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Original Article

Reconstruction of the anterior cruciate ligament: comparison of analgesia using intrathecal morphine, intra-articular morphine and intra-articular levobupivacaine☆

Leandro Queiroz Pinheiro[a], *Edmundo Neri Junior*[a], *Reginaldo Mendonça Fernandes*[a], *Rodrigo Tavares Cardozo*[a,*], *Priscila Rodrigues Rezende*[b]

[a] *Serviço de Ortopedia e Traumatologia de Ribeirão Preto, Ribeirão Preto, SP, Brazil*
[b] *Cooperativa dos Anestesiologistas de Ribeirão Preto, Ribeirão Preto, SP, Brazil*

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ABSTRACT

Objective: To compare the analgesic effect of intra-articular administration of morphine and levobupivacaine (separately or in combination) with intrathecal administration of morphine in patients undergoing anterior cruciate ligament (ACL) reconstruction using autologous grafts from the patellar tendon.

Methods: This was a retrospective analysis on data gathered from the medical files of 60 patients aged 20 to 50 years who underwent knee video arthroscopy for ACL reconstruction. The patients were divided into four groups of 15 individuals (A, B, C and D) according to the agent administered into the joint and around the incision: 20 mL of saline solution with 5 mg of morphine in A; 20 mL of 0.5% levobupivacaine solution in B; 10 mL of solution with 2.5 mg of morphine plus 10 mL of 0.5% levobupivacaine solution in C; and morphine administered intrathecally in D.

Results: All the groups presented low pain scores during the first 12 h after the surgery. Groups B and C presented significantly greater pain scores than shown by group D (control), 24 h after the surgery. There was no statistical difference in pain scores between group A and group D.

Conclusion: The patients in group A presented analgesia comparable to that of the patients in group D, whereas the procedure of group C was no capable of reproducing the analgesic effect observed in group D, as observed 24 h after the surgery. Further studies are needed in order to show the exact mechanism of action, along with the ideal dose and concentration for applying opioids to joints.

☆ Work developed at the Serviço de Ortopedia e Traumatologia de Ribeirão Preto and at Hospital São Francisco, Ribeirão Preto, SP, Brazil.

* *Corresponding author.*
E-mail: torradarodrigo@hotmail.com (R.T. Cardozo).

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Reconstrução do ligamento cruzado anterior: comparação da analgesia com morfina intratecal, morfina intra-articular e levobupivacaína intra-articular

Palavras-chave:
Morfina/administração e dosagem
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RESUMO

Objetivo: Comparar o efeito analgésico da administração intra-articular de morfina e levobupivacaína (isoladas ou associadas) com a administração intratecal de morfina em pacientes submetidos à reconstrução do LCA com enxerto autólogo de tendão patelar.

Métodos: Análise retrospectiva dos dados coletados nos prontuários de 60 pacientes entre 20 e 50 anos, submetidos à vídeoartroscopia de joelho para reconstrução do LCA. Os pacientes encontravam-se separados em quatro grupos de 15 pessoas (A, B, C e D) de acordo com a administração intra-articular e peri-incisional de 20 mL de solução salina com 5 mg de morfina em A, 20 mL de solução a 0.5% levobupivacaína em B, 10 mL de solução com 2.5 mg de morfina e 10 mL de solução a 0.5% de levobupivacaína em C e morfina intratecalmente em D.

Resultados: Todos os grupos apresentaram baixos escores de dor nas primeiras 12 horas após a cirurgia. Os grupos B e C apresentaram escores de dor significativamente maiores do que o grupo D (controle) 24 horas após a cirurgia. Não houve diferença estatística entre os escores de dor do grupo A e do grupo D.

Conclusão: Nos pacientes do grupo A houve analgesia comparável à dos pacientes do D, ao passo que o procedimento em C não foi capaz de reproduzir o efeito analgésico observado em D quando os indivíduos foram estudados após 24 horas da cirurgia. Novos estudos são necessários para evidenciar o exato mecanismo de ação, bem como a dose e concentração ideais para aplicação articular de opioides.

Introduction

The anterior cruciate ligament (ACL) is the ligament most affected by knee injuries.[1] The majority of ACL injuries are related to practicing sports, especially those that demand rapid changes in direction in association with body contact.[2] Arthroscopic ACL reconstruction is a successful orthopedic procedure that is frequently performed. A considerable variety of techniques and materials are used in it.[3] In the United States, approximately 175,000 reconstructions involving this orthopedic operation are performed every year. ACL reconstruction has now become a worldwide practice[4] and is increasingly being performed as an outpatient procedure. In the service from which the present study originated, 204 ACL reconstruction operations were performed by two knee surgeons in 2012.

Adequate control over postoperative pain, particularly during its peak intensity on the first days after the operation, is a common concern shared by the surgeon, anesthetist, patient and physiotherapist. Good control over this pain enables early hospital discharge, comfort and the confidence to place weight on the operated limb early on and do physiotherapeutic exercises that have the objective of allowing gains in joint range of motion. It also prevents arthrofibrosis, improves tonus and muscle trophism and allows better motor control over the limb.[5,6] Among the benefits, greater independence in day-to-day activities and minimization of the duration of interruption of work activities can be highlighted.[5–7]

A variety of types of postoperative analgesia are frequently used: cryotherapy,[8,9] systemic analgesic and anti-inflammatory drugs (administered orally, intramuscularly or intravenously),[10] intra-articular injection of drugs,[11–18] anesthetic block of peripheral nerves[19,20] and intrathecal and peridural injection of analgesic drugs.[21]

The ideal treatment not only should provide adequate analgesia but also should be safe, with low incidence of complications and side effects. Intra-articular use of drugs has the advantage of diminishing the need for drugs with systemic action (intravenous or oral) and their side effects.[22] This is therefore an attractive method for clinical practice. Several drugs have been proposed and tested for intra-articular use, including non-steroidal anti-inflammatory drugs,[11,21] opioids[14,23] and local anesthetics.[17,23]

Although intra-articular analgesia after ACL reconstruction has already been analyzed in many studies, there are large numbers of variables relating to the surgical technique, type of anesthesia, drug dose, time for drug injection and postoperative protocol.

The expectation of the authors of the present study is that intra-articular drug application should be capable of replacing the use of intrathecal morphine and should diminish the need for intravenous administration of analgesics, in order to avoid their side effects. It can also be emphasized that, in investigating the pertinent literature, it was observed that in most of these studies, general anesthesia and autologous grafts from the flexor tendons were used. However, in the services where the present study was conducted, the anesthetic