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Original Article

Groin Hernia Repair under Local Anesthesia in One Day Surgery-8-year Experience

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Abstract

Objective: Inguinal hernia repair is one of the most commonly performed operations world-wide. The objective of the present study was to evaluation of outcomes of open repair hernia under local anesthesia (LA) as a one-day surgery at Chonburi Hospital, using established surgical techniques.

Patient and Methods: A retrospective review of all adult inguinal hernia repairs under LA performed over an 8-year period (2011-2018) at Chonburi Hospital was done. There were 914 patients. Data collected included demographics, surgical techniques, early and late complications. LA techniques included the use lidocaine with adrenaline plus bupivacaine, in 3 steps: inguinal nerve blocking, subcutaneous infiltration and stepwise infiltration.

Results: Almost all patients (96%) were operated on as day case surgery. A few patients with functional class III were admitted for postoperative observation. Half of patients were between 60 to 80 years of age and 12% were functional class III. Primary indirect inguinal hernia was seen in 75% of patients, 5% had bilateral inguinal hernia and a few had incarcerated inguinal hernia. The most common operation was the Lichtenstein repair (98%). There were neither deaths nor side effects of anesthetic agents. Hematoma was the most common complication, requiring reoperation in a few patients. There were a few cases of chronic groin pain that were adequately treated by medications. The recurrence of hernia was very low.

Conclusion: Groin hernia repair under local anesthesia is a good option for any elective primary groin hernia repair, especially in patients with multiple underlying diseases, due to safety, low morbidity, and economic advantages.

Keywords: Repair groin hernia under local anesthesia, Lichtenstien repair under local anesthesia

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Introduction

Inguinal hernia repair is one of the most commonly performed operations world-wide[1]. There are three methods of anesthetic administration: general anesthesia, spinal anesthesia and local anesthesia (LA). The choice of anesthesia for inguinal hernia repair is up to surgeon, the patient and the policy of the hospital. Several retrospective studies and randomized controlled trials have shown that local anesthesia provides the best clinical and economic benefits to patients[2-6]. Local anesthetic inguinal hernia repair in Thailand is being performed in few hospitals with a specialist interest in hernia repair. There are specialist centers of hernia repair and public hospitals in US and Europe have been achieved both in terms of high day-case rates and reduced long-term recurrence[8-10]. According to the guidelines of the European Hernia Society, inguinal hernia repair under local anesthesia is recommended for primary inguinal hernia[11]. The operation achieves good results, low morbidity and mortality, is low cost, and does not require hospitalization.

Inguinal hernia is the most common surgical disease at Chonburi Hospital. There are approximately 250 cases of inguinal hernia per year. Before 2011, most cases were performed under general or spinal anesthesia and required 2-3 days of hospitalization. Inguinal hernia repair under local anesthesia (LA) has been performed in Chonburi hospital since 2011. The first case of inguinal hernia repair under LA at Chonburi hospital was performed in 2010 on an elderly patient, with good results. The aim of the present study was to evaluate the outcome of open repair hernia under LA as a one-day surgery at Chonburi Hospital and to describe the surgical techniques.

Patients and Methods

We performed a retrospective medical chart review of all adult inguinal hernia repairs performed over an 8-year period (2011-2018) at Chonburi Hospital under the care of single consultant surgeon. The study population comprised all patients (n= 914) attending the Hernia Clinic. Patients receive hernia repair under LA if he/she: accepts LA; is ASA (American Society of Anesthesiologist) classes I, II or III with well-controlled systemic disease preoperatively; and has a good caregiver. LA was not used if the patient: fears the operation; is allergic to local anesthetic drugs; is obese (BMI > 30 kg/m^2); is uncooperative (with psychiatric disorder); has strangulated inguinal hernia. The data collected included demographics, ASA class, technique of repair, early and late complications. Early outcomes measures included intraoperative and postoperative pain, wound infection, wound hematoma, mesh graft infection, urinary retention, uncontrolled intraoperative pain, and unplanned readmission. Long-term outcome measures included chronic groin pain and hernia recurrence.

The preoperative preparation was done by the surgeon and a nurse manager. The local anesthetic procedure was explained to the patient by the surgeon. During operation, all patients were monitored for blood pressure and pulse oximetry. There was a nurse who observed the patient for signs of distress during operation. Patients were operated on in the morning, then closely observed at the recovery room and discharged 2 hours after operation. Nurses telephoned the patient to evaluate pain symptoms and to detect early complications at 1 hour, 24 hours and 72 hours after discharge. Patients returned for follow up at 7 days and one month after operation.

Surgical Technique

The anesthetic solution used for local anesthetic hernia repair consisted of 20 mL of 0.5% bupivacaine, 20 mL of 2% lidocaine in 1: 200,000 adrenaline and 60 mL of 0.9% saline. The total volume of the anesthetic solution is 100 mL, and in most cases approximately 60 mL will be required. The therapeutic maximum dose of lidocaine is 300 mg in plain form, and 500 mg with epinephrine. For bupivacaine, the dose is 175 mg plain, and 225 mg with epinephrine. Anesthetic duration time can be prolonged further by the addition of epinephrine to the solution[12,14].

1. Inguinal nerves blocking.

The first step is to block the ilioinguinal, iliohypogastric and the genital branch of the genitofemoral nerves. The ilioinguinal and iliohypogastric nerves are located under the external oblique fascia, 2 fingerbreadths medial to anterior superior iliac spine. Approximately 5 mL of the anesthetic solution is infiltrated at that area using a 2-inch long 25-gauge needle (Figure 1). To make sure that the tip of needle is beneath the external oblique fascia, 5 mL of the solution is infiltrated at internal ring using the same technique (Figure 2), and 5 mL of the solution is infiltrated posteromedial to the spermatic cord at pubic tubercle to block the genital branch of genitofemoral nerve (Figure 3). This step requires some experience.

Figure 1 Ilioinguinal and iliohypogastric nerve block. The first injection of 5 mL of local anesthetics, 2 finger breadths medial to the anterior superior iliac spine, beneath the external oblique fascia

Figure 2 The second injection of 5 mL of local anesthetics at internal ring, beneath the external oblique fascia.

2. Subcutaneous infiltration

Second step is the subcutaneous infiltration around the area of operation (Figure 4). Normally, 20 to 25 mL of the solution is used. The author uses a number 25 spinal needle for this step. Intradermal injection is done at the skin incision.

3. Stepwise infiltration

Although inguinal nerve blocking and subcutaneous infiltration have been performed, the loss of sensation is not complete. Patients might feel a little pain at certain areas, and stepwise infiltration is helpful. After opening the skin and subcutaneous tissues, the author will infiltrate 1-2 mL of the anesthetic solution at the Scarpa fascia (Figure 5) and before opening the external oblique fascia, 10 mL should be infiltrated under the

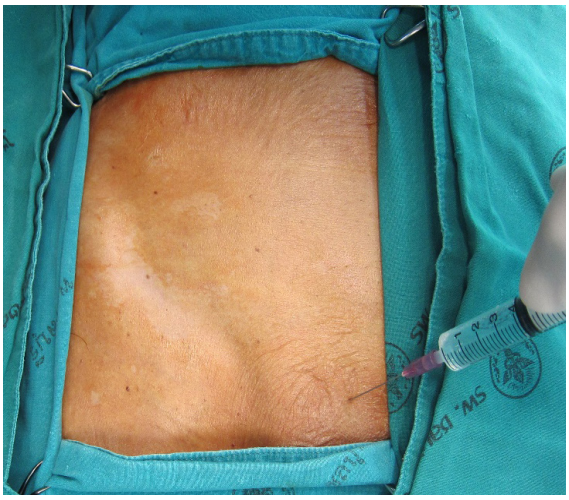

Figure 3 Genital branch of genitofemoral nerve block. Injecting 5 mL of local anesthetics at medial side of spermatic cord.

Figure 4 Subcutaneous infiltration should be done including area of operation. Use 15-20 mL of local anesthetics.

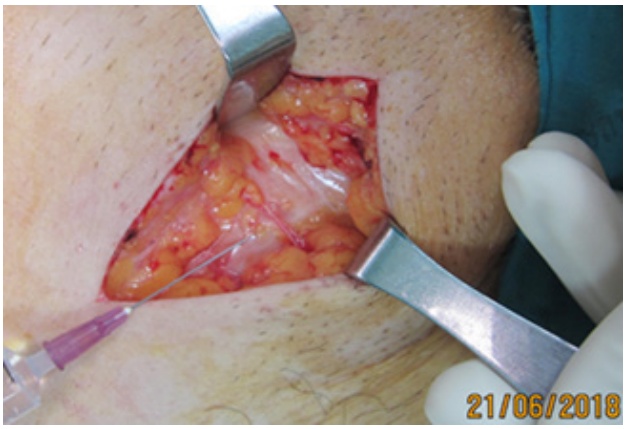

Figure 5 Injecting 1-2 mL of local anesthetics at Scarpa fascia before cutting it.

external oblique fascia (Figure 6). This also serves to separate the external oblique fascia from the underlying ilioinguinal nerve, decreasing the likelihood of injuring the nerve when the external oblique fascia is incised. An injection of 5 mL at the pubic tubercle and inguinal floor before mobilization of the spermatic cord should be done (Figure 7). Infiltration around the internal ring and hernia sac should also be done before dissecting the hernia sac from the spermatic cord (Figure 8). Further additional infiltration should be done when the patient feels pain anywhere and anytime during operation. Electrical cautery can cause severe pain so the author recommends sharp dissection.

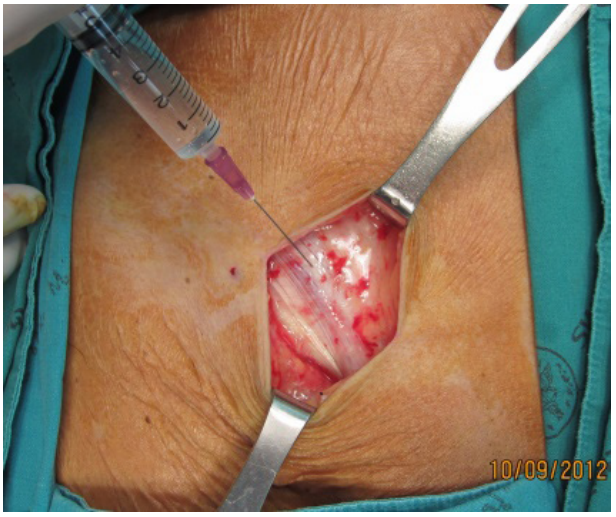

Figure 6 Before opening external oblique fascia inject 10 mL of local anesthetics.

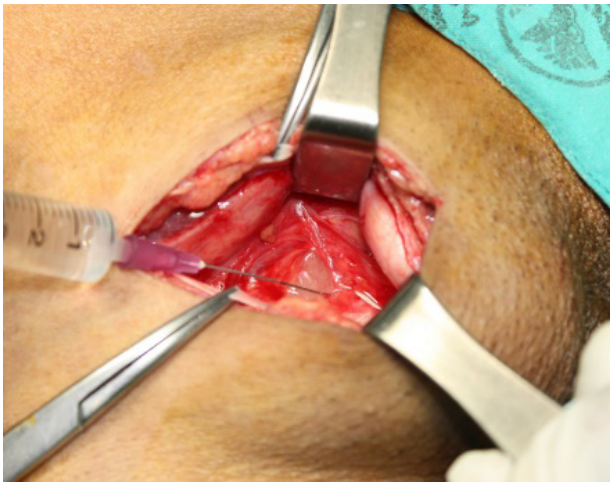

Figure 7 Before mobilization of spermatic cord, injection 5 mL at posterior aspect of spermatic cord.

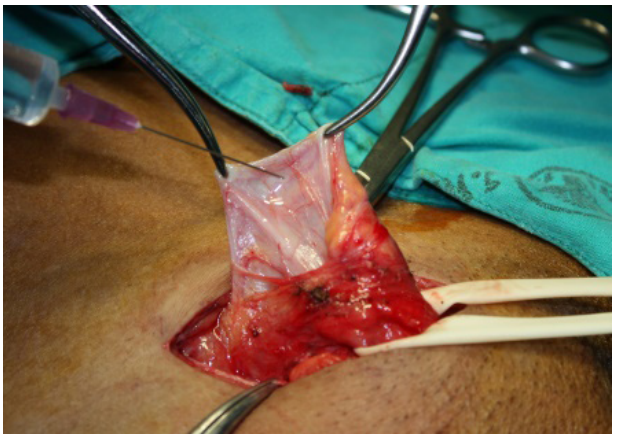

Figure 8 Injection the agents around peritoneum and internal ring. It helps to control pain and makes easy the peritoneum dissection from the spermatic cord.

Results

Eight hundred and seventy-eight patients (96%) left the hospital as day cases with an average time spent at the One Day Surgery Unit of 2 hours. Thirty-six patients (4%) could not be discharged home the same day. These patients had liver cirrhosis, end-stage renal failure and valvular heart diseases, which required prolonged and close observation for early complications (Table 1). Of all patients operated, 878 (96%) were male and 36 (4%) were female. More than 50% of patients were between 60 to 80 years of age. With respect to ASA class, 77% of cases were class I, 10% class II and 12% class III (Table 2).

Primary indirect inguinal hernia constituted 75% of all cases (Table 3), 10% were primary direct hernia and 5% bilateral inguinal hernia. There were 11 incarcerated inguinal hernias; 8 cases of omentum, 2 cases of large bowel, and 1 case of small bowel incarceration. Omentum incarceration was treated by omentectomy. There were 4 cases of inguinal hernia with undescended testis, and all these underwent orchidectomy due to testicular atrophy. All 57 cases of bilateral inguinal hernia underwent surgery on both sides. All 5 patients with recurrent inguinal hernia were operated on under LA because of high risk for general anesthesia.

Lichtenstein technique was used for 98% of patients, and a few cases underwent tissue repair (Table 4). Three cases required the assistance of the anesthesiologist due to uncontrolled perioperative pain. Most patients experienced little intraoperative pain and were satisfied with the treatment received.

Table 1 Times of discharge

Times	No	%
Same day (0-6 h)	878	96
24-48 hours	26	2.84
> 48 hours	10	1.16
Total	**914**	**100**

Table 2 Demographic variable of the patients

		No.	%
Gender	Male	878	96
	Female	36	4
Age group (year)	< 20	7	0.7
	20-40	117	12.1
	40-60	214	23.4
	60-80	502	54.8
	> 80	79	6.8
ASA score	1	707	77.3
	2	95	10.3
	3	112	12.2
	4	0	0

Table 3 Hernia type

Hernia type	No.	%
Primary IIH	699	76.4
Primary DH	91	9.9
Primary IIH with incarceration	11	1.5
Primary IIH with undescended testis	4	0.4
Bilateral IH	57	6.2
Pantaloons hernia	42	4.6
Recurrent IH	5	0.54
Femoral hernia	3	0.32
Umbilical hernia	2	0.2
Total	**914**	**100**

Table 4 Surgical techniques

	No.	%
Lichtenstein	885	98
Lichtenstein with omentectomy	6	
Lichtenstein with orchidectomy	4	
Bassini	11	1.2
McVay	6	0.5
Bilayer	2	0.2
Total	**914**	**100**

Table 5 Complications

	No.	%
Wound complications		
Hematoma	19	2
Hematoma with evacuation blood clot	4	0.4
Wound infection	5	0.54
Seroma	4	0.4
Mesh graft infection	1	0.1
Nerve injury	5	0.54
Urinary retention	1	0.1
Chronic groin pain	10	1.09
Recurrent hernia	30	0.32
Uncontrolled pain	1	0.1
Total	**53**	**5.79**

There were no deaths and no side effects of local anesthetic agents. The overall morbidity was 5.7% (Table 5), including 23 wound hematomas, of which 4 required reoperations. There were 10 cases of chronic groin pain, one of which was neuralgic pain. All chronic groin pain was treated with medications. There were three of recurrent inguinal hernia, which was treated by laparoscopic hernia repairs.

All patients were prescribed some form of pain medication (acetaminophen plus ibuprofen) upon discharge from the hospital. All patients were followed 7 days and then one month after surgery.

Discussion

Lichtenstein inguinal hernia repair under local anesthesia is the most popular procedure for primary inguinal hernia in USA and Europe[13]. At the Lichtenstein Hernia Institute and British Hernia Centre, nearly 100% of inguinal hernia cases are day surgery cases. In Thailand, most inguinal hernias are repaired using the Lichtenstein technique under general anesthesia or spinal block, but are also performed under local anesthesia in some hospitals. At Chonburi hospital, the first case of Lichtenstein repair under LA was performed in late 2010, and presently these procedures are being done for over 120 cases a year. Almost all patients can be discharged 2 to 4 hours after operation, although some will need hospitalization because multiple underlying diseases. The cost of this procedure is approximate two times lower than that of repair under general or spinal anesthesia.

There are many techniques of local anesthesia infiltration for open inguinal hernia repair. The author's technique included inguinal nerve blocks, field block (subcutaneous) and stepwise infiltration. This technique resulted in satisfied patients with very low intraoperative pain score. After operation, the most painful time is the next morning (VAS score 3 to 4) with subsequent decrease in pain. At 7 days after operation, most patients will have a pain score of 1 or 2. The maximum doses of bupivacaine and lidocaine without adrenaline are 2.5 mg/kg and 5 mg/kg, respectively, but maximum doses when used with adrenaline can be higher. If these agents are mixed (lidocaine plus bupivacaine), then it is recommended not to exceed 100% of the combined maximum dose[14]. Normally, the author uses 20 mL of 2% lidocaine with adrenaline, 20 mL of 0.5% bupivacaine 20 ml and 60 mL of normal saline combined into a 100 mL solution. Most patients required approximates 60 to 70 mL of this solution for one side of the operation. All patients had no side effects or drug allergy.

Preoperative preparation for inguinal hernia repair under LA is easier than that under general or spinal anesthesia. A few basic laboratory investigations (CBC, Anti-HIV) and a chest film are all that is required, with no need for an EKG. While the use of antibiotic prophylaxis for surgical site infection in hernia surgery is still controversial[15], the author uses antibiotics only in patients with a high risk of infection. Patients can have sugared soft drinks before operation to prevent hypoglycemia. A good caregiver should be available to look after the patient after operation, to take the patient back to the hospital when complications occur at home.

The incidence of early complications was found to be low, and there was no mortality. The most common complication was wound hematoma, which could be treated conservatively in most cases, and only four cases required open evacuation. Recurrence after Lichtenstein inguinal hernia repair are reported to be as low as 1 to 2% in a large series[18]. In the present series, there were only 3 cases of recurrent inguinal hernia and all were seen during the early part of the author's experience. These patients were treated by laparoscopic hernioplasty. The author uses 7.5 x 15 cm light-weight mesh for Lichtenstein repair and prefers self-gripping mesh or using glue to avoid nerve entrapment from suturing.

Chronic groin pain following inguinal hernia repair is a common problem. Postoperatively, after 6 months, 8 to 16% of these patients experience chronic pain to a degree that impairs their daily lives. A problem with some of the current evidence, based on research in chronic pain after groin hernia repair, is the use of different assessment methods and different lengths of follow up[16-17]. In Thailand, the incidence of chronic pain after groin hernia surgery is unknown. In the present study, only a few cases of chronic groin pain were identified, possibly because of the short duration of follow up. All 10 cases of chronic groin pain were managed by watchful waiting and pharmacologic intervention. Most of the pain improved with time. Prevention of chronic groin pair is probably the best approach. In the author's practice, chronic groin pair is prevented by avoiding nerve entrapment from suturing, by using light-weight mesh and minimal tissue injury during surgery.

Conclusion

Groin hernia repair under local anesthesia is a good option in all cases of elective primary inguinal hernia repair, especially for patients with multiple underlying diseases, because of safety, low morbidity and economic advantages. This procedure can be done as a day-case surgery that avoids hospitalization. The key to success is intraoperative pain control with proper technique of local anesthesia.

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บทคัดย่อ **การผ่าตัดไส้เลื่อนขาหนีบโดยการฉีดยาชาเฉพาะที่**

เกรียงศักดิ์ ชัยนาภาพงษ์

กลุ่มงานศัลยกรรม โรงพยาบาลชลบุรี

ความเป็นมา: ไส้เลื่อนขาหนีบเป็นโรคที่พบบ่อยของศัลยกรรม การรักษามาตรฐานคือการผ่าตัดซ่อมแซมโดยการใช้แผ่นผนังหน้าท้องเทียม โดยวิธีการดมยาสลบ หรือ การฉีดยาชาเข้าไขสันหลัง ส่วนการใช้วิธีการฉีดยาชาเฉพาะที่ยังไม่ได้รับความนิยมแพร่หลายขึ้นกับศัลยแพทย์ การผ่าตัดชนิดนี้เป็นการผ่าตัดที่ให้ผลการรักษาที่ดีมาก ปลอดภัย และประหยัดค่าใช้จ่าย

จุดประสงค์: เพื่อศึกษาผลการรักษาการผ่าตัดไส้เลื่อนขาหนีบโดยการฉีดยาชาเฉพาะที่ และเทคนิคการผ่าตัด

วัสดุและวิธีการ: เป็นการวิจัยศึกษาย้อนหลังเพื่อดูผลการรักษาการผ่าตัดไส้เลื่อนขาหนีบด้วยวิธีการฉีดยาชาเฉพาะที่ของโรงพยาบาลชลบุรี โดยศึกษาผู้ป่วยที่ผ่าตัด ตั้งแต่ ปี 2554-2561 มีจำนวนผู้ป่วยทั้งหมด 914 คน โดยมีการเก็บข้อมูลพื้นฐานของผู้ป่วย ชนิดการผ่าตัด ภาวะแทรกซ้อนจากการผ่าตัด และการกลับมาเป็นซ้ำของไส้เลื่อน

เทคนิคการผ่าตัด: ใช้ยาชา lidocaine with adrenaline ผสมกับ bupivacaine ขั้นตอนการฉีดยาชาประกอบด้วย 3 ขั้นตอนคือ inguinal nerve block การฉีดยาชาในชั้นไขมัน และการฉีดยาชาในระหว่างการผ่าตัด

ผลการศึกษา: 96% ของผู้ป่วยรักษาแบบวันเดียวกลับ 4% ของผู้ป่วยต้องนอนโรงพยาบาลเพื่อสังเกตอาการ ส่วนใหญ่เป็นผู้ป่วยที่มีโรคประจำตัวรุนแรง 50% ของผู้ป่วยมีอายุระหว่าง 60-80 ปี ผู้ป่วยเกือบทั้งหมดรักษาโดยการผ่าตัดแบบ Lichtenstein repair พบภาวะแทรกซ้อนจากการผ่าตัดในระดับต่ำ ส่วนใหญ่เลือดออกใต้แผลผ่าตัด ไม่พบผู้ป่วยเสียชีวิตและผลข้างเคียงของยาชา และพบการเกิดเป็นซ้ำของไส้เลื่อนในระดับต่ำ

สรุปผลการศึกษา: การผ่าตัดรักษาไส้เลื่อนขาหนีบโดยใช้ยาชาเฉพาะที่เป็นการผ่าตัดที่มีผลการรักษาที่ดีมาก ปลอดภัย ค่าใช้จ่ายน้อย และลดจำนวนผู้ป่วยที่ต้องนอนโรงพยาบาล