug used

	Group BM	Group BD	P value
Total amount of Rescued rug used	250mg	150 mg	0.01*

This table summarizes the total quantity of rescue analgesic drug administered. Group BM used 250 mg while Group BD used 150 mg.

Table 12: Heart rate

	Group BM		Group BD		P Value
	Mean	SD	Mean	SD	
0 hr	83.20	6.23	83.40	5.97	0.899
2 Hr	84.80	6.61	81.00	6.01	0.023
4 hr	83.47	5.94	79.13	5.93	0.006
8 hr	81.67	6.13	77.13	5.67	0.004
12 hr	79.87	6.01	77.20	5.77	0.085
24hr	79.73	5.77	76.47	5.79	0.033

The table presents mean heart rates at different time intervals post operatively. At 0 hr, Group BM had a mean of 83.20 bpm, and Group BD had 83.40 bpm. At 2 hr: BM – 84.80, BD–81.00. At 4 hr: BM–83.47, BD–79.13. At 8hr: BM–81.67, BD–77.13. At 12 hr: BM–79.87, BD–77.20. At 24 hr: BM – 79.73, BD –76.47.

Table 13: SBP

	Group BM		Group BD		P Value
	Mean	SD	Mean	SD	
0 hr	124.20	6.33	127.40	7.43	0.078
2 Hr	126.57	8.97	124.67	7.32	0.373
4 hr	115.87	11.88	113.60	11.05	0.447
8 hr	117.40	9.57	115.07	10.68	0.377
12 hr	116.20	8.75	108.73	8.72	0.002
24 hr	115.40	10.32	108.20	10.11	0.008

The table presents mean SBP values at different time intervals. At 0 hr: BM – 124.20 mmHg, BD–127.40 mmHg. At 2hr: BM–126.57, BD–124.67. At 4hr: BM–115.87, BD–113.60. At 8hr: BM–117.40, BD–115.07.At 12 hr: BM–116.20, BD–108.73. At 24 hr: BM–115.40, BD–108.20.

Table14: DBP

	Group BM		Group BD		P Value
	Mean	SD	Mean	SD	
0 hr	77.00	5.38	78.87	5.25	0.076
2 Hr	79.77	6.64	78.23	5.67	0.340
4 hr	73.73	6.72	71.80	6.48	0.261
8 hr	73.00	5.94	70.73	6.18	0.153
12 hr	70.80	5.40	66.33	5.44	0.002
24 hr	70.47	6.62	66.60	6.54	0.027

This table provides mean DBP values across time points. At 0 hr: BM–77.00 mm Hg, BD–78.87. At 2 hr: BM–79.77, BD–78.23. At 4hr: BM–73.73, BD–71.80.At8 hr:BM–73.00, BD–70.73. At12hr: BM–70.80, BD–66.33. At 24 hr:BM–70.47, BD–66.60.

Table 15: MAP

	Group BM		Group BD		P Value
	Mean	SD	Mean	SD	
0 hr	92.73	5.07	95.71	5.17	0.028
2 Hr	95.37	6.78	93.71	5.69	0.310
4 hr	87.78	8.07	85.73	7.70	0.320
8 hr	87.80	6.85	85.51	7.44	0.220
12 hr	85.93	6.25	80.47	5.73	0.001
24 hr	85.44	7.54	80.47	7.05	0.011

This table lists MAP values for both groups at various time points. At 0 hr: BM–92.73mmHg, BD–95.71.At 2 hr: BM–95.37, BD–93.71.At 4 hr: BM–87.78, BD–85.73. At 8 hr: BM–87.80, BD–85.51. At 12 hr: BM–85.93, BD–80.47. At 24 hr: BM–85.44, BD–80.47.

Table 16: SPO2

	Group BM		Group BD		P Value
	Mean	SD	Mean	SD	
0 hr	99.47	0.51	99.53	0.51	0.613
2 Hr	99.50	0.51	99.53	0.51	0.800
4 hr	99.53	0.51	99.43	0.50	0.447
8 hr	99.63	0.49	99.57	0.50	0.605
12 hr	99.33	0.48	99.53	0.51	0.122
24 hr	99.23	0.43	99.60	0.50	0.003

The table details oxygen saturation (SpO2) percentages at specified intervals. At 0 hr: BM–99.47%, BD –99.53%. At 2 hr: BM –99.50%, BD –99.53%. At 4 hr: BM –99.53%, BD–99.43%. At 8 hr: BM–99.63%, BD–99.57%. At 12 hr: BM–99.33%, BD 99.53%. At 24 hr: BM–99.23%, BD–99.60%.

DISCUSSION

Effective control of acute postoperative pain is central to enhanced recovery protocols and the prevention of longer-term morbidity. Open unilateral inguinal hernia repair one of the most frequently performed general-surgical procedures worldwide regularly elicits moderate-to-severe pain in the first 24 h after surgery. When inadequately treated, this acute pain can evolve into chronic post operative inguinal pain, which affects roughly 10-14% of patients and markedly impairs quality of life.[6]

A diverse array of analgesic methods has been explored as a result for hernia repair, including systemic non-opioid analgesics and opioids, wound infiltration with local anaesthetic, ilioinguinal–iliohypogastric (II/IH) nerve blocks, neuraxial techniques, and other multimodal combinations. Opioids are limited by dose-dependent adverse effects, while II/IH or wound-infiltration techniques may provide incomplete dermatomal coverage or be technically

variable.[7]

Ultrasound-guided transversus abdominis plane (TAP) block offers a pragmatic alternative: by bathing the thoracolumbar nerves in the fascial plane between the internal oblique and transversus muscles, it delivers reliable somatic analgesia to the antero lateral abdominal wall, spares motor function, is easy to learn, and carries a low complication rate. According to clinical studies, TAP blockade following inguinal hernia surgery can help alleviate early pain scores and opioid requirements without compromising haemodynamic stability.[8]

Because the duration of a single shot TAP block is governed largely by the pharmacodynamics of the local anaesthetic, investigators have evaluated a variety of perineural adjuvants to extend its effect. Both magnesium sulphate and dexamethasone have individually demonstrated the ability to prolong block duration and lessen opioid consumption in abdominal surgery. However, direct head-to-head evidence comparing these two inexpensive, widely available agents within a standardized TAP-block protocol for adult inguinal hernia open surgery remains scarce. Tackling this knowledge deficit was therefore the rationale for the present study.[9]

Age in Years

In the present study, the mean age was 40.13±12.63 years in Group BM and 44.16±10.91 years in Group BD. This is comparable to Imani et al.(2018), who reported mean ages of 40.7 ± 11 years (Group R) and 40.4 ± 12 years (Group RM), indicating a similar middle-aged adult population.

Rana et al.(2016)observed mean ages of 44.6±5.86 years (GroupB) and 45.63±7.03 years (Group BM), also closely matching the present study.

Gender

The gender distribution in the present study included 43.3% males and 56.7% females in Group BM, and 60% males and 40% females in Group BD.

In contrast, the studies by Rana et al.(2016) Shambhavi et al (2023) involved predominantly or entirely female (Rana) and male (Shambhavi) populations respectively due to the nature of surgeries performed-total abdominal hysterectomy (TAH) in the former and open inguinal hernia repair in the latter.

ASA status

In the present study, ASAI patients constituted 53.3% in Group BM and 46.7% in Group BD, while ASAII patients accounted for 46.7% and 53.3%, respectively. This distribution is balanced across both groups.

In the study by Rana et al. (2016), 80% of Group BM and 75% of Group B were ASA I, and the remainder were ASA II, showing a similar focus on low-risk patients.

Weight, Height, and BMI

In the present study, the mean weight was 52.40±4.32 kg in Group BM and 52.43 ± 4.73 kg in Group BD, with BMI values of 23.12 ± 1.45 and 23.02 ± 1.76 respectively. These values are within the normal BMI range. Shambhavi et al. (2023) reported mean weights of 62.9 ± 9.44 kg (BM) and 65.35 ± 8.67 kg (BD), with corresponding BMIs of 23.68 ± 2.82 and 24.25 ± 2.67.

Rana et al.(2016) noted BMI values of 23.16±1.64 for Group BM and 22.29±2.5 for GroupB, again comparable to the present study.

Duration of Surgery

The present study recorded a mean duration of surgery of 51.4±7.89 minutes in Group BM and 53.7±8.12 minutes in Group BD. These durations reflect moderately short procedures typical of lower abdominal surgeries.

Rana et al.(2016) reported longer durations for total abdominal hysterectomy, with Group BM averaging 90.50±16.73 minutes and Group B at 94.17±15.26 minutes.

Total Duration of Analgesia (Minutes)

The total duration of analgesia in the present study was 408±14.10 minutes in Group BM and 525.33 ± 18.89 minutes in Group BD. This suggests that dexamethasone significantly prolonged the analgesic effect.

Rana et al.(2016), who used 150 mg $MgSO_4$ as an adjuvant, observed a much longer analgesic duration of 968.00± 161.06 minutes for Group BM and only 397.67±92.84 minutes for bupivacaine alone.

Time of First Rescue Analgesia (Minutes)

In the present study, the mean time to first rescue analgesia was 417.67±15.01 minutes in Group BM and 535.33 ± 18.89 minutes in Group BD.

Shambhavi et al (2023) reported comparable findings: 422.50±51.95 minutes in the BM group and 596.13±57.93 minutes in the BD group. Rana et al.[72]. (2016) documented a much longer time in Group BM (968 ± 161.06 minutes), likely due to their methodology (bilateral TAP block after subarachnoid block and a different pain assessment interval).

NRS Score at Rest and Movement

The present study reported NRS scores of 2.23 ± 0.90 at rest and 1.67 ± 0.76 on movement in Group BM, while in Group BD, scores were 0.60±0.50 at rest and 0.30± 0.47on movement.

Shambhavi et al (2023) similarly observed significantly lower NRS scores in the BD group compared to the BM group across multiple time points, supporting the superior analgesic profile of dexamethasone.

Complications

In the present study, no complications were observed in either Group BM or Group BD (0% each). This is consistent with the findings from Rana et al.(2016), who reported no significant complications in either group, noting a comparable incidence of nausea and vomiting and no local or systemic side effects.

Patient Satisfaction Score

Patient satisfaction in the present study was higher in Group BD, with 36.67% scoring 91–100, and another 36.67% scoring 81–90. In contrast, Group BM had only 20% scoring 91–100 and 23.3% scoring 81–90.

Shambhavi et al (2023) similarly reported that 85% of patients in the BD group was fully satisfied, compared to only 25% in the BM group.[10]

CONCLUSION

The present study concludes that Dexamethasone is superior to Magnesium sulphate as adjuvant to bupivacaine in ultrasound-guided transversus abdominis plane (TAP) block for postoperative analgesia in open unilateral inguinal hernia surgeries. Patients who received dexamethasone experienced a significantly longer duration of analgesia and delayed requirement for the first rescue analgesic. Additionally, they reported lower pain scores both at rest and on movement, needed less total rescue analgesic, and had higher overall satisfaction levels. Hemodynamic parameters such as heart rate, blood pressure, mean arterial pressure, and oxygen saturation remained stable and within physiological limits throughout the monitoring period and no complications were reported confirming the safety of the adjuvants used.

REFERENCES

1. Rafi AN. Abdominal field block: a new approach via the lumbar triangle. Anaesthesia 2001;56(10):1024–6.
2. W. M. Rozen, T. M. N. Tran, M. W. Ashton, M. J. Barrington, J. J. Ivanusic, and G.I. Taylor, “Refining the course of the thoracolumbar nerves: A new understanding of the innervation of the anterior abdominal wall,” Clinical Anatomy, vol. 21, no. 4, pp. 325–333, 2008.
3. Brogi E, Kazan R, Giunta F, Hemmerling TM. Transversus abdominal plane block for postoperative analgesia: a systematic review and meta-analysis of randomized-controlled trials. Canadian Journal of Anesthesia 2016;63(10):1184.
4. R. Champaneria, L. Shah, J. Geoghegan, J. K. Gupta, and J. P. Daniels, “Analgesic effectiveness of transversus abdominis plane blocks after hysterectomy: A meta-analysis,” European Journal of Obstetrics & Gynecology and Reproductive Biology, vol. 166, no. 1, pp. 1–9, 2013.
5. Elkassabany N, Ahmed M, Malkowicz SB, Heitjan DF, Isserman JA, Ochroch EA. Comparison between the analgesic efficacy of transversus abdominis plane (TAP) block andplaceboinopen retropubicradicalprostatectomy:aprospective, randomized,double-blinded study. Journal of clinical anesthesia 2013;25(6):459-65.
6. Peng K, Ji F hai, Liu H yue, Wu S ru. Ultrasound-guided transversus abdominis plane

block for analgesia in laparoscopic cholecystectomy: a systematic review and meta-analysis. Medical Principles and Practice 2016;25(3):237–46.

7. Abdallah FW, Laffey JG, Halpern SH, Brull R. Duration of analgesic effectiveness after the posterior and lateral transversus abdominis plane block techniques for transverse lower abdominal incisions: a meta-analysis. British journal of anaesthesia 2013;111(5):721-35.
8. Maeda A, Shibata SC, Kamibayashi T, Fujino Y. Continuous subcostal oblique transversus abdominis plane block provides more effective analgesia than single-shot block after gynaecological laparotomy: a randomised controlled trial. European Journalof Anaesthesiology| EJA 2015;32(7):514–5.
9. Niraj G, Kelkar A, Hart E, Kaushik V, Fleet D, Jameson J. Four quadrant transversus abdominis plane block and continuous transversus abdominis plane analgesia: a 3-year prospective audit in 124 patients. Journal of Clinical Anesthesia 2015;27(7):579–84.
10. Hutchins JL, Kesha R, Blanco F, Dunn T, Hochhalter R. Ultrasound−guided subcostal transversus abdominis plane blocks with liposomal bupivacaine vs. non−liposomal bupivacaine for postoperative pain control after laparoscopic hand assisted donor nephrectomy: a prospective randomised observer−blinded study. Anaesthesia 2016;71(8):930-7.