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SPECIAL ARTICLE

Dexmedetomidine and propofol infusion on sedation characteristics in patients undergoing sciatic nerve block in combination with femoral nerve block via anterior approach

Abdulkadir Yektaş*, **Funda Gümüş**, **Ayşin Alagol**

Anesthesiology and Reanimation Clinic, Bağcılar Training and Research Hospital, Istanbul, Turkey

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KEYWORDS
Dexmedetomidine;
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Abstract
Objective: Dexmedetomidine is an α-2 adrenergic agonist having wide range of effects including sedation in mammalian brain, and has analgesic as well as sympatholytic properties. This study aimed to compare the effects of dexmedetomidine and propofol infusion on sedation characteristics in patients undergoing combined sciatic nerve and femoral nerve block via anterior approach for lower limb orthopedic procedure.
Methods: Forty patients, who were between 18 and 65 years old, this study was made at anesthesiology clinic of Bağcılar training and research hospital in 08 September 2011 to 07 June 2012, and underwent surgical procedure due to fractures lateral and medial malleol, were included. Sciatic nerve and femoral nerve block were conducted with an anterior approach on all patients included in the study, with an ultrasonography. The patients were randomly divided into dexmedetomidine [Group D ($n = 20$); 0.5 $\mu g\,kg^{-1}\,h^{-1}$] and propofol [Group P ($n = 20$); 3 $mg\,kg^{-1}\,h^{-1}$] infusion groups.
Results: The vital findings and intra-operative Ramsay sedation scale values were similar in both groups. Time taken for sedation to start and time required for sedation to become over of Group D were significantly higher than those of Group P ($p < 0.001$ for each).
Conclusions: Substitution of dexmedetomidine instead of propofol prolongs the times to start of sedation, the times to end of sedation and duration of sedation.

* Corresponding author.
E-mails: akyektas722000@yahoo.co.uk, akyektas@hotmail.com (A. Yektaş).

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PALAVRAS-CHAVE
Dexmedetomidina;
Propofol;
Sedação;
Bloqueio de nervo

Características da sedação com infusão de dexmedetomidina e propofol em pacientes submetidos ao bloqueio do nervo ciático em combinação com bloqueio do nervo femoral via abordagem anterior

Resumo
Objetivo: Dexmedetomidina é um agonista α2-adrenérgico que tem uma ampla gama de efeitos, incluindo sedação do cérebro de mamíferos, e propriedades tanto analgésicas quanto simpatolíticas. Este estudo teve como objetivo comparar os efeitos de dexmedetomidina e propofol sobre as características da sedação em pacientes submetidos ao bloqueio combinado dos nervos ciático e femoral via abordagem anterior em procedimento ortopédico de membro inferior.
Métodos: Quarenta pacientes, entre 18 e 65 anos, submetidos a procedimento cirúrgico por causa de fraturas lateral e medial do maléolo, foram incluídos neste estudo, conduzido no Departamento de Anestesiologia do, Bağcılar Training and Research Hospital de 8 de setembro de 2011 a 7 de junho de 2012. O bloqueio dos nervos ciático e femoral foi feito via abordagem anterior em todos os pacientes incluídos no estudo, com ultrassonografia. Os pacientes foram randomicamente divididos em dois grupos para as infusões de: dexmedetomidina (grupo D [n = 20]; 0,5 μg kg^{-1} h^{-1}) e propofol (grupo P [n = 20]; 35 mg kg^{-1} h^{-1}).
Resultados: Os sinais vitais e os valores da escala de sedação de Ramsay no período intraoperatório foram semelhantes em ambos os grupos. Os tempos de início e término da sedação no grupo D foram significativamente maiores do que os no grupo P ($p < 0,001$, respectivamente).
Conclusão: O uso de dexmedetomidina em vez de propofol prolonga os tempos de início, término e duração da sedação.

Introduction

Anxiety may lead to hypertension, arrhythmia and increase in myocardial oxygen consumption by causing higher sympathetic stimulation in patients undergoing surgical procedure under local or general anesthesia. Generally, sedation and non-surgical pain management during a surgery in patients undergoing surgical procedure under regional anesthesia has become an important issue in the anesthesiology practice.[1] Primary aim of the sedation includes providing comfort to patients, eliminating anxiety, maintenance of hemodynamic stability and restraining patient from moving. Dexmedetomidine is an α-2 adrenergic agonist which is more selective than clonidine and has wide range of effects including sedation in mammalian brain without causing anesthesia as well as has analgesic and sympatholytic properties.[2] The most important advantage of dexmedetomidine is lack of properties that may cause respiratory depression, although it may causes deep sedation at therapeutic doses.[3] Owing to such novel properties, dexmedetomidine may be a safer drug to provide sedation in patients undergoing peripheral nerve block. It has been used for sedation in various anesthesia procedure like MRI, spinal anesthesia involving vide range of patients including infants and children.[4] High dose of dexmedetomidine has been successfully used in pediatric magnetic resonance imaging (MRI) sleep studies.[5] Additionally, in a case report it was reported that dexmedetomidine was successfully and safely used for sedation during spinal anesthesia of a very old patient.[6] Dexmedetomidine has also been used effectively for the sedation of infants and children during spinal anesthesia in combination with ketamine preserving cardiovascular and respiratory functions.[7] Favorable results have been obtained by dexmedetomidine sedation during septoplasty surgery under local anesthesia in terms of satisfaction from anesthesia and surgery.[8] However, it has not been used for sedation in various other regional anesthesia procedures such as lower limb nerve block.

Propofol is being safely and successfully used for a long time during any intervention and imaging technique requiring sedation in patients with spontaneous respiration, as well as in regional anesthesia and peripheral nerve blocks. Various studies have shown that propofol is a preferable agent for sedation when used in combination with opioids since its efficacy starts and ends easily and dose titration is easily performed.[9,10] Bilateral brachial plexus block has been successfully performed with propofol–ketamine sedation under ultrasonography guidance.[11]

Sciatic nerve block via anterior approach can be performed under ultrasonography guidance and such an approach is very comfortable for the patient; femoral nerve block as well can be performed at the same time in the same region.[12,13]

The present study was aimed to compare the effects of intravenous continuous infusion of dexmedetomidine and propofol on the sedation characteristics of patients undergoing sciatic nerve block and femoral nerve blocks through anterior approach.

Materials and methods

After the study was approved by the local ethics committee of Yeditepe University Medical Faculty (approval date and number: 02.08.2011; 130), this study was made at anesthesiology clinic of Bağcılar training and research hospital, İstanbul, Turkey in 08 September 2011 to 07 June 2012,