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Original Article

Hernia Repair under Local Anesthesia

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Abstract

Background and Objective: **The author introduces a simple five-step infiltration technique that results in satisfactory local anesthesia and prolonged postoperative analgesia, requiring a maximum of 30 to 40 mL of local anesthetic solution.**

For the last 10 years, more than 200 groin hernia repairs have been performed under local anesthesia techniques. Initially, field block was the mean of achieving local anesthesia. During the last five years, a simple infiltration technique has been used because the field block was more time consuming and required larger volume of the local anesthetic solution. Furthermore, because of the blind nature of the procedure, it did not always result in satisfactory anesthesia and, at times, accidental needle puncture of the ilioinguinal nerve resulted in prolonged postoperative pain, burning, or electric shock sensation within the field of the ilioinguinal nerve innervation.

Materials and Methods: **More than 200 patients underwent operations at Debaratana Nakhon Ratchasima Hospital and at Pakthongchai Hospital from January 2007 to December 2015. All patients were assessed preoperatively by a surgeon and written informed consent was obtained. Patients were monitored intraoperatively for heart rate, blood pressure and pulse oximetry.**

Conclusion: **For the last 10 years more than 200 adult patients with reducible groin hernias satisfactorily underwent operations under local anesthesia without complications.**

The preferred choice of anesthesia for all reducible adult inguinal hernia repair is local anesthesia. It is safe, simple, effective, and economical, without post anesthesia side effect. Furthermore, local anesthesia administered before the incision produces longer postoperative analgesia because local infiltration, theoretically, inhibits build-up of local nociceptive molecules and results in better postoperative pain control.

Keywords: **Hernia repair, local anesthesia, pain control**

INTRODUCTION

The preferred choice of anesthesia for all reducible adult inguinal hernia repairs is local anesthesia. It is safe, simple, effective and economical, without post-anesthesia side effects[1]. Furthermore, local anesthesia administered before the incision produces longer postoperative analgesia because local infiltration, theoretically, inhibits build-up of local nociceptive molecules and results in better postoperative pain control. Experimental studies have demonstrated that peripheral tissue injury may result in long-lasting changes in central processing with reduction in threshold, amplification of responses, expansion of receptive fields, and (after) discharge of dorsal horn neurons. Subsequently, it has been suggested that surgical trauma in human may lead to comparable alterations, resulting in amplification and prolongation of postoperative pain[2-4]. Preoperative

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local anesthesia, in conjunction with general or spinal anesthesia, has been shown to reduce postoperative pain and wound tenderness compared with general or spinal anesthesia alone[5-6].

Materials and Methods

More than 200 patients underwent operations at Debaratana Nakhon Ratchasima Hospital and at Pakthongchai Hospital from January 2007 to December 2015. All patients were assessed preoperatively by a surgeon and written informed consent was obtained. Patients were monitored intraoperatively for heart rate, blood pressure and pulse oximetry.

The success of local anesthesia requires a proper technique of administration and gentle manipulation of the anesthetized tissues. Several safe and effective anesthetic agents are currently available. Our choice is a 50:50 mixture of 2% lidocaine (Xylocaine, Astra Pharmaceutical Prod., Inc., Westborough, MA) and 0.9% sodium chloride. The therapeutic maximum dose: 4.5 mg/kg, up to 300 mg lidocaine without epinephrine; or 7 mg/kg, up to 500 mg lidocaine with epinephrine. Reduction in onset time has been reported with the addition of sodium bicarbonate 1 mEq per 10 milliliters (mL) of lidocaine[7]. Anesthetic duration time can be prolonged further by addition of epinephrine to the mixture. Epinephrine, however, may produce severe prolonged hypertension in patients receiving monamine oxidase inhibitors or tricyclic antidepressants.

An average of 45 mL of this mixture is usually sufficient for unilateral hernia operation.

The following are the steps of the technique of local anesthesia, as currently used at our institute:

1. Subdermal infiltration. Approximately 5 mL of the mixture is infiltrated along the line of the incision using a 1.5-inch long 24-gauge needle inserted into the subdermal tissue parallel with the skin (Figure 1). Infiltration continues as the needle is advanced. Movement of the needle decreases the likelihood of intravascular infusion of the drugs because even if the needle penetrates a blood vessel, the tip will not remain in the vessel long enough to deliver a substantial amount of the anesthetic agent intravenously. This step blocks the subdermal nerve endings and decreases the discomfort of the intradermal infiltration, which is the most uncomfortable stage of local anesthesia.



Figure 1 Subdermal infiltration

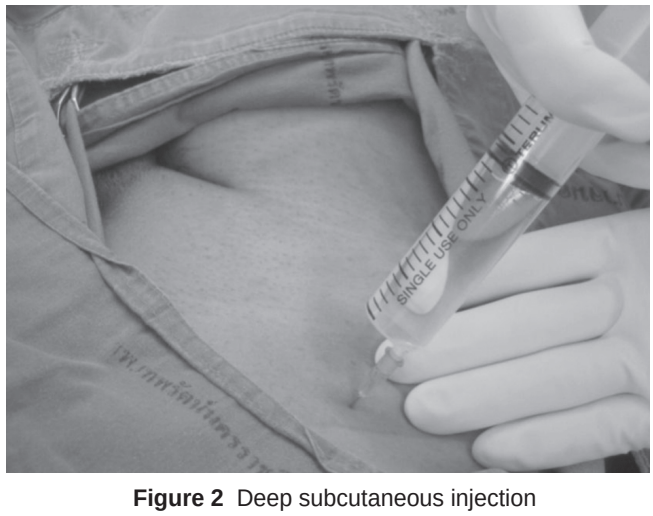


Figure 2 Deep subcutaneous injection

2. Intradermal injection (making of the skin wheal). The needle previously inserted into the subdermal plane is slowly withdrawn until the tip of the needle reaches the intradermal level. At this point, without extracting the needle completely, the intradermal infiltration and making of the skin wheal is performed by very slow injection of approximately 3 mL of the mixture along the line of the incision. Addition of sodium bicarbonate solution to increase the pH of the mixture and thereby decreases the burning pain of intradermal infiltration has been suggested[8].

3. Deep subcutaneous injection. Ten mL of the mixture is injected deep into the subcutaneous adipose tissue by vertical insertions of the needle (perpendicular to the skin) 2 cm apart (Figure 2). Again, injections are continued as the needle is kept moving to decrease the risk of intravascular infusion.



Figure 3 Injection beneath external oblique

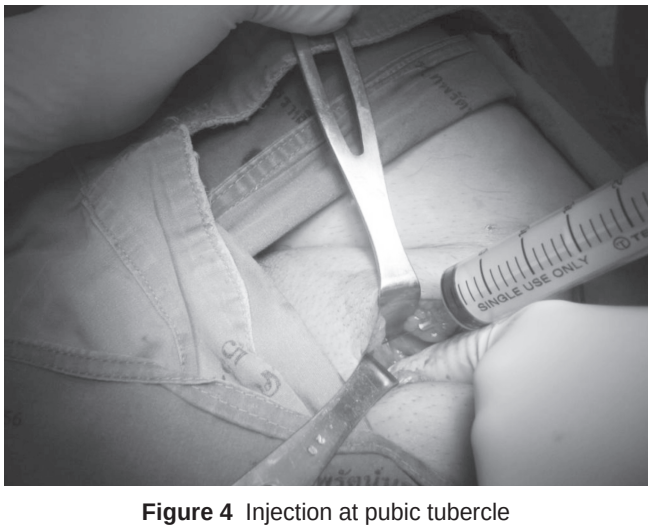


Figure 4 Injection at pubic tubercle

4. Subfascial infiltration. Approximately 8 to 10 mL of the anesthetic mixture is injected immediately underneath the aponeurosis of the external oblique through a window created in the subcutaneous adipose tissue at the lateral corner of the incision (Figure 3). This injection floods the enclosed inguinal canal and while the rest of the subcutaneous tissue is incised, anesthetizes all three major nerves in this anatomic region. Furthermore, it separates the external oblique aponeurosis from the underlying ilioinguinal nerve, thus decreasing the likelihood of injury to the nerve when the external oblique aponeurosis is incised.

5. Pubic tubercle and hernia sac injection. Occasionally, infiltration of a few mL of the mixture at the level of the pubic tubercle, around the neck and inside the indirect hernia sac, is required to achieve complete local anesthesia. Further prolongation of the local anesthesia can be achieved by splashing 10mL of the mixture, with the addition of epinephrine, into the inguinal canal before the closure of the external oblique aponeurosis and into the subcutaneous space before the skin closure[9] (Figure 4 and 5).

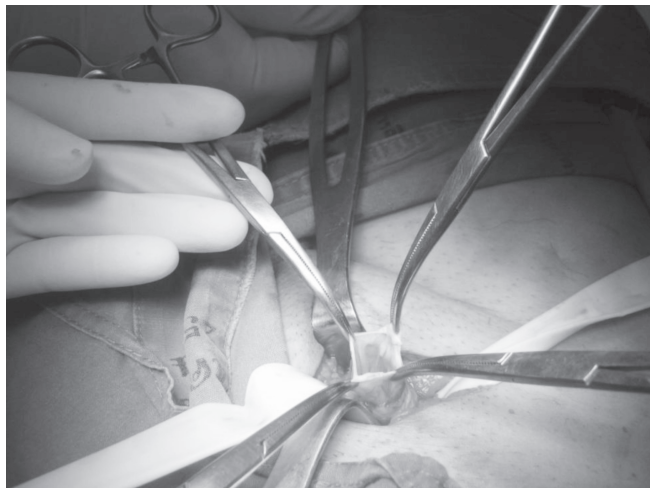


Figure 5 Hernia sac

Results

For the last 10 years, more than 200 adult patients with reducible groin hernias satisfactorily underwent operations under local anesthesia without complications.

Discussion

For the last 10 years, we have used local anesthesia for more than 200 groin hernia repairs. Obesity has not been a problem in our experience. Even morbidly obese patients do not have as much adipose tissue in the groin area as in the abdominal wall region. At times, spinal anesthesia is a preferred method for bilateral inguinal lhernia repair in obese patients. Administration of sedative drugs by the surgeon, or preferably, by an anesthesiologist as "monitored anesthesia care", for intraoperative infusion of rapid short-acting amnesic and anxiolytic agents, such as propofol, reduces the patient's situational anxiety. Furthermore, it decreases the required amount of local anesthetic agents, especially in the case of bilateral inguinal hernia repair[10].

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บทคัดย่อ

การผ่าตัดไส้เลื่อนโดยการฉีดยาชาเฉพาะที่

สาธิต บัวคล้าย

แผนกศัลยกรรม โรงพยาบาลเทพรัตน์นครราชสีมา จังหวัดนครราชสีมา

ภูมิหลัง: 10 ปีที่ผ่านมา ผู้ป่วยมากกว่า 200 ราย ที่ได้รับการผ่าตัดไส้เลื่อนขาหนีบ และเป็นการผ่าตัดที่ทำบ่อยที่สุดอย่างหนึ่งของงานศัลยกรรมทั่วไป วิธีระงับความรู้สึกที่ใช้ส่วนใหญ่มี 3 วิธีด้วยกันคือ การดมยาสลบ การฉีดยาชาเข้าทางไขสันหลัง (spinal anesthesia) และการฉีดยาชาเฉพาะที่ (local anesthesia) เพื่อให้การผ่าตัดสามารถดำเนินไปด้วยความเรียบร้อย และภายหลัง 5 ปีต่อมา ผู้เขียนได้ทำการผ่าตัดไส้เลื่อนโดยใช้วิธีระงับความรู้สึกด้วยการฉีดยาชาเฉพาะที่ที่มีข้อดีในแง่ที่มีความปลอดภัยสูงโดยขั้นตอนของการฉีดยาชาเฉพาะที่มี 5 ขั้นตอน

การนำเสนอรายงานผู้ป่วย: การศึกษานี้กระทำการในโรงพยาบาลเทพรัตน์นครราชสีมา และโรงพยาบาลปักธงชัย ตั้งแต่ มกราคม พ.ศ. 2550 ถึง ธันวาคม พ.ศ. 2558 ทำการผ่าตัดโดยศัลยแพทย์ และผู้ป่วยได้รับการติดตามการผ่าตัดโดยประเมินค่าอัตราการเต้นของหัวใจ ค่าความดันโลหิต และระดับค่าออกซิเจนในร่างกาย

สรุป: ผลการศึกษาเป็นที่น่าพอใจมาก โดยสามารถลดระยะเวลาการนอนโรงพยาบาล ลดความเจ็บปวดหลังการผ่าตัด และช่วยลดค่าใช้จ่ายในการผ่าตัดได้เป็นอย่างดี มีความปลอดภัย
