Rev Bras Anestesiol. 2014;64(5):343–349

REVISTA BRASILEIRA DE ANESTESIOLOGIA
Official Publication of the Brazilian Society of Anesthesiology
www.sba.com.br

SCIENTIFIC ARTICLE

Intraoperative esmolol infusion reduces postoperative analgesic consumption and anaesthetic use during septorhinoplasty: a randomized trial

Nalan Celebi, Elif A. Cizmeci*, Ozgur Canbay

Department of Anaesthesiology and Reanimation, Hacettepe University Faculty of Medicine, Ankara, Turkey

Received 17 August 2013; accepted 31 October 2013
Available online 2 February 2014

KEYWORDS
Analgesia;
Bispectral index;
Esmolol;
Morphine

Abstract
Background and objectives: Esmolol is known to have no analgesic activity and no anaesthetic properties; however, it could potentiate the reduction in anaesthetic requirements and reduce postoperative analgesic use. The objective of this study is to evaluate the effect of intravenous esmolol infusion on intraoperative and postoperative analgesic consumptions as well as its effect on depth of anaesthesia.
Methods: This randomized-controlled double blind study was conducted in a tertiary care hospital between March and June 2010. Sixty patients undergoing septorhinoplasty were randomized into two groups. History of allergy to drugs used in the study, ischaemic heart disease, heart block, bronchial asthma, hepatic or renal dysfunction, obesity and a history of chronic use of analgesic or β-blockers were considered cause for exclusion from the study. Thirty patients received esmolol and remifentanil (esmolol group) and 30 patients received normal saline and remifentanil (control group) as an intravenous infusion during the procedure. Mean arterial pressure, heart rate, and bispectral index values were recorded every 10 min. Total remifentanil consumption, visual analogue scale scores, time to first analgesia and total postoperative morphine consumption were recorded.
Results: The total remifentanil consumption, visual analogue scale scores at 0, 20 and 60 min, total morphine consumption, time to first analgesia and the number of patients who needed an intravenous morphine were lower in the esmolol group.
Conclusions: Intravenous infusion of esmolol reduced the intraoperative and postoperative analgesic consumption, reduced visual analogue scale scores in the early postoperative period and prolonged the time to first analgesia; however it did not influence the depth of anaesthesia.

* Corresponding author.
E-mail: elifcizmeci@hotmail.com (E.A. Cizmeci).

0104-0014
http://dx.doi.org/10.1016/j.bjane.2013.10.015

PALAVRAS-CHAVE
Analgesia;
Índice bispectral;
Esmolol;
Morfina

Infusão intraoperatória de esmolol reduz o consumo pós-operatório de analgésicos e o uso de anestésico durante a septorrinoplastia: estudo randômico

Resumo
Justificativa e objetivos: esmolol é conhecido por não ter atividade analgésica e propriedades anestésicas; porém, pode potenciar a redução da necessidade de anestésicos e reduzir o uso de analgésicos no pós-operatório. O objetivo deste estudo foi avaliar o efeito da infusão de esmolol por via intravenosa sobre o consumo de analgésico durante os períodos intraoperatório e pós-operatório, bem como seu efeito sobre a profundidade da anestesia.
Métodos: este estudo randômico, controlado e duplo-cego foi conduzido em um hospital terciário entre março e junho de 2010. Foram randomicamente divididos em dois grupos 60 pacientes programados para serem submetidos à septorrinoplastia. História de alergia aos medicamentos usados no estudo, isquemia cardíaca, bloqueio cardíaco, asma brônquica, insuficiência hepática ou renal, obesidade e história de uso crônico de analgésicos ou β-bloqueadores foram os critérios de exclusão. Trinta pacientes receberam esmolol e remifentanil (grupo esmolol) e 30 receberam soro fisiológico e remifentanil (grupo controle) via perfusão intravenosa. Pressão arterial média, frequência cardíaca e valores do índice bispectral foram registrados a cada 10 minutos. Consumo total de remifentanil, escores da escala visual analógica, tempo para a primeira analgesia e consumo total de morfina no pós-operatório foram registrados.
Resultados: o consumo total de remifentanil, os escores da escala visual analógica nos minutos 0, 20 e 60, o consumo total de morfina, o tempo para a primeira analgesia e o número de pacientes que precisaram de morfina intravenosa foram menores no grupo esmolol.
Conclusões: esmolol em infusão intravenosa reduziu o consumo de analgésicos tanto no intraoperatório quanto no pós-operatório, reduziu os escores da escala analógica visual no pós-operatório imediato e prolongou o tempo para a primeira analgesia; contudo, não influenciou a profundidade da anestesia.

Introduction

Esmolol is an ultra-short-acting, cardioselective β_1-receptor antagonist. It is effective in blunting adrenergic responses to perioperative stimuli, including tracheal intubation,[1] intraoperative events caused by decreasing anaesthetic depth,[2] and tracheal extubation.[3] Esmolol is known to have no analgesic activity and no anaesthetic properties.[4] However, previous studies have shown that esmolol could potentiate the reduction in anaesthetic requirements during propofol,[5] or volatile-based anaesthesia.[6] In a previous study it was suggested that esmolol infusion reduced the intraoperative use of fentanyl, decreased haemodynamic responses and reduced postoperative morphine consumption.[7] Esmolol also decreased nociception in a variety of experimental settings, suggesting the potential to decrease the intraoperative anaesthetic requirements.[8] In animals esmolol provided analgesia and a reduction of cardiovascular responses to pain in the absence of anaesthesia.[9] However the role of esmolol in pain modulation remains to be established.

This prospective, randomized, double-blind, placebo controlled study was designed to assess the effect of perioperative esmolol upon analgesic consumption and depth of anaesthesia in patients undergoing septorhinoplasty surgery.

Methods

Patients

After approval by the Institutional Ethics Committee, patients' written informed consents were obtained. The study took place in a tertiary hospital between March and June 2010. Patients of American Society of Anesthesiologists (ASA) physical status I–II, ages 18–65 years old and undergoing septorhinoplasty were enrolled in this study. Patients were selected randomly by using computer-generated random numbers and divided into two groups (esmolol vs. control). Exclusion criteria included allergic history to any of the drugs used in the study, ischaemic heart disease, heart block, bronchial asthma, hepatic or renal dysfunction and obesity (body mass index ≥ 30) and a history of chronic use of analgesic or β-blocking agents. No patients were excluded from the study according to these criteria. Patient recruitment to the study was started upon calculation of the sample size using the University of Iowa's sample size calculator. At 95% confidence level $(1-\alpha)$ and power $(1-\beta)$ of 80%, ratio of cases to control 1:1, we enrolled 30 cases for the study group while 30 cases were required as controls.