Hernia Repair under Local Anesthesia Step by Step Procedure

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บทคัดย่อ: การผ่าตัดใส่เส้นในเป็นการผ่าตัดที่ทํานองดีย์ที่สุดอย่างหนึ่งของงานศัลยกรรมทั่วไป การให้ยาพารี
ความสุขในผ่าตัดช่วยลดเจ็บปวดให้ผู้ป่วยได้พักผ่อนในศูนย์การรักษาได้ยาวนานกว่า โดยทั่วไป นิยมใช้ยาหน้าทํา
ิติทั้งหมด 3 วิธีคือด้วยการฉีดยาในระบบไขสันหลัง และการฉีดยาเฉพาะที่ที่ไม่ได้รับการผ่าตัดเสร็จสิ้น
สำนักใหญ่ในนวัตกรรมนี้ วิธีการผ่าตัดที่ใช้ขนาดใหญ่ 242 ราย เป็นเพศชายทั้งหมด อายุ ตั้งแต่ 9-85 ปี และผู้ป่วยได้รับการติดตามการผ่าตัด
โดยประเมินมี ภาวะการเต้นของหัวใจ ค่าความดัน
โลหิต และระดับค่าออกซิเจนในจํานวน เพื่อให้การ
ศึกษาผลลัพธ์ของการผ่าตัดได้เส้นผ่านศูนย์ซึ่งผลการ
ศึกษาพบว่าการผ่าตัดมีความปลอดภัยสูง มีวิธีการ
ผ่าตัดที่ไม่ยุ่งยาก มีประสิทธิภาพ ช่วยลดค่าใช้จ่ายใน
การผ่าตัด สามารถลดระยะเวลาการอยู่ในโรงพยาบาล
การผ่าตัดเลือกใช้เส้นผ่านศูนย์โดยการใช้ยาเฉพาะที่
เนื่องจากโรงพยาบาลขนาดเล็กที่มีวิสัญญีแพทย์
ไม่เพียงพอ สามารถนำไปใช้สำหรับการให้บริการกับ
ผู้ป่วยนอกในโรงพยาบาลได้ ดังนั้นการใช้ยาเฉพาะที่
จึงเป็นทางเลือกที่ดีขึ้นที่มีประสิทธิภาพสูงและ
มีการได้ถึงวิสัยทัศน์มากขึ้น

คำสำคัญ: การผ่าตัดใส่เส้น ยาชาเฉพาะที่ ความเจ็บปวด
Introduction

The favorable choice of anesthesia for all adults with reducible inguinal hernia repair is local anesthetic due to safety, simple, effectiveness, economical price, and without post anesthetic side effects.\textsuperscript{1-4} Furthermore, the local anesthesia administration before the incision provides a longer postoperative analgesia effect on account of local infiltration which theoretically inhibits the build-up of local nociceptive molecules leading to better pain control in the postoperative period. Several studies demonstrated that peripheral tissue injury may result in long-lasting changes in the central processing with a reduction in threshold, amplification of responses, expanded receptive fields after discharges of dorsal horn neurons. The studies suggested that the surgical trauma in humans possibly lead to comparable alterations resulting in the amplification and prolongation of postoperative pain.\textsuperscript{5-7} Preoperative local anesthesia with general or spinal anesthesia can reduce more postoperative pain and wound tenderness in comparison with utilization of only general or spinal anesthesia.\textsuperscript{4, 8}

In 1990, Cushing indicated in \textit{Annals of Surgery} that the hernias of all adults can be repaired under local anesthesia. Since then, the local anesthesia has been successfully used for repairing reducible groin hernias in adult patients at many center. The purpose of this study is to introduce a seven-step infiltrative technique that provides satisfactory results and also this method can prolong post-operative analgesia. Additionally, this technique requires maximum amount of 30 to 40 mL of the local anesthetic solution. A retrospective study of inguinal herniorrhaphy at Debaratana Nakhon Ratchasima Hospital and Pakthongchai Hospital between July 2007 and December 2015 were performed. Two hundred and forty-two patients with inguinal hernia from the age ranging from 9 to 85 years were included in to this study. The preoperative assessments of all patients were determined by a surgeon. The informed consent forms were obtained. The heart rate; blood pressure and pulse oximetry of the patients were intraoperatively monitored. The local anesthesia that prolonged postoperative analgesia requires a maximum of 30 to 40 mL of the local anesthetic solution. In addition, this method was deprived of post anesthetic side effect and could reduce hospital stay. The inguinal hernia repair under the local anesthesia is does not need the anesthesiologist. It can be offered as an ambulatory or day care surgery. Therefore, the use of local anesthesia is another alternative, and one prominent advantage over other methods.

\textbf{Keywords} : Hernia repair, Local anesthesia, Pain

Abstract

Herniorrhaphy is one of the most frequently performed operations. Inguinal hernia can be repaired in several ways and also the anesthesia is always required for this surgery. The three main methods of anesthetic administration are general anesthesia, spinal anesthesia and local anesthesia. There are numerous inguinal hernia patients in Nakhon Ratchasima and the majority of these patients are old mean age >55 years. This leads to the increment of the risk of diabetes and hypertension. The herniorrhaphy by local anesthesia is more inexpensive and safer than that of general anesthesia. During the last 10 years, the author has been introducing a simple seven-step infiltration technique for herniorrhaphy by using local anesthesia with satisfactory results. The local anesthesia that prolonged postoperative analgesia requires a maximum of 30 to 40 mL of the local anesthetic solution. A retrospective study of inguinal herniorrhaphy at Debaratana Nakhon Ratchasima Hospital and Pakthongchai Hospital between July 2007 and December 2015 were performed. Two hundred and forty-two patients with inguinal hernia from the age ranging from 9 to 85 years were included in to this study. The preoperative assessments of all patients were determined by a surgeon. The informed consent forms were obtained. The heart rate; blood pressure and pulse oximetry of the patients were intraoperatively monitored. The local anesthesia was the desirable option for all adults with reducible inguinal hernia repair as a result of safety, simple, effectiveness and economical cost. In addition, this method was deprived of post anesthetic side effect and could reduce hospital stay. The inguinal hernia repair under the local anesthesia is does not need the anesthesiologist. It can be offered as an ambulatory or day care surgery. Therefore, the use of local anesthesia is another alternative, and one prominent advantage over other methods.

\textbf{Keywords} : Hernia repair, Local anesthesia, Pain
Inguinal hernia repairs by Lichtenstein, Trabucco and Valenti techniques are safe and easy to perform with excellent results and no variation between each technique for all parameters studies. However the better outcome depend on more surgical experience of the operator.¹⁶

Materials and Methods

Two hundred and forty-two patients with inguinal hernia from the age ranging from 9 to 85 years underwent operations at Debaratana Nakhon Ratchasima Hospital and Pakthongchai Hospital between July 2007 and December 2015. The operations were performed by the same surgeon and technique. The preoperative assessments of all patients were determined by the same surgeon. The informed consents were signed by the patients. The heart rate, blood pressure and pulse oximetry of the patients were intraoperatively monitored.

Successful local anesthesia requires accurate administration technique and gentle tissue manipulation. Current anesthetic agents are safe and effective. The author used a 50:50 mixture of 2% lidocaine (Xylocaine) with adrenaline and NSS (0.9% Sodium chloride). The maximum therapeutic dose of lidocaine without epinephrine is 4.5 mg/kg (total dose is not more than 300 mg). For lidocaine with epinephrine maximum dose is 7 mg/kg (total dose is not more than 500 mg). In general, 45 ml of this mixture is sufficient for a unilateral hernia operation.

The following seven steps of local anesthetic technique are currently used at our institute. After the operative field is cleaned, it is painted with the povidone iodine solution and draped with sterile clothes except for the incisional area. The operative field includes the perineum, the groin, both scrota, and the upper part of thigh. Mark the incision line that is usually just above the inguinal ligament whereas its lateral end must pass through the deep inguinal ring.

Step 1. Subdermic infiltration with 10-15 ml of anesthetic along the incision line starting from the anterior superior iliac spine obliquely to the pubic tubercle (Fig 1). Please notice the bulging and pallor of the skin along the incision line. This step blocks the sub-dermic nerve endings and decreases the discomfort of the intradermic infiltration, which is the most uncomfortable stage of local anesthesia administration.¹⁷
**Step 2.** Wait until the anesthetic works, 5-10 ml anesthetic is added with subcutaneous infiltration with the right angle approach to the skin (Fig 2).

**Fig 2 Deep subcutaneous injection**

**Step 3.** After cutting through the skin and subcutaneous fat, Scarpa’s fascia is exposed. The tissue beneath the Scarpa’s fascia must be thoroughly infiltrated with 5-10 ml anesthetic (Fig 3).

**Fig 3 Exposure of Scarpa’s fascia**

**Step 4.** Cut Scarpa’s fascia with the scissors to find the external oblique aponeurosis. Then 2-3 ml anesthetic is infiltrated into each point beneath the aponeurosis for 2-3 points to block the ileoinguinal nerve. (Fig 4) 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 injuring the nerve when the external oblique aponeurosis is incised.

**Fig 4 Injection beneath the external oblique aponeurosis**

**Step 5.** Open the external ring through the internal ring, infiltrate 2 ml anesthetic into the spermatic cord. Separate and open the hernia sac, and infiltrate 2 ml anesthetic into the neck of hernia sac (Fig 5-6).

**Fig 5 Injection at pubic tubercle**

**Fig 6 Hernia sac and injection of anesthetic into the spermatic cord at deep ring, the neck of the sac**
Step 6. Completely dissect the hernia sac and cut it at its neck. Each 2 ml anesthetic is infiltrated at the conjoint tendon and Poupart’s ligament. Repair the abdominal wall with the appropriate techniques for each individual that depend on the findings during operation. With my own experience, there are 47 patients with Bassini Method (Tissue Repaired) and 196 with Lichtenstein’s Method (Mesh Repaired).

Step 7. Suture anatomically the incisional wound layer by layer.

Results

This is a retrospective analysis of 242 patients with inguinal hernia underwent operation under local anesthesia. All patients were male with the ages of 9 to 85 years and the average age was 56.26±0.72 years. All patients were allocated to two groups by surgical method. First group (tissue repaired by Bassini Method) (n=47) and second group (mesh repaired by Lichtenstein Method) (n=195). The average operation time was 37±11.3 minutes. The average length of hospital stay of the patients with inguinal hernia surgery by local anesthesia was 1.53±0.48 day. (Table I)

Table I Number of Hernia

<table>
<thead>
<tr>
<th>Total</th>
<th>242</th>
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<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>242</td>
</tr>
<tr>
<td>Female</td>
<td>0</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>0-20 years</td>
<td>11</td>
</tr>
<tr>
<td>21-40 years</td>
<td>28</td>
</tr>
<tr>
<td>41-60 years</td>
<td>89</td>
</tr>
<tr>
<td>61-80 years</td>
<td>103</td>
</tr>
<tr>
<td>&gt;81 years</td>
<td>11</td>
</tr>
<tr>
<td>Average</td>
<td>56.26±0.72 year</td>
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The surgery method

<table>
<thead>
<tr>
<th>Method</th>
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<tbody>
<tr>
<td>Bassini method</td>
<td>47</td>
</tr>
<tr>
<td>Lichtenstein’s method</td>
<td>195</td>
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Time surgery

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>&lt;30 min.</td>
<td>86</td>
</tr>
<tr>
<td>31-60 min.</td>
<td>118</td>
</tr>
<tr>
<td>&gt;60 min.</td>
<td>38</td>
</tr>
<tr>
<td>Average</td>
<td>37±11.3 minutes</td>
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</table>
Table I Number of Hernia (ต่อ)

<table>
<thead>
<tr>
<th>Length of stay in hospital</th>
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<tbody>
<tr>
<td>1 day</td>
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<tr>
<td>2 day</td>
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<tr>
<td>&gt;3 day</td>
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<tr>
<td>Average</td>
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Thirty-two patients had bilateral hernias, 145 patients had right sided hernia, 65 patients had left sided hernia, and 8 patients were operated for recurrent hernia. (Table II).

Table II Number of hernias according to site and type

<table>
<thead>
<tr>
<th>No. of hernias according to site</th>
<th>No. of hernias according to type</th>
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<tbody>
<tr>
<td>Right sided</td>
<td>Direct</td>
</tr>
<tr>
<td>145</td>
<td>68</td>
</tr>
<tr>
<td>Left sided</td>
<td>Indirect</td>
</tr>
<tr>
<td>65</td>
<td>174</td>
</tr>
<tr>
<td>Bilateral</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Total</td>
</tr>
<tr>
<td>242</td>
<td>242</td>
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All patients underwent operations under local anesthesia without complications. The patients were followed up about two weeks. It was found that 5 patients (2.1%) developed wound hematoma and 2 patients (0.8%) developed wound infection.

Discussion

For the past 10 years, the author has used local anesthesia also facilitates faster mobilization and earlier discharge from post anesthetic care units than other anesthetic techniques. General, Spinal and local anesthesia are all used for the surgery, but to different degrees.

In general, surgeons in Thailand are always familiar with the general anesthesia or spinal anesthesia for the inguinal hernia repair. In contrast, the local anesthesia for the inguinal hernia repair is more popular in foreign countries.

There are several studies which indicates that the post-operative pain of patients using local anesthesia have less post-operative pain than those using spinal anesthesia.\(^{18-20}\) Post surgery patients having less pain allows them to move their bodies earlier, so they have increased mobility and are discharged from hospital earlier than patients who used spinal anesthesia. Hence, herniorrhaphy with local anesthesia requires only a short postoperative stay in hospital.

Furthermore, local anesthesia administered before the incision produces longer postoperative analgesia because of local infiltration, theoretically, this inhibits the build-up of local nociceptive molecules and consequently there is better pain control in the postoperative period.\(^{21}\)

Young\(^{20}\) evaluated patients who had undergone inguinal herniorrhaphy with local, general, or spinal anesthesia and they were surveyed for satisfaction with the anesthesia. Satisfaction ratings were equal among the three groups. Complication rates were highest in the spinal anesthesia group for patients of all ages. Local anesthesia had the lowest complication rate in those over 65 and those with concomitant illnesses.
Ban\textsuperscript{22} study was to assess the efficacy of simplex lidocaine in local anesthesia for inguinal hernia mesh-repairs, comparing three different concentrations of lidocaine (concentration of 3.3, 5 and 8 mg/mL lidocaine). The local anesthesia technique was good with lidocaine alone in local anesthesia for inguinal hernia mesh-repairs, no patient required conversion to general anesthesia. The mean pain scores were not significantly different among the three groups.

Nesioonpour\textsuperscript{23} study on the use of bupivacaine as a long acting local anesthetic for the purpose of inducing preemptive analgesia in patients undergoing inguinal hernia repair under spinal anesthesia. The pre-operative local infiltration of bupivacaine reduces pain, nausea, vomiting and opioid use in the first 24 h after inguinal hernia surgery under spinal anesthesia. Therefore, further evaluation of the efficacy of this technique as a modality of preemptive analgesia is suggested.

**Conclusion**

The preferred choice of anesthesia for all reducible adult inguinal hernia repairs is local anesthesia. Our study has confirmed the result of safety, simple, effectiveness and economical cost, without post-anesthesia side effects. Both post operative discomfort and morbidity rates are low. The procedure can be learnt easily and quickly therefore it is the recommended procedure to be used in our practice for the repair of inguinal hernia.

The inguinal hernia repair under the local anesthesia is found more appropriate for any hospital because it costs less general and operative expense and does not need the anesthesiologist. The patients have more convenience and do not need the admission so the bed occupancy rate and over-crowding problem in wards could be relieved. It can be offered as an ambulatory or day care surgery. The patients have less wound pain and less postoperative complications as compared with the spinal or general anesthesia. The risk of general anesthesia can be avoided especially in the patients with asthma, myocardial infarction or the elderly with spinal fusion in whom the spinal anesthesia is hardly possible. And one prominent advantage of the local anesthesia for the inguinal hernia repair is the easy and rapid identification of hernia sac during operation by requesting the patients to cough or to strain.

**REFERENCES**


