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SCIENTIFIC ARTICLE

Ketamine as an adjunct to Bupivacaine in infra-orbital nerve block analgesia after cleft lip repair

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KEYWORDS
Postoperative pain;
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Bupivacaine;
Ketamine

Abstract
Objectives: We conducted this study to investigate the safety and analgesic efficacy of the addition of Ketamine to Bupivacaine in bilateral extra-oral infra-orbital nerve block in children undergoing cleft lip surgeries.
Methods: Sixty patients were randomly allocated into two groups ($n = 30$), Group B received infra-orbital nerve block with 2 mL of 0.25% Bupivacaine and Group BK received 0.5 mg.kg^{-1} Ketamine for each side added to 1 mL of 0.5% Bupivacaine solution diluted up to 2 mL solution to 0.25% Bupivacaine concentration. Assessment parameters included; hemodynamics, recovery time, time to first oral intake, postoperative Faces Legs Activity Cry Consolability (FLACC) scores, Four-point Agitation scores, analgesic consumption and adverse effects.
Results: Patients in Group BK showed lower postoperative FLACC scores during all recorded time points ($p < 0.0001$). Two patients in Group BK versus 12 in Group B requested for postoperative rescue analgesia ($p < 0.001$). There were no differences between groups in time, minutes (min), to first request for rescue analgesia. Patients in Group BK reported lower analgesic consumption (366.67 ± 45.67 vs. 240.0 ± 0.0 mg, $p < 0.04$). The time to first oral intake was significantly reduced in Group BK (87.67 ± 15.41 vs. 27.33 ± 8.68 min, $p < 0.001$). Lower postoperative Agitation scores were recorded in Group BK patients that reached a statistical significance at 45 min (0.86 ± 0.11 vs. 0.46 ± 0.16, $p < 0.04$) and in the first hour (h) postoperatively (1.40 ± 0.17 vs. 0.67 ± 0.14, $p < 0.003$). Higher parent satisfaction scores were recorded in Group BK ($p < 0.04$) without significant adverse effects.
Conclusions: The addition of Ketamine to Bupivacaine has accentuated the analgesic efficacy of infra-orbital nerve block in children undergoing cleft lip repair surgeries.

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PALAVRAS-CHAVE
Dor pós-operatória;
Lábio leporino;
Analgesia local;
Nervo infraorbitário;
Bupivacaína;
Cetamina

Cetamina como adjuvante de bupivacaína em bloqueio do nervo infraorbitário para analgesia após correcão de lábio leporino

Resumo
Objetivos: Realizamos este estudo para avaliar a segurança e eficácia da analgesia com a adição de cetamina à bupivacaína em bloqueio do nervo infraorbitário, bilateral e extraoral, em crianças submetidas à cirurgia de lábio leporino.
Métodos: Sessenta pacientes foram randomicamente alocados em dois grupos ($n = 30$): Grupo B recebeu bloqueio do nervo infraorbitário com bupivacaína a 0,25% (2 mL) e Grupo BC recebeu bloqueio com cetamina (0,5 mg.kg^{-1}) em cada lado, mais a adição de 1 mL de solução de bupivacaína a 0,5% diluída até 2 mL da concentração a 0,25%. Os parâmetros de avaliação incluíram: hemodinâmica, tempo de recuperação, tempo até a primeira ingestão oral, escores da escala FLACC (que avalia a expressão facial [Face], os movimentos das pernas [Legs], a atividade [Activity], o choro [Cry] e a consolabilidade [Consolability]), escores de agitação em escala de quatro pontos, consumo de analgésicos e efeitos adversos no pós-operatório.
Resultados: Os pacientes do Grupo BC apresentaram escores FLACC mais baixos em todos os momentos mensurados no pós-operatório ($p < 0,0001$). Dois pacientes do Grupo BC *versus* 12 do Grupo B solicitaram analgesia de resgate no pós-operatório ($p < 0,001$). Não houve diferenças entre os grupos em relação ao tempo até a primeira solicitação de analgesia de resgate. Os pacientes do Grupo BC relataram consumo menor de analgésicos (366,67 ± 45,67 *vs.* 240,0 ± 0,0 mg, $p < 0,04$). O tempo em minutos (min) até a primeira ingestão oral foi significativamente reduzido no Grupo BC (87,67 ± 15,41 *vs.* 27,33 ± 8,68 min, $p < 0,001$). Escores mais baixos de agitação no pós-operatório foram registrados para os pacientes do Grupo BC, com significância estatística no tempo de 45 min (0,86 ± 0,11 *vs.* 0,46 ± 0,16; $p < 0,04$) e na primeira hora de pós-operatório (1,40 ± 0,17 *vs.* 0,67 ± 0,14; $p < 0,003$). Índices mais altos de satisfação dos pais foram registrados no Grupo BC ($p < 0,04$), sem efeitos adversos significativos.
Conclusões: A adição de cetamina à bupivacaína acentuou a eficácia analgésica do bloqueio do nervo infraorbitário em crianças submetidas à cirurgia de correção de lábio leporino.

Introduction

Cleft lip and palate (CLP) is one of the most common surgical abnormalities requiring surgical treatment in early years of life.[1] Corrective surgical procedures subject those children to intense pain, postoperatively. Postoperative pain management in CLP includes; local anesthetic (LA) infiltration by the surgeon, nerve blocks, opioid and non-opioid analgesics.[2]

The popularity of regional anesthesia in conjunction with general anesthesia in children is increasing as it provides satisfactory operating conditions and excellent perioperative analgesia.[3] The infra-orbital nerve is a branch of the maxillary division of the trigeminal nerve that supplies not only the upper lip, but much of the skin of the face between the upper lip and the lower eyelid, except for the bridge of the nose.[4] Unilateral or bilateral infra-orbital nerve block has been performed with a very high success rate.[5,6] Various adjuvant to local anesthetics have been studied to improve the duration of the block.[7,8]

Ketamine has an analgesic action at many sites both centrally and peripherally. Besides its role as N-methyl-D-aspartate receptor antagonist, Ketamine induces an analgesic effect by nitric oxide synthase inhibition.[9] Ketamine is widely used as an adjunct to analgesics during the perioperative period.[10,11]

The aim of this study was to evaluate the safety and analgesic efficacy of Ketamine addition to Bupivacaine in bilateral infra-orbital nerve block for postoperative analgesia in children undergoing cleft lip repair.

Patients and methods

Patients

This prospective, randomized, double blind, comparative study was conducted in Assuit University hospital after IRB approval from our Medical Ethics Committee. Trial registration was prospectively undertaken in clinical trial.gov (ID: NCT02514980). A written informed consent was obtained from the parental or guardian authorized representative before participation in the study. All collected data were confidential and were used for the purpose of scientific research only. Every research participant guardian had the complete right and freedom to withdraw at any time from the study with no negative consequences on the medical service provided to his/her child. Sixty patients of either sex aged less than 6 years, (ASA I or II) and scheduled for elective cleft lip repair under general anesthesia were included in this study. Exclusion criteria included; local infection at the block injection site, history suggestive of drug allergy,

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