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SCIENTIFIC ARTICLE

Effects of lidocaine and esmolol infusions on hemodynamic changes, analgesic requirement, and recovery in laparoscopic cholecystectomy operations



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KEYWORDS

Lidocaine;
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Abstract

Objective: We compared the effects of lidocaine and esmolol infusions on intraoperative hemodynamic changes, intraoperative and postoperative analgesic requirements, and recovery in laparoscopic cholecystectomy surgery.

Methods: The first group ($n = 30$) received IV lidocaine infusions at a rate of 1.5 mg/kg/min and the second group ($n = 30$) received IV esmolol infusions at a rate of 1 mg/kg/min. Hemodynamic changes, intraoperative and postoperative analgesic requirements, and recovery characteristics were evaluated.

Results: In the lidocaine group, systolic arterial blood pressures values were lower after the induction of anesthesia and at 20 min following surgical incision ($p < 0.05$). Awakening time was shorter in the esmolol group ($p < 0.001$); Ramsay Sedation Scale scores at 10 min after extubation were lower in the esmolol group ($p < 0.05$). The modified Aldrete scores at all measurement time points during the recovery period were relatively lower in the lidocaine group ($p < 0.05$). The time to attain a modified Aldrete score of ≥ 9 points was prolonged in the lidocaine group ($p < 0.01$). Postoperative resting and dynamic VAS scores were higher in the lidocaine group at 10 and 20 min after extubation ($p < 0.05$, $p < 0.01$, respectively). Analgesic supplements were less frequently required in the lidocaine group ($p < 0.01$).

Conclusion: In laparoscopic cholecystectomies, lidocaine infusion had superiorities over esmolol infusions regarding the suppression of responses to tracheal extubation and postoperative need for additional analgesic agents in the long run, while esmolol was more advantageous with respect to rapid recovery from anesthesia, attenuation of early postoperative pain, and modified Aldrete recovery (MAR) scores and time to reach MAR score of 9 points.

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PALAVRAS-CHAVE

Lidocaína;
Esmolol;
Recuperação;
Colecistectomia
laparoscópica

Efeitos das infusões de lidocaína e esmolol sobre as alterações hemodinâmicas, necessidade de analgésicos e recuperação após colecistectomia laparoscópica

Resumo

Objetivo: Comparamos os efeitos de infusões de lidocaína e esmolol sobre as alterações hemodinâmicas no período intraoperatório, a necessidade de analgésicos intra- e pós-operatoriamente e a recuperação após colecistectomia laparoscópica.

Métodos: O primeiro grupo (n = 30) recebeu infusões IV de lidocaína a uma taxa de 1,5 mg/kg/min e o segundo grupo (n = 30) recebeu infusões IV de esmolol a uma taxa de 1 mg/kg/min. Alterações hemodinâmicas, necessidade de analgésicos no intra- e pós-operatório e características da recuperação foram avaliadas.

Resultados: No grupo lidocaína, os valores da pressão arterial sistólica foram menores após a indução da anestesia e 20 minutos após a incisão cirúrgica ($p < 0,05$). O tempo até o despertar foi menor no grupo esmolol ($p < 0,001$), os escores na escala de Sedação de Ramsay 10 minutos após a extubação foram menores no grupo esmolol ($p < 0,05$). Os escores de Aldrete modificados em todos os tempos mensurados durante o período de recuperação foram relativamente baixos no grupo lidocaína ($p < 0,05$). O tempo necessário para atingir um escore de Aldrete ≥ 9 pontos foi prolongado no grupo lidocaína ($p < 0,01$). Os escores Eva em repouso e em movimento no pós-operatório foram maiores no grupo lidocaína nos minutos 10 e 20 após a extubação ($p < 0,05$, $p < 0,01$, respectivamente). Analgésicos suplementares foram necessários com menos frequência no grupo lidocaína ($p < 0,01$).

Conclusão: Em colecistectomia laparoscópica, a infusão de lidocaína foi superior às infusões de esmolol quanto a suprimir as respostas à extubação traqueal e necessidade de analgésicos adicionais no pós-operatório, enquanto esmolol foi mais vantajoso quanto à rápida recuperação da anestesia, à atenuação da dor no pós-operatório imediato e aos escores de recuperação de Aldrete modificado (RAM) e o tempo até atingir o escore RAM de 9 pontos.

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Introduction

During the perioperative period, as a hemodynamic response to laryngoscopy, intubation, and surgical excision, complications including tachycardia, hypertension, myocardial ischemia, arrhythmia, myocardial infarction, and cerebral hemorrhages can be seen. To prevent development of these unwanted effects, various measures such as increasing the depth of anesthesia and the administration of topical anesthesia, IV lidocaine, vasodilators, α_2 agonists, beta-adrenergic blockers, opioids, and precurarization procedures have been implemented.¹⁻⁴

In the control of unfavorable hemodynamic changes developed secondary to intubation, lidocaine can be administered intravenously before the induction of anesthesia and several studies have demonstrated its preventive effects on postoperative pain.⁵⁻⁷

Esmolol is effective in the suppression of adrenergic responses against laryngoscopic procedures, intubation, and many other perioperative stimulations.^{8,9} Furthermore, some studies have indicated that beta adrenergic receptor blockers decrease the need for anesthetics and postoperative analgesic consumption.¹⁰⁻¹² Even though pain scores are lower in laparoscopic cholecystectomy relative to conventional open cholecystectomy, multimodal analgesic regimens should be performed, including preoperative treatment.¹³

Though many studies have compared the effects of both drugs on hemodynamic responses, comparative studies related to their effects on recovery and analgesia are lacking. In our study, we have aimed to compare the effects of lidocaine and esmolol infusions on intraoperative hemodynamic changes, intra- and postoperative analgesic requirements, and recovery.

Materials and methods

This double-blind study was performed on 60 ASA I-II patients aged 18–65 years scheduled for laparoscopic cholecystectomy after obtaining informed consent from of the patients. Patients with allergies to local anesthetics and opioids, morbid obesity, or advanced respiratory, renal, hematological, hepatic or cardiovascular diseases; chronic use of opiate, beta adrenergic receptor antagonists, or alcohol; and drug addicts, pregnant women, and mentally retarded cases were excluded from the study. For premedication, patients were given 40 mg famotidine and 10 mg diazepam orally. The patients underwent electrocardiographic (EKG) examinations, pulse oxymetric measurements of peripheral oxygen saturation (SpO₂), and noninvasive monitoring of arterial pressure. The patients were randomized into 2 groups using the sealed envelope method.

The first group (group L) received an IV lidocaine infusion slowly at a rate of 1.5 mg/kg/min for a total dose of

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