

ORIGINAL RESEARCH

Comparison Of Intravenous Lignocaine With Intravenous Lignocaine And Magnesium Sulfate Combination For Laparoscopic Cholecystectomy

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ABSTRACT

Introduction: The postoperative pain can have a significant effect on patient's recovery and increases hospital stay and cost of care. Hence, this study was conducted to compare post-operative analgesia in the group with lignocaine and a group with combination of lignocaine and magnesium sulphate by NRS score at 0, 2, 4, 12 and 24 hour and to compare hemodynamics between the two groups intra-operatively and post operatively.

Materials and Methods: In this prospective, randomized, double-blind, controlled trial, 100 patients were enrolled. The study was conducted by the Department of Anesthesiology, Indira Gandhi institute of Medical Sciences, Patna, Bihar. The study was approved at the Institutional Ethics Committee. The time period of the study was six months. Selected patients were randomly allocated to two groups, each containing 50 patients. Group A patients received only intravenous lignocaine 2mg/kg in bolus in 50 ml Normal saline and maintained at the rate of 3mg/kg/hour. Group B patients received the combination of intravenous lignocaine and magnesium sulphate 50mg/kg in bolus of 50 ml Normal saline and maintained at the rate of 15 mg/kg/hour and lignocaine at same dose.

The postoperative pain was estimated with two tools; consumption of analgesic during postoperative period and the time to request them. Each patient was assessed using NRS score which varies from 0 to 10 where 0 means no pain 10 means intolerable pain. Statistical analysis was done using Microsoft Excel.

Results: We found that a combination of lidocaine and magnesium sulfate resulted in significantly lower analgesic consumption. We also found that lidocaine had lower pain score than Mg group, though statistical significance could not be established.

Conclusions: Hence, we concluded that usage of IV MgSO₄ followed by continuous infusion leads to decrease in postoperative pain and analgesic consumption in patients undergoing laparoscopic cholecystectomy.

Key Words: Intravenous Lignocaine, Intravenous Lignocaine And Magnesium Sulfate Combination, Laparoscopic Cholecystectomy

INTRODUCTION

Surgical pain is due to inflammation from tissue trauma (surgical incision, dissection, burns) or direct nerve injury (nerve transection, stretching, or compression). The postoperative pain can have a significant effect on patient recovery and increases hospital stay and costs of care. In the long term, acute surgical pain is followed by chronic pain in 10%–50% of patients who

undergo common surgical procedures. [1] Management of postoperative pain relief suffering and leads to earlier mobilization, shortened hospital stay, reduced hospital cost, increased patient satisfaction and improve quality of life. [2] Acute postoperative pain is one of the main acute complaints affecting the quality of care and highly considered by physicians and the patients. Many therapeutic modalities, including pharmaceutical agents, have been used for its suppression.

Opioids, though very effective for acute pain, are associated with a number of drawbacks.[3, 4] Also nonopioid agents have been proposed to compensate for part of the complications related to the opioid agents.[5-8]One IV adjuvant medication that has shown potential in preemptive analgesia is magnesium. [9] It can antagonize N-Methyl-D-aspartic acid receptor and it also inhibits the release of acetylcholine in the neuromuscular junction. It has been demonstrated that the receptor N-Methyl-D-aspartic acid (NMDA) plays a principle role in central excitability. Increased central excitability during surgery is more pronounced, so the idea that the addition of NMDA antagonists can reduce pain sensitivity seems innovative. [10]

Another drug is lidocaine that is an amidetype of local anesthetic. The anti-nociceptive and analgesic effect are thought to be attributable to the blockade of neuronal sodium channels, blockade of potassium currents, interaction with nociceptive pathways, muscarinic receptor antagonist, blockade of dopamine receptors, glycine inhibitor, reduction in excitatory amino acids, reduction in thromboxane and release of endogenous opioid peptides. [11]

Hence, this study was conducted to compare post-operative analgesic in the group with lignocaine and a group with combination of lignocaine and magnesium sulphate by NRS score at 0, 2, 4, 12 and 24 hour and to compare hemodynamics between the two groups intra-operatively and post operatively.

MATERIALS AND METHODS

In this prospective, randomized, double-blind, controlled trial, 100 patients were enrolled. The study was conducted by the Department of Anesthesiology, Indira Gandhi institute of Medical Sciences, Patna, Bihar. The study was approved at the Institutional Ethics Committee. The time period of the study was six months. Patients were evaluated by detailed history, detailed general examination and systemic examination. Parents' consent was taken after explanation of procedure. Selected patients were randomly allocated to two groups, each containing 50 patients. Group A patients received only intravenous lignocaine 2mg/kg in bolus in 50 ml normal saline and maintained at the rate 3mg/kg/hour. Group B patients received the combination of intravenous lignocaine and magnesium sulphate 50mg/kg in bolus of 50 ml normal saline and maintained at the rate of 15 mg/kg/hour and lignocaine at same dose.

The postoperative pain was estimated with two tools; consumption of analgesia during postoperative period and the time to request them. Each patient was assessed using NRS score which varies from 0 to 10 where 0 means no pain 10 means intolerable pain. In this study, the assessment was taken at 24 hour during post-operative period.

Statistical analysis was done using Microsoft Excel. Result has been depicted in text, figure or table, as appropriate. Mann whitney test was used in order to compare proportions between two parameters. Margin of error accepted was set to 5%. So, P-value <0.05 was considered significant and P-value >0.05 was considered insignificant.

RESULTS

The mean (SD) age of the patients in group A and B was 32.5 (6.4) years and 35.8 (4.7) years, respectively. Male to female was almost 1 in both the groups. Mean (SD) BMI of the both the groups were 32.6 (14.4) and 31.7 (11.2) kg/m², respectively. Both the groups were

comparable in terms of age and gender distribution as well as BMI ($p > 0.05$). NRS scores were noted thrice: NRS 1 was taken before initiation of procedure, NRS 2 was the pain score measured at the first visit in the post-anesthetic care unit and NRS 3 was the pain score reported after 12 hours in the post-anesthetic care unit. [Table 1] In PACU, analgesic requirement of the patients were noted. [Table 2]

Table 1: NRS pain scores for both the groups

NRS scores Mean (SD)	Group		P value
	Group A	Group B	
NRS 1	6.1 (1.7)	5.7 (2.1)	> 0.05
NRS 2	1.7 (1.2)	1.6 (1.9)	> 0.05
NRS 3	1.2 (1.7)	2.1 (1.1)	> 0.05

Table 2: Post-operative analgesic requirement of both the groups

Post operative period	Mean (SD) analgesics consumption in mg		P value
	Group A	Group B	
After 2 hours	23.5 (11.3)	17.8 (9.7)	<0.05
After 4 hours	29.1 (13.6)	20.8 (6.2)	<0.05
After 8 hours	34.3 (10.8)	20.1 (12.4)	<0.05
After 12 hours	46.7 (19.8)	31.4 (10.1)	<0.05

DISCUSSION

The results of this study demonstrated that adding magnesium to lidocaine in patients undergoing laproscopic cholecystectomy reduces the post operative analgesic requirement of the patients significantly. But this study did not demonstrate any difference between the groups regarding the results of acute pain assessments using the NRS scores, though there are studies insisting on the effects of magnesium in suppressing acute pain.[5-8]

The results were in accordance with that of the study of Saadawy et al. [12] where a combination of lidocaine and magnesium sulfate resulted in significantly lower rated analgesic consumption. They also found that lidocaine had lower pain score and analgesic consumption than Mg group. The study of Kim et al. [13] on postoperative lidocaine and magnesium on postoperative functional recovery and pain after mastectomy due to breast cancer. They measured the outcome using quality of recovery (Qor) survey and found that both lidocaine and magnesium sulfate had significant better results of Qor than the control group. They also found that lidocaine had significantly better Qor results than magnesium sulfate. Although they showed better results with both lidocaine and magnesium sulfate groups that had better results of pain scores immediately postoperatively, they found that both of them attenuated the intensity of chronic pain in patients undergoing breast cancer surgery.

The pain relief effects of lidocaine and magnesium sulfate were compared in the study of Safavi et al. [14] They found that about 60% of patients in the control group had pain as compared to 22.2% and 40% in the lidocaine and magnesium sulfate groups, respectively. The other finding was that there was difference in induction pain score between the three treated groups significantly, and observed that the differences in pain scores between “normal saline and lidocaine group” and “normal saline and magnesium sulfate groups” were statistically meaningful.

The result the study of Levoux et al. [15] agreed with the results of this study as they found that postoperative opioid consumption and pain scores were lower in the magnesium groups as well as the first night's sleep and the global satisfaction scores, but it differed from this study as it was under general anesthesia.

The current results were also consistent with Ryu et al. [16] study which was randomized, doubleblind, and prospective study and was undertaken to evaluate the effects of magnesium sulphate on anesthetic requirements and postoperative analgesia in patients undergoing total IV anesthesia. Their findings were that patients in magnesium group required less rocuronium than those in saline group. They found also postoperative pain scores, cumulative analgesic consumption, and shivering incidents were significantly lower in magnesium sulfate group.

CONCLUSIONS

Hence, we conclude that adding magnesium to lidocaine in patients undergoing laproscopic cholecystectomy reduces the post operative pain and analgesic requirement of the patients significantly.

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