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Original Article

Anaesthesia Section

Comparison of Intravenous Lignocaine versus Intravenous Magnesium Sulphate as Premedication for Haemodynamic Stability in Laparoscopic Surgery: A Randomised Controlled Trial

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ABSTRACT

Introduction: Laparoscopic surgeries currently represent the mainstay of surgical modalities. Pneumoperitoneum imposes significant intraoperative haemodynamic alterations, which are more pronounced in elderly patients and those with co-morbid conditions. Inadequate pain relief in the perioperative period may result in various physiological and psychological traumas. Therefore, effective premedication is required to attenuate haemodynamic responses during laryngoscopy and intubation while ensuring optimal postoperative recovery.

Aim: To compare the efficacy of intravenous lignocaine versus magnesium sulphate as premedication for perioperative analgesia, haemodynamic stability, and postoperative recovery in laparoscopic surgery under general anaesthesia.

Materials and Methods: This double-blinded, randomised controlled trial was conducted at Department of Anaesthesiology, Shrimati Bhikhiben Kanjibhai Shah Medical Institute & Research Centre (SBKS), Sumandeep Vidyapeeth Deemed to be University, Piparia, Vadodara, Gujarat, India, from January 2023 to June 2024. Sixty patients aged 18-65 years, American Society of Anaesthesiologists (ASA) physical status grade I-II, scheduled for elective laparoscopic surgery, were randomly divided into two groups. Group L (n=30) received lignocaine 2 mg/kg intravenously (i.v.), and Group M (n=30) received magn esium sulphate 30 mg/kg i.v. ten minutes before induction. Haemodynamic parameters {Heart Rate (HR), Blood Pressure (BP)} were monitored intraoperatively for 90 minutes, postoperative sedation scores, and complications were recorded. Data analysed using an Unpaired t-test and a Chi-square test. The p-value <0.05 is considered significant.

Results: Both groups were demographically comparable (mean age: 42.13±16.41 vs 42.33±15.82 years; gender: 50% male in both groups; weight: 68.40±11.19 vs 66.03±10.84 kg for groups L and M, respectively, all p-values>0.05). Throughout 90 minutes of intraoperative monitoring, group M showed superior haemodynamic stability. At one minute post intubation, percentage increase from baseline was significantly lower in group M compared to group L for HR (mean HR: 102.53±7.16 vs 80.07±5.17 bpm; 10.44% vs 40.78%, p-value <0.001), Systolic Blood Pressure (SBP) (mean SBP: 144.90±3.83 vs 127.43±7.09 mmHg; 4.48% vs 17.17%, p-value <0.001), Diastolic Blood Pressure (DBP) (mean DBP: 97.57±6.96 vs 85.60±5.65 mmHg; 11.13% vs 24.0%, p-value <0.001), and Mean Arterial Pressure (MAP: 113.35±5.30 vs 99.54±5.68 mmHg; 8.18% vs 21.0%, p-value <0.001). Group M showed better postoperative recovery with Ramsay Sedation Score (RSS) scores of 3 compared to 2 in group L at one hour postoperatively, and fewer complications (6.67% vs 23.33%).

Conclusion: Magnesium sulphate provides superior haemodynamic stability during laryngoscopy and intubation compared to lignocaine, with a better postoperative recovery profile in laparoscopic surgery. This study demonstrates that magnesium sulphate at 30 mg/kg is more effective than lignocaine 2 mg/kg in attenuating the haemodynamic stress response, offering a valuable premedication option for patients undergoing laparoscopic procedures, particularly those at risk for cardiovascular instability.

Keywords: Anaesthesia, Premedication, Stress response

INTRODUCTION

Laparoscopic surgery has revolutionised modern surgical practice through its minimally invasive approach, offering reduced postoperative pain, faster recovery, and shorter hospital stays. Despite these advantages, the management of pneumoperitoneum-induced haemodynamic changes remains a significant challenge. Current literature reveals conflicting evidence regarding the optimal premedication agent for attenuating the stress response during laryngoscopy and intubation in laparoscopic procedures [1-4]. While both lignocaine and magnesium sulphate have been used, there is limited head-to-head comparison data, particularly in the context of laparoscopic surgery, where pneumoperitoneum adds haemodynamic burden. This gap in knowledge necessitates a well-designed comparative study to guide clinical practice [5]. Although laparoscopic abdominal surgeries offer significant advantages such as reduced trauma and quicker recovery, managing pneumoperitoneum-induced haemodynamic changes remains challenging for anaesthesiologists during surgery. The creation of pneumoperitoneum with CO_2 insufflation induces significant physiological changes, including increased intra-abdominal pressure, systemic CO_2 absorption, and altered cardiovascular dynamics, particularly sudden increases in arterial blood pressure and Systemic Vascular Resistance (SVR) [1,2]. These haemodynamic alterations are triggered by elevated levels of vasopressin, catecholamines, renin, and angiotensin produced due to increased intra-abdominal pressure. These changes, combined with the haemodynamic stress responses during critical phases such as laryngoscopy and endotracheal intubation, present unique challenges for anaesthetic management [3,4]. The absorbed CO_2 can lead to hypercarbia and respiratory acidosis, while the increased intra-abdominal pressure

reduces venous return and increases SVR, potentially compromising cardiovascular stability in susceptible patients [5,6].

Various drugs have been explored for mitigating the haemodynamic responses induced by pneumoperitoneum, including alpha2 agonists, inhalation agents, opioids, beta-blockers, and Glyceryl Trinitrate (GTN). However, the traditional reliance on opioids for perioperative pain management has prompted exploration of opioid-free anaesthesia protocols due to associated complications including respiratory depression, postoperative nausea and vomiting, and potential for dependence [7,8]. Multimodal analgesia employing non opioid agents has emerged as an effective strategy to achieve adequate pain control while minimising adverse effects.

Intravenous lignocaine and magnesium sulphate have gained attention as valuable premedication agents. Lignocaine exerts its effects through sodium channel blockade, preventing nociceptive transmission and demonstrating anti-inflammatory properties [9]. Magnesium sulphate acts as a physiological calcium channel blocker and N-Methyl-D-Aspartate (NMDA) receptor antagonist, inhibiting catecholamine release and providing vasodilation [10,11].

The present study aimed to compare the efficacy of intravenous lignocaine versus magnesium sulphate as premedication in laparoscopic surgery, focusing on primary outcomes of haemodynamic stability (HR, BP, MAP) during laryngoscopy and intubation throughout 90 minutes of intraoperative monitoring, and secondary outcomes of postoperative recovery parameters, including sedation scores and complications.

MATERIALS AND METHODS

This double-blinded, randomised controlled trial was conducted at the Department of Anaesthesiology, SBKS Medical Institute and Research Centre, Piparia, Vadodara, Gujarat, India from January 2023 to June 2024. The study was approved by the Institutional Ethics Committee (SVU/SBKS/2022) and Clinical Trial Registry number: CTRI/2024/12/077689. Written informed consent was obtained from all participants.

Sample size calculation: Sample size was calculated based on pilot study data with 80% power and 5% significance level, yielding 30 patients per group

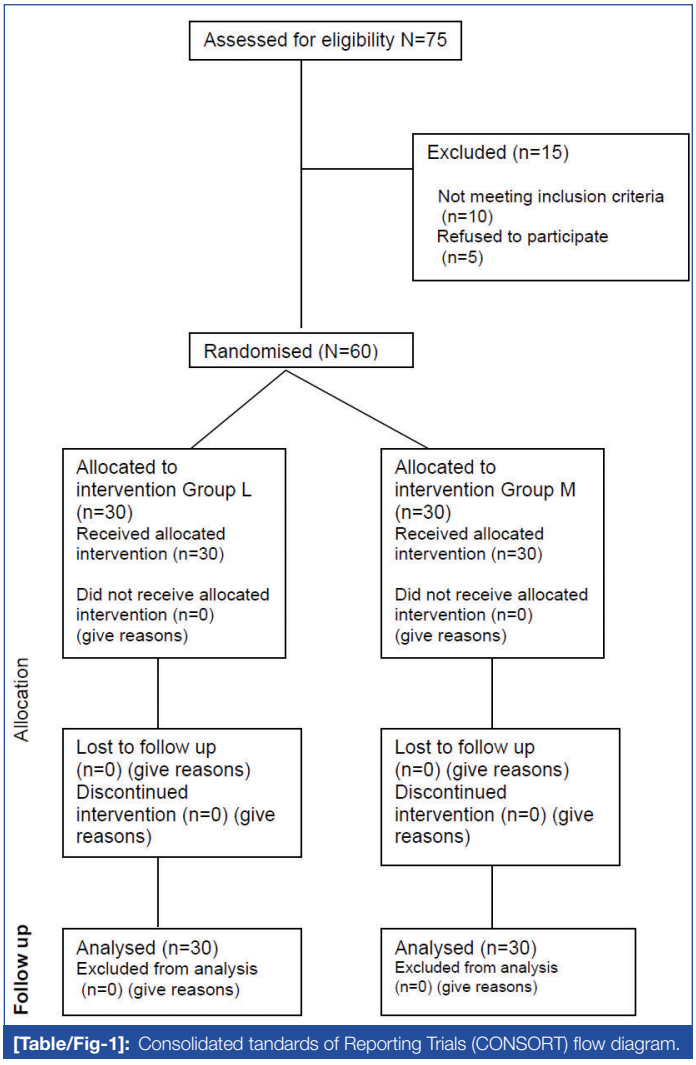
Inclusion criteria: The inclusion criteria were as follows: patients aged between 18 and 65 years, classified as ASA physical status I or II, and those scheduled for elective laparoscopic surgery under general anaesthesia.

Exclusion criteria: The exclusion criteria was as follows: individuals with significant cardiovascular, cerebrovascular, hepatic, or renal diseases; those with arrhythmias or heart block; patients with psychiatric disorders; pregnant women; individuals with known drug allergies; those with anticipated difficult airway; patients with neuromuscular diseases; serum magnesium levels greater than 2.5 mg/dL; and patients who were converted from laparoscopic to open surgery.

A total of 75 patients were assessed for eligibility. Ten patients did not meet the inclusion criteria, and five patients declined to participate. The remaining 60 patients were included and randomised.

Study Procedure

Patients were randomly allocated using computer-generated random number sequence in opaque sealed envelopes [Table/Fig-1]. The allocation sequence was generated by a statistician not involved in the study. Participants were enrolled by the primary investigator, and the anaesthesiologist administering the drugs assigned participants to interventions. This was a double-blind study where patients and outcome assessors were blinded to group allocation. The study drugs were prepared by an anaesthesiologist not involved in data collection.



[Table/Fig-1]: Consolidated tandards of Reporting Trials (CONSORT) flow diagram.

Group L (n=30) received lignocaine 2 mg/kg i.v. diluted in 50 mL normal saline, and group M (n=30) received magnesium sulphate 30 mg/kg i.v. diluted in 50 mL normal saline, administered as an infusion over 10 minutes, 10 minutes before induction. Drug dosages were based on established literature [12,13].

All patients received standardised premedication with glycopyrrolate (0.004 mg/kg), ondansetron (0.1 mg/kg), ranitidine (50 mg), and diclofenac sodium (75 mg) i.v. After pre-oxygenation, anaesthesia was induced with propofol (2 mg/kg) and succinylcholine (2 mg/kg). Anaesthesia was maintained with oxygen, nitrous oxide (1:1), and isoflurane. Muscle relaxation was achieved with atracurium (0.5 mg/kg loading dose, 0.5 mg/kg/hr maintenance). Postoperatively, patients received standard analgesic protocol with diclofenac 75 mg i.v. eight-hourly and tramadol 50 mg i.v. for breakthrough pain by Visual Analogue Scale (VAS>4).

Haemodynamic parameters were recorded at baseline, after drug administration, and at 1, 3, 5, 7, 10, 15, 30, 45, 60, 75, and 90 minutes intraoperatively. Postoperative sedation was assessed using Ramsay Sedation Score (RSS) at 1, 2, 4, 6, and 12 hours. Complications were documented.

STATISTICAL ANALYSIS

Data were analysed using Statistical Packages for Social Sciences (SPSS) version 26.0. Normality was assessed using the Shapiro-Wilk test. Categorical variables were expressed as frequencies and percentages, while continuous variables were expressed as mean±standard deviation. An Unpaired t-test was used for continuous variables and a Chi-square test for categorical variables. Multiple comparisons were adjusted using the Bonferroni correction. The p-value <0.05 was considered statistically significant. Intention-to-treat analysis was performed.

RESULTS

Both groups were comparable regarding demographic characteristics, with no significant differences in age, weight, gender distribution, ASA grading, or duration of surgery (p-value>0.05) as shown in [Table/Fig-2].

Parameters	Group L (Lignocaine) (n=30)	Group M (Magnesium) (n=30)	p-value
Age (years), (Mean±SD)	42.13±16.41	42.33±15.82	0.96
Gender distribution n (%)			
Male	15 (50.0%)	15 (50.0%)	1.00
Female	15 (50.0%)	15 (50.0%)	
Weight (kg), (mean±SD)	68.40±11.19	66.03±10.84	0.40
ASA Physical status n (%)			
ASA I	21 (70.0%)	22 (73.3%)	0.77
ASA II	9 (30.0%)	8 (26.7%)	
Duration of durgery (min), Mean±SD	106.93±25.68	104.97±27.57	0.76

[Table/Fig-2]: Demographic characteristics and baseline parameters.
Data presented as mean±SD or number (percentage). ASA: American society of anaesthesiologists; SD: Standard deviation; p<0.05 is considered statistically significant

Haemodynamic parameters: The haemodynamic responses at various time points throughout the 90-minute monitoring period are presented in [Table/Fig-3].

Heart rate showed significant differences between groups postdrug administration onwards. Group M demonstrated better attenuation of tachycardic response with significantly lower values at one and three minutes postintubation. The percentage increase from baseline at one minute was markedly higher in group L (40.78%) compared to group M (10.44%).

Blood pressure parameters showed significant differences postintubation. Group M demonstrated superior control with percentage increases from baseline significantly lower than group L for SBP (4.48% vs 17.17%), DBP (11.13% vs 24.0%), and MAP (8.18% vs 21.0%) at one minute post-intubation.

Postoperative parameters: Postoperative sedation assessment revealed different recovery profiles between the groups, as shown in [Table/Fig-4].

Time after extubation	Group L (Lignocaine) (n=30)	Group M (Magnesium) (n=30)	p-value
Immediately	2 (2-2)	3 (3-3)	<0.001*
1 hour	2 (2-2)	3 (3-3)	<0.001*
2 hours	2 (2-2)	3 (2-3)	0.001*
4 hours	2 (2-2)	2 (2-2)	1.000
6 hours	2 (2-2)	2 (2-2)	1.000
12 hours	2 (2-2)	2 (2-2)	1.000

[Table/Fig-4]: Postoperative sedation assessment using Ramsay Sedation Score.
*Data presented as median (interquartile range). p<0.05 was considered significant; Group M showed higher sedation scores as compared to group I, which was statistically significant

Postoperatively, both groups demonstrated comparable haemodynamic parameters throughout the 12-hour postoperative monitoring period, with no statistically significant differences in any parameter at any time point (all p-values >0.05), as shown in [Table/Fig-5].

Incidence of postoperative complications has been described in as shown in [Table/Fig-6], with no serious complications.

DISCUSSION

The present randomised controlled trial aimed to compare the efficacy of intravenous lignocaine versus intravenous magnesium sulphate in attenuating the pressor response during laryngoscopy and endotracheal intubation. The results demonstrate a superior effect of magnesium sulphate in maintaining haemodynamic stability throughout the 90-minute intraoperative monitoring period.

The current study found that group M consistently showed better HR control with significantly lower values at critical time points. The percentage increase from baseline at one minute was 40.78% in

Time Point	Heart Rate (bpm)			Systolic BP (mmHg)			Diastolic BP (mmHg)			MAP (mmHg)		
	Group L	Group M	p-value	Group L	Group M	p-value	Group L	Group M	p-value	Group L	Group M	p-value
Baseline	72.83±5.01	72.50±4.87	0.796	123.67±5.13	121.97±6.57	0.265	78.70±4.63	77.03±5.21	0.186	93.69±4.39	92.01±5.39	0.172
After drug	71.80±4.93	78.77±5.05	<0.001	123.37±5.47	122.40±6.81	0.548	79.53±4.83	77.63±5.10	0.145	94.14±4.67	92.56±5.52	0.229
1 min post	102.53±7.16	80.07±5.17	<0.001	144.90±3.83	127.43±7.09	<0.001	97.57±6.96	85.60±5.65	<0.001	113.35±5.30	99.54±5.68	<0.001
3 min post	97.53±7.24	78.63±4.73	<0.001	138.47±4.48	124.60±6.33	<0.001	96.00±6.83	85.97±5.48	<0.001	110.16±5.53	98.85±5.42	<0.001
5 min post	80.87±5.03	76.77±4.96	0.002	123.17±4.95	118.17±5.95	0.001	77.30±4.24	71.63±5.19	<0.001	92.59±3.93	87.14±5.15	<0.001
7 min post	77.77±5.01	74.13±4.82	0.005	121.83±5.37	118.03±5.97	0.011	76.87±4.73	71.13±4.84	<0.001	91.86±4.48	86.77±4.94	<0.001
10 min post	75.57±5.97	73.23±5.03	0.103	121.90±5.31	117.30±6.25	0.003	75.43±6.09	71.27±5.11	0.004	90.92±5.35	86.61±5.10	0.002
15 min post	74.77±5.31	72.97±4.73	0.169	121.30±5.05	117.10±6.59	0.007	76.33±5.97	70.20±5.56	<0.001	91.32±5.16	85.83±5.52	<0.001
30 min post	73.50±5.37	72.67±4.93	0.534	119.93±4.57	116.77±6.15	0.025	76.17±5.91	70.07±5.50	<0.001	90.76±4.93	85.63±5.44	<0.001
45 min post	72.80±5.09	72.53±5.21	0.841	119.77±5.60	117.17±5.94	0.089	75.87±5.17	70.30±5.74	<0.001	90.50±4.83	85.92±5.52	0.001
60 min post	72.63±5.21	72.13±5.46	0.714	120.53±5.38	117.43±5.84	0.035	75.83±5.30	70.07±5.73	<0.001	90.73±4.82	85.86±5.57	0.001
75 min post	72.10±5.42	72.23±4.75	0.920	119.10±5.82	117.63±6.09	0.333	75.97±5.92	70.40±6.21	0.001	90.35±5.59	86.14±5.86	0.005
90 min post	72.03±5.17	71.97±4.72	0.957	120.47±5.36	118.37±6.58	0.169	75.53±6.19	71.17±7.00	0.013	90.51±5.44	86.90±6.59	0.022

[Table/Fig-3]: Intraoperative haemodynamic parameters at various time points.
Data presented as mean±SD. BP: Blood pressure; MAP: Mean arterial pressure. p<0.05 is considered statistically significant

Time Point	Heart Rate (bpm)			Systolic BP (mmHg)			Diastolic BP (mmHg)			MAP (mmHg)		
	Group L	Group M	p-value	Group L	Group M	p-value	Group L	Group M	p-value	Group L	Group M	p-value
Post-op 1 hr	71.47±6.50	69.80±5.05	0.272	121.30±5.41	119.57±6.18	0.249	76.20±5.16	74.70±5.59	0.130	91.23±4.93	89.32±5.49	0.320
Post-op 2 hr	71.07±5.50	70.07±5.36	0.481	120.00±5.61	119.33±6.24	0.663	74.90±5.75	72.47±5.98	0.107	89.93±5.38	88.09±5.57	0.190
Post-op 4 hr	72.20±5.40	70.70±4.74	0.258	121.57±5.46	120.53±6.67	0.509	76.37±5.36	74.43±5.63	0.070	91.44±4.93	89.46±5.56	0.310
Post-op 6 hr	73.43±5.66	71.53±5.10	0.177	121.40±5.09	121.17±6.20	0.868	77.40±5.06	73.53±5.91	0.080	92.07±4.67	91.41±5.77	0.520
Post-op 12 hr	73.13±5.23	72.87±5.09	0.842	122.97±5.59	122.13±6.42	0.592	78.97±5.28	76.10±6.49	0.059	93.64±4.96	91.44±6.30	0.128

[Table/Fig-5]: Postoperative haemodynamic parameters.
Data presented as mean±SD. BP: Blood pressure; MAP: Mean arterial pressure; bpm: beats per minute. Group L: Lignocaine 2 mg/kg; Group M: Magnesium sulphate 30 mg/kg. p<0.05 is considered statistically significant

Complications	Group L (n=30)	Group M (n=30)	p-value
Bradycardia	3 (10.0%)	0	0.076
Hypotension	0	1 (3.33%)	0.313
Nausea/vomiting	2 (6.67%)	1 (3.33%)	0.554
Shivering	2 (6.67%)	0	0.150
Total	7 (23.33%)	2 (6.67%)	0.071

[Table/Fig-6]: Incidence of postoperative complications.
Data presented as a number (percentage)

group L versus 10.44% in group M (p-value <0.001). These findings align with recent studies in the literature. Khalid V et al., (2021) evaluated patients undergoing cardiac surgery. They found that both magnesium sulphate (50 mg/kg) and lidocaine (1.5 mg/kg) showed good efficacy for haemodynamic management after laryngoscopy and intubation, with magnesium sulphate proving to be a potential alternative [12]. Similarly, Misganaw A et al., (2021) reported that peak mean heart rates occurred immediately postintubation, with values of 99.82±10.86 bpm in the magnesium group and 96.35±9.25 bpm in the lignocaine group, both significantly lower than the control group's 120.0±11.04 bpm (p-value <0.001) [14]. A systematic review by Qi DY et al., (2013) examining 37 randomised controlled trials found that intravenous lidocaine significantly attenuated the cardiovascular response to intubation, though the effect was less pronounced than the current study findings with magnesium sulphate [15].

Group M demonstrated superior blood pressure control throughout the monitoring period, with the percentage change in SBP from baseline at one minute being 4.48% versus 17.17% in group L. Mendonça FT et al., (2017) compared lignocaine and magnesium sulfate in a double-blind randomised study of 56 patients and found that both drugs were effective in attenuating haemodynamic responses, with magnesium showing slightly better efficacy [13]. A recent systematic review by Greenwood J et al., (2021) analysing 15 studies concluded that magnesium sulphate at doses of 30-50 mg/kg provided consistent haemodynamic stability with minimal adverse effects [16]. The current study findings are also supported by Vamshidhar M et al., (2024), who demonstrated that magnesium sulphate reduced the need for additional antihypertensive agents intraoperatively compared to lignocaine [17].

The MAP changes followed similar patterns, with baseline values comparable between groups (group L: 93.69±4.39 mmHg; group M: 92.01±5.39 mmHg; p-value=0.172). Throughout the monitoring period, group M showed superior MAP control with a percentage increase of only 8.18% at one minute postintubation compared to 21.0% in group L. This aligns with a recent study by Zouche I et al., (2024), who evaluated 50 mg/kg of intravenous magnesium sulfate and found that 95% of patients in the magnesium group achieved clinically acceptable intubation conditions without neuromuscular blocking agents, with better haemodynamic stability throughout the procedure [18]. The study by Udupi S et al., (2019) compared haemodynamic changes with i.v. and nebulised lidocaine, finding that more than 25% deviation in MAP was observed in 72.73% of control patients, but only 54.55% in both i.v. and nebulised lignocaine groups [19]. In the current study, it was observed that even better control with magnesium sulphate, with only 23.3% of patients showing >20% deviation in MAP at one minute postintubation, compared to 83.3% in the lignocaine group.

Recent evidence from Saadawy IM et al., (2010) in patients undergoing laparoscopic cholecystectomy showed that magnesium sulphate provided better attenuation of haemodynamic responses compared to lidocaine, with significantly lower intraoperative fentanyl requirements [20]. Research has established that magnesium at doses of 40 mg/kg bolus followed by 10 mg/kg/h infusion leads to significant reductions in intraoperative propofol and muscle relaxant requirements, demonstrating its comprehensive effect on anaesthetic requirements [21]. Multiple pharmacological strategies for haemodynamic control during intubation have been evaluated, including gabapentin, dexmedetomidine, and esmolol, but magnesium sulphate remains particularly attractive due to its multiple beneficial effects and safety profile [22].

The mechanisms underlying these differential effects can be explained by the distinct pharmacological properties of each drug. Lignocaine primarily acts through sodium channel blockade, interrupting nociceptive transmission. While effective to some degree, the present study findings suggest this mechanism provides less robust attenuation of the sympathoadrenal surge during airway manipulation. In contrast, magnesium sulphate acts as a physiological calcium antagonist, inhibiting catecholamine release from adrenal glands and adrenergic nerve terminals, while also providing direct vasodilation.

Postoperative recovery assessment revealed interesting differences between the groups. Group M showed RSS scores of 3 at one and two hours postoperatively compared to scores of 2 in group L (p-value <0.001). This higher sedation level in the magnesium group was not associated with adverse outcomes and may have contributed to smoother recovery. By four hours postoperatively, both groups had similar RSS scores of 2, indicating that the initial sedation difference was transient. A review by Sawant U et al., (2024) highlighted magnesium sulphate's capacity to lower sympathetic nervous system excitability and reduce catecholamine synthesis from adrenergic nerve endings and the adrenal medulla, supporting its use for attenuating adverse haemodynamic responses during laryngoscopy and intubation in Ear Nose Throat (ENT) surgeries [23]. Similar benefits have been demonstrated in neurosurgical procedures where magnesium has been shown to reduce the minimum alveolar concentration of volatile anaesthetics by up to 60%, indicating its potent anaesthetic-sparing effects [24].

The findings from the present study have several important clinical implications for anaesthetic practice in laparoscopic surgery. When haemodynamic stability during laryngoscopy and intubation is the

primary concern, magnesium sulphate appears to be the superior choice over lignocaine. The dose of magnesium sulphate (30 mg/kg) used in the current study provided effective haemodynamic control without significant adverse effects, supporting its use at this dosage. The lower overall complication rate with magnesium sulphate, particularly the absence of bradycardia, suggests it may be safer for patients at risk of bradyarrhythmias. The transient higher sedation scores with magnesium sulphate did not adversely affect recovery and may contribute to patient comfort in the immediate postoperative period and better economic profile [25].

Limitation(s)

The present study has several limitations that should be acknowledged. The single-centre design may limit generalisability to other populations and settings. Authors used fixed dosing regimens without evaluating dose-response relationships, which could provide valuable information for optimising clinical protocols. The study was limited to ASA I-II patients, and results may differ in higher-risk populations. The current study's focus was primarily on haemodynamic parameters without a comprehensive pain assessment using validated scales. The relatively short follow-up period of 12 hours postoperatively may have missed delayed complications. Future research should address these limitations through multicenter trials with larger sample sizes, dose-finding studies, inclusion of higher-risk patients, and longer follow-up periods. Additionally, investigating the combination of lignocaine and magnesium sulphate may reveal synergistic effects that could further improve patient outcomes.

CONCLUSION(S)

Magnesium sulphate (30 mg/kg i.v.) demonstrates significantly superior efficacy compared to lignocaine (2 mg/kg i.v.) in attenuating the haemodynamic stress response to laryngoscopy and endotracheal intubation in patients undergoing laparoscopic surgery under general anaesthesia. Throughout 90 minutes of intraoperative monitoring, magnesium sulphate provided better control of heart rate, blood pressure, and mean arterial pressure, with faster return to baseline values. Additionally, magnesium sulphate was associated with a more favourable postoperative recovery profile with appropriate sedation levels and fewer complications. These findings support the preferential use of magnesium sulphate as premedication for haemodynamic stabilisation in laparoscopic procedures, particularly in patients where cardiovascular stability is paramount.

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