Original Article

Use of adrenalin with lidocaine in hand surgery[☆,☆☆]

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ABSTRACT

Objective: Because of the received wisdom within our setting that claims that local anesthesia should not be used with adrenalin in hand surgery; we conducted a study using lidocaine with adrenalin, to demonstrate its safety, utility and efficacy.
Methods: We conducted a prospective study in which, in wrist, hand and finger surgery performed from July 2012 onwards, we used local anesthesia comprising a 1% lidocaine solution with adrenalin at 1:100,000. We evaluated the quantity of bleeding, systemic alterations, signs of arterial deficit and complications, among other parameters. We described the infiltration techniques for specific procedures individually.
Results: We operated on 41 patients and chose to describe separately the raising of a lateral microsurgical flap on the arm, which was done without excessive bleeding and within the usual length of time. In only three cases was there excessive bleeding or use of bipolar tweezers. No systemic alterations were observed by the anesthesiologists or any complications relating to ischemia and necrosis in the wounds or in the fingers, and use of tourniquets was not necessary in any case.
Conclusions: Use of lidocaine with adrenalin in hand surgery was shown to be a safe local anesthetic technique, without complications relating to necrosis. It provided efficient exsanguination of the surgical field and made it possible to perform the surgical procedures without using a pneumatic tourniquet, thereby avoiding its risks and benefiting the patient through lower sedation.
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Uso da adrenalina com lidocaína em cirurgia da mão

Palavras-chave:
Anestesia local
Adrenalina

RESUMO

Objetivo: Por causa do dogma existente em nosso meio de que não deve ser usada anestesia local com adrenalina na cirurgia da mão, fizemos um estudo com o uso de lidocaína com adrenalina para demonstrar sua segurança, utilidade e eficácia.

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Cirurgia
Mão
Dedos

Métodos: Fizemos um trabalho prospectivo no qual, a partir de julho de 2012, usamos como anestesia local uma solução de lidocaína 1% com adrenalina 1:100.000 nas cirurgias em punho, mão e dedos e avaliamos a quantidade de sangramento, as alterações sistêmicas, os sinais de déficit arterial e as complicações, entre outros parâmetros. Descrevemos as técnicas de infiltração de procedimentos específicos individualmente.
Resultados: Operamos 41 pacientes e optamos por descrever separadamente um levantamento de retalho microcirúrgico lateral do braço, que ocorreu sem sangramento excessivo e no tempo habitual. Em apenas três casos houve sangramento e uso de pinça bipolar excessivos. Não houve alterações sistêmicas verificadas pelos anestesiologistas ou complicações relacionadas à isquemia e necrose nas feridas ou nos dedos e em nenhum caso foi necessário o uso do torniquete.
Conclusões: O uso de lidocaína com adrenalina na cirurgia da mão mostrou-se técnica anestésica local segura, sem complicações relacionadas à necrose, forneceu campo cirúrgico exsangue eficiente, permitiu os procedimentos cirúrgicos sem uso do torniquete pneumático, evitou seus riscos e beneficiou os pacientes com menor sedação.
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Introduction

"Adrenaline should never be injected into the finger, because of the gangrene that frequently results." This affirmation, which appears in Bunnel's textbook *Surgery of the hand* (1956), serves to demonstrate the extent to which adrenaline in association with a local anesthetic has been rejected for hand surgery.[1] Despite studies showing that the true cause of digital gangrene is not adrenaline, such as the work by Thomson,[2] the myth revolving around the causal relationship between adrenaline and necrosis persists until today.

It is important to break down this dogma, because the method most used for maintaining the operative field free from blood (pneumatic tourniquets) may cause difficulties, given that patients can only tolerate this for short periods, of less than 30 min on average.[3] Thus, greater sedation is needed and the pneumatic tourniquet has to be deflated, with a wait before inflating it again so as to avoid complications such as ischemia and muscle dysfunction, along with other possible complications.[4]

Use of adrenaline provides the advantages of a faster start and longer duration of anesthesia, a longer-lasting surgical field without blood, without interruptions, and a lower concentration of anesthesia for achieving pain control.[5] This makes it possible to perform the surgery with a lower dosage of sedatives and also facilitates certain surgical procedures, such as tenolysis and tenorrhaphy, thus demonstrating the intraoperative efficacy of adrenaline.[6]

With the aim of demonstrating the various advantages of using lidocaine with adrenaline in hand surgery, given the lack of evidence of occurrences of digital necrosis in the literature, and also because of the impressive strength of this dogma in our setting and the scarcity of this subject in the Brazilian literature, we decided to conduct this study in order to demonstrate the safety and efficacy of this method in hand surgery.

We chose to always have an anesthetist present during our surgical procedures, which were all performed in a surgical center. Thus, our study differed from those conducted in other countries, without an anesthetist and with procedures done in an outpatient environment, which we judged not to be applicable to our country, because of the legislation and the behavior of our patients in the light of the situation of tension that the procedures involve.

Methods

Starting on July 6, 2012, patients at our institution and in private hospitals underwent the method.

Patients undergoing surgery as a result of complications (for example, recurrence of carpal tunnel syndrome or synovial cysts), or who presented poor peripheral perfusion before the surgery, histories of vascular diseases or contraindications to anesthetics, were excluded.

The solution used was 1% lidocaine with adrenaline at 1:100,000. The standard was the solutions described by Lalonde,[6] who used them in cases in which less than 50 mL was necessary. We used flasks of 20 mL of 1% lidocaine and added 0.2 mL of adrenaline to obtain the solution. If a greater volume is necessary, Lalonde recommends that the concentrations should be more diluted (Table 1), with a view to maintain a safety limit for lidocaine with adrenaline of less than 7 mg/kg of weight.

Table 1 – Dosage and concentration of lidocaine with adrenaline to be injected into the forearm, hand and fingers.

Volume of adrenaline and lidocaine solution needed	Adrenaline and lidocaine concentration
Less than 50 mL	1% lidocaine with adrenaline at 1:100,000
Between 50 and 100 mL	1/2% lidocaine with adrenaline at 1:200,000
Between 100 and 200 mL	1/4% lidocaine with adrenaline at 1:400,000

Reproduced from Lalonde.[6]

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