Rev Esp Anestesiol Reanim. 2016;xxx(xx):xxx–xxx

Revista Española de Anestesiología y Reanimación

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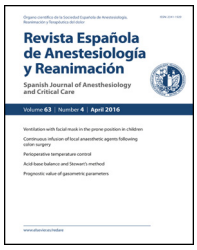

ORIGINAL ARTICLE

Analgesic effect of a single-dose of perineural dexamethasone on ultrasound-guided femoral nerve block after total knee replacement☆

C. Morales-Muñoz*, J.L. Sánchez-Ramos, M.D. Díaz-Lara, J. González-González, I. Gallego-Alonso, M.S. Hernández-del-Castillo

Servicio de Anestesiología y Reanimación, Complejo Hospitalario Universitario Juan Ramón Jiménez, Huelva, Spain

Received 27 December 2015; accepted 24 May 2016

KEYWORDS
Dexamethasone;
Femoral nerve block;
Postoperative analgesia;
Total knee replacement

Abstract
Introduction: Total knee replacement is usually a very painful procedure. A single-dose of femoral nerve block has been shown to provide similar analgesia to an epidural, with fewer side effects, but limited in time.
Objective: To compare the analgesia provided by dexamethasone used at perineural level in the femoral nerve block after total knee replacement with the one used at intravenous level, and with that of a control group.
Material and methods: A prospective, randomised, double-blind controlled trial was conducted on 81 patients randomly assigned to one of three groups: (1) IV dexamethasone (8 mg); (2) perineural dexamethasone (8 mg), and (3) placebo. All patients received 20 ml of ropivacaine 0.5% for femoral nerve block. The primary outcome was the duration of the sensory-analgesic block of the femoral nerve block. The secondary outcomes included pain intensity measurements, patient satisfaction, and incidence of complications.
Results: Randomisation was effective. Analgesia duration was significantly higher ($P < .0001$) in the perineural dexamethasone group (mean 1152.2 min, 95% confidence interval [95% CI]: 756.9–1547.6) in comparison with the control group (mean 186 min, 95% CI: 81.2–292) and dexamethasone IV group (mean 159.4 min, 95% CI: 109.8–209). Postoperative pain, complications and side effects were also lower in this group.
Conclusions: Dexamethasone prolongs sensory block of single dose of femoral nerve block using ropivacaine. It also provides better analgesia and patient satisfaction, with fewer side effects.

☆ Please cite this article as: Morales-Muñoz C, Sánchez-Ramos JL, Díaz-Lara MD, González-González J, Gallego-Alonso I, Hernández-del-Castillo MS. Eficacia analgésica de una dosis única de dexametasona perineural en el bloqueo ecoguiado del nervio femoral en cirugía de prótesis total de rodilla. Rev Esp Anestesiol Reanim. 2016. http://dx.doi.org/10.1016/j.redar.2016.05.006

* Corresponding author.
E-mail address: morales.munoz.clara@gmail.com (C. Morales-Muñoz).

PALABRAS CLAVE
Dexametasona;
Bloqueo femoral;
Analgesia postoperatoria;
Cirugía de prótesis de rodilla

Eficacia analgésica de una dosis única de dexametasona perineural en el bloqueo ecoguiado del nervio femoral en cirugía de prótesis total de rodilla

Resumen
Introducción: La cirugía de prótesis de rodilla se caracteriza por tener un postoperatorio muy doloroso. El bloqueo del nervio femoral a dosis única ha demostrado proporcionar una analgesia similar a la epidural, con menos efectos secundarios pero limitado en el tiempo.
Objetivo: Evaluar la eficacia de la analgesia proporcionada por la dexametasona utilizada a nivel perineural en el bloqueo del nervio femoral para cirugía de prótesis de rodilla, comparada con la aplicada a nivel intravenoso y con un grupo control.
Material y métodos: Estudio prospectivo, aleatorizado, con enmascaramiento doble, controlado. Un total de 81 pacientes fueron aleatoriamente divididos en 3 grupos de estudio: (1) dexametasona 8 mg i.v.; (2) dexametasona 8 mg perineural, y (3) placebo. Todos los pacientes recibieron un bloqueo femoral con 20 ml de ropivacaína al 0,5%. La variable principal fue la duración del bloqueo sensitivo-analgésico del nervio femoral. Como variables secundarias se midieron el dolor según EVA, la satisfacción del paciente y la incidencia de complicaciones.
Resultados: La aleatorización fue efectiva. La duración de la analgesia fue significativamente mayor ($p < 0{,}0001$) en el grupo dexametasona perineural (1.152,2 min; IC 95%: 756,9–1.547,6) comparada con el grupo control (186 min; IC 95%: 81,2–292) y el grupo dexametasona i.v. (159,4 min; IC 95%: 109,8–209). El dolor postoperatorio, la incidencia de complicaciones y los efectos secundarios también fueron menores en este grupo.
Conclusiones: La dexametasona prolonga el bloqueo sensitivo del nervio femoral realizado con ropivacaína, a la vez que proporciona una mejor analgesia con menos efectos secundarios.

Introduction

Total knee arthroplasty is characterised by substantial postoperative pain.[1] Single dose femoral nerve block has been shown to be useful and effective[2,3] in controlling postoperative pain, although duration of a analgesia is limited. Several studies have sought to prolong the duration of locoregional nerve blockade with local anaesthetic (LA) coadjuvants,[4] such as adrenaline, opioids, ketamine or midazolam, although the analgesic effect has been limited. Alpha 2 adrenergic receptor agonists (clonidine[5] and dexmedetomidine[6]) have been shown to significantly prolong analgesic effect, but are associated with serious adverse effects. Dexamethasone, however, prolongs the duration of analgesia in brachial plexus[7–15] and sciatic[16,17] nerve blocks, with no side effects. Research suggests that this is because dexamethasone attenuates surgery-induced inflammation by suppressing ectopic neural discharge and potentiating the activity of inhibitory potassium channels on nociceptive C-fibres,[18–20] on the one hand, and by exerting a vasoconstrictive effect[21] that slows down LA absorption, on the other.

No studies have yet evaluated perineural (PN) administration of dexamethasone for femoral nerve block. The aim of this study has been to evaluate the efficacy and safety of PN vs IV dexamethasone compared with controls in femoral nerve block for knee replacement surgery.

Materials and methods

The study was approved by the ethics committee of the *Complejo Hospitalario Universitario de Huelva Juan Ramón Jiménez*, authorising the use of PN dexamethasone. Informed written consent was obtained from 81 patients scheduled for knee replacement surgery who voluntarily agreed to take part in the study. Patients were randomised to receive single-dose postoperative femoral nerve block using one of the following drug combinations: (1) IV Dex group: PN administration of 20 ml of 0.5% ropivacaine with 2 ml saline solution (SS) and 2 ml (8 mg) IV dexamethasone; (2) PN Dex group: PN administration of 20 ml of 0.5% ropivacaine with 2 ml (8 mg) dexamethasone and 2 ml IV SS; (3) Control Group: PN administration of 20 ml of 0.5% ropivacaine with 2 ml SS and 2 ml IV SS. Computer software was used to randomise subjects into blocks corresponding to the study groups. The allocation of each patient to a particular group and drug treatment was placed in sealed envelopes, numbered sequentially from 1 to 81. Inclusion criteria were: patients scheduled for knee replacement surgery under spinal anaesthesia (10–12 mg hyperbaric bupivacaine and 10 μg fentanyl using a 24G Sprotte cannula [Pajunk®, Germany]). Exclusion criteria were: sensitivity to or intolerance of study LAs, morphine or morphine derivatives, diabetes, peripheral nerve damage and prior treatment with steroids for over 6 months. The following