

Outcome of using local anesthesia in repair of inguinal hernia in comparison to general anesthesia

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Abstract

Background: Local anesthetic inguinal hernia repair may be technically demanding. There are minimal data regarding the outcomes of local anesthetic hernia repair in comparison to general anesthesia. This study analyses the outcomes of mesh hernia repair under local anesthesia versus general anesthesia.

Patients and methods: A prospective randomized control study of mesh inguinal hernia repairs over a 22 months (Jan 2009-Oct 2010) period was performed. A total number of 205 patients with inguinal hernia were included in this study in Baghdad teaching hospital, patients were divided in two groups. Group 1 (study group) included 106 patients who had their hernia repaired under local anesthesia. Group 2 (control group) included 99 patients who had their hernia repaired under general anesthesia.

Results: A total of 215 hernia repairs were performed during the study period. Of these, 110 (51.2%) repairs were performed under local anesthesia (LA) and 105 (48.8%) repairs under general anesthesia (GA). Early postoperative complications revealed no significant differences in both groups in the incidence of hematoma, wound infection and scrotal swelling. There were no pulmonary or urinary complications in study group (LA), in comparison to control group (GA). Five patients (4.7%) developed pulmonary complications and 4 (3.8%) developed urinary complications in control group (GA). The day-case rates were significantly higher under LA compared to GA (80% versus 40%; $P < 0.05$). Patients operated under LA had lower postoperative analgesic requirements ($P < 0.05$). There were no recurrences at a median follow-up of 1 year (range 3-22 months). Long term questionnaire revealed higher satisfaction rates with LA compared to GA repair.

Conclusions: The use of LA results in an increased day-case rates, lesser postoperative analgesic requirements and no pulmonary and micturition problems. Both anesthetic techniques were associated with good outcomes and satisfaction.

Keywords: Inguinal hernia –mesh repair– Local anesthesia

Introduction

Groin hernia is a common pathologic entity, and its incidence is high in patients above 65 years (1). Surgical repair of groin hernias is one of the most commonly performed procedures in the Western world (2). Several

techniques have been employed since Bassini first described his repair in 1889. However, this technique was associated with high recurrence rates ranging from 5 to 21% (3,4). Subsequently, in 1986, the Lichtenstein hernia repair was advocated, which has

revolutionized hernia surgery; it is the most commonly employed hernia repair today (5). Since the description of the Lichtenstein repair, several tension-free techniques have been described. The most commonly used techniques include the mesh plug repair (6), the laparoscopic transabdominal preperitoneal repair (7) and totally extra peritoneal repair approaches (8), the preperitoneal approach of Nyhus (9) and, more recently, the Prolene Hernia System (Ethicon; Somerville, N.J., USA), a one-piece bilobed device connected by a mesh cylinder (10). Lichtenstein modern herniologist performed operation under LA. Using synthetic propene mesh, in the form of simple on lay graft to the posterior wall of inguinal canal or plugged or rolled form for patulous internal ring or femoral canal or even in recurrent hernia (16,17,18). Hernia repair under local anesthesia like other regional anesthesia has become in common use during the last four decades owing to the availability of rapidly acting safe local anesthetic drugs with an adequate duration of action have all combined to make regional anesthesia quick, safe and reliable (26). The advantages of total pain relief both during and after surgery are clear (26,27). Local anesthesia is also considered acceptable in terms of costs (25). Consequently, to increase safety and, if possible, to reduce costs, the surgical treatment of a common disorder such as groin hernia should be performed using surgical techniques that, proven to be effective, can be carried out under local anesthesia. In private specialized hernia centers, local anesthesia (LA) is often preferred for day-case open hernia repair (24,25,30).

The aim

This study was to evaluate the results of using local anesthesia in the repair of inguinal hernia in comparison to general anesthesia. The outcome measures were the following, Postoperative analgesia, hospital stay, wound complications, urinary complications, chronic groin pain and the recurrence rate.

Patients and methods

A prospective comparative study was conducted from Jan 2009 - Oct. 2010, in Baghdad teaching hospital. A total number of 205 patients with inguinal hernia were included in the study. Patients were either referred from the consultation clinic at Baghdad teaching hospital or from private clinic. Patients were divided in two groups. Group 1 (study group) included 106 patients who had their hernia repaired under local anesthesia. Group 2 (control group) included 99 patients who had their hernia repaired under general anesthesia. All patients were randomly allocated primarily on the basis of their willingness to choose the procedure whether local anesthesia or general anesthesia after full description of the technique. Patients deliberately excluded were children and those who were either unable or unwilling to cooperate and patients with emergency obstructed or strangulated inguinal hernia. All patients were subjected for routine preoperative assessment and special forms had to be filled for each patient including medical history and preoperative and postoperative details. All patients in study group were considered for day case surgery except patients who developed postoperative complication and those who were living in a district area. All patients were followed up for 1 year (3-22 months) postoperatively for development of long term complications.

Methods

All patients admitted at the morning of the operation following thorough discussion with the patient regarding the benefits of local

anesthesia and its lower risk, cooperation needed, and after preoperative preparation, the patient is placed in supine position. An anesthesiologist or nurse anesthetist was in attendance for each case. The usual anesthetic chart was kept and pulse, blood pressure and respiration were recorded in most instances. An intravenous cannula and i.v infusion of 5% dextrose was given during the operation; an attempt was made, however, to hold the amount administered to less than 500cc to avoid postoperative difficulty in voiding. Antibiotic (claforan vial) 1g i.v. was given at time of induction of local anesthesia and repeated after 8hrs and 16hrs. Following full aseptic preparation, the anterior superior iliac spine is allocated, at a point 2cm medial and 2cm caudal to this point, a 22-gauge needle is introduced perpendicularly, the needle is advanced until the aponeurosis of external oblique is reached, when a slight increase in resistance is noted. After aspiration, 5-6 ml of local anesthetic is injected, the needle is then advanced 1-2 cm through the internal oblique muscle and another 5ml of local anesthetic is injected. Alternatively, the oblique muscle can be infiltrated in a fan, from the same point, using 10ml of local anesthetic. In either case, the needle is then with-drawn to the skin, and further 10ml is added. The importance of adding supplementary dosages of anesthesia as soon as discomfort is suspected, cannot be overemphasized. If this is not done, the patient soon becomes restless and apprehensive as the surgeon persists in his dissection. Thin patients may require no further anesthetic after the initial infiltration. Others may require occasional small supplementary injections during the early part of the procedure. The amount of solution required is a function of the surgeon's experience and the patient's obesity. Postoperatively, the patients were not restricted as to either fluid or diet. The lack of pain sensation immediately postoperatively due to the action of local anesthesia especially when opiate is given I.V at the same time, enhances some patients to walk about freely during this period, these patients were noted to have increased pain after the anesthesia has disappeared, for this reason, subsequently, bed rest was advised, except for voiding until sensation had returned to the operative site and thereafter, ambulation was encouraged. The same anesthetic solution was used for every patient regardless of age or risk and it consists of 30-40ml of 1% xylocaine with or without adrenaline 1:200,000 which equals 300-400mg of xylocaine, no patient required more than 40mL. An intravenous opiate in small doses may be useful, like pethidine, fentanyl and sometime ketamine according to patients' control for pain. No supplemental

infiltrated in a fan shape subcutaneously, blocking any cutaneous innervation from the subcostal nerve. The genitofemoral nerve is blocked by an injection of 10 ml of local anesthetic in a fan from the pubic tubercle towards the external inguinal ring and then to the midline (Fig 3,4). In an awake patient, further injection of local anesthetic may be required into the deeper structures by the surgeon during surgery, the total dose of local anesthetic used was below the toxicity limits, was range from (30- 40ml) of 1% lignocaine with or without epinephrine. If the patient had pain, supplemental doses of the anaesthetic solution should be added immediately, with experience, the surgeon learns the areas where such supplementary anesthesia may be required, these areas, in order of dissection, are:

1. Below the shelving edge of the inguinal ligament
2. In the substance of the cord at the internal ring;
3. In the peritoneum at the neck of an indirect sac, and in the presence of large sac, where intraperitoneal manipulation may be required, 5cc of solution placed directly intraperitoneally gives excellent topical anesthesia for the peritoneum and involved viscera.

inhalation or intravenous anesthesia was used, as cooperation is helpful in gaining adequate anesthesia.

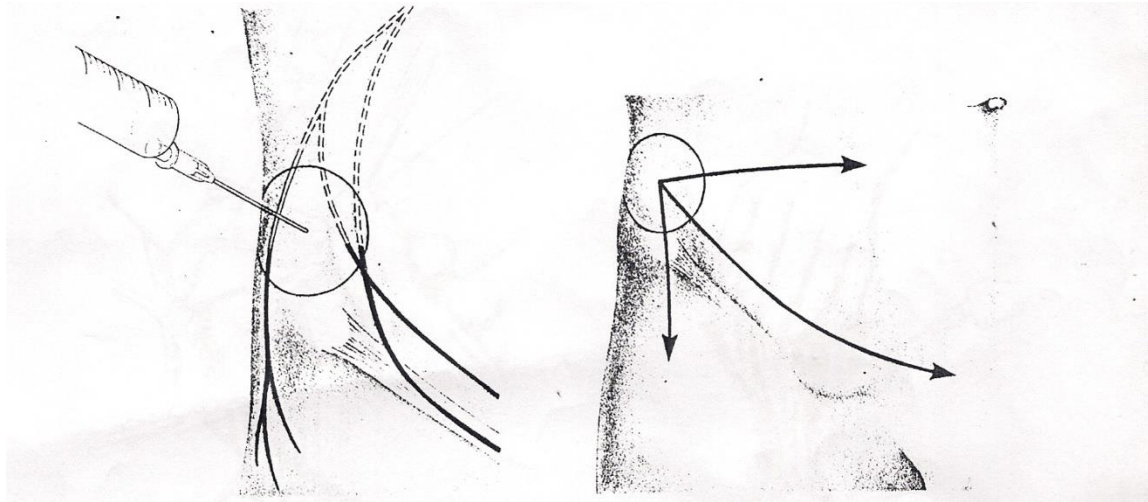


Fig (4) Retinal nerve block anesthesia.

Results

In this study 205 patients underwent 215 mesh repair for inguinal hernia, by using 2 method of anesthesia (local and general anesthesia. The median age was 46yr(18-70) in the study group(LA) and 41yr(20-65)in control group(GA).110 repair(51.2%)were performed under LA. and 105(48.8%) repair under GA,table(1).Four patients in study group(LA.) operated for bilateral hernia repair in separate session with 1 month apart ,6 patients in control group(GA.) underwent bilateral hernia repair under general anesthesia simultaneously table(2)

Table(1): The demographic characters of the patients.

variabls	LA. n.110	GA. n.105
Median age	46(18-70)yr.	41(20-65)yr.
Gender M:F	105:1	98:1
B.wt(kg)	63-86	65-84
NO.of patients	106	99

Table(2): Anatomical classification of the hernia.

Type of hernia	LA. n.110	GA. n.105
Primary H.	108(98.2%)	95(90.5%)
Recurrent H.	2(1.8%)	10(9.5%)
Rt.side H.	60(54.6%)	53(50.5%)
LT.side H.	42(38.2%)	40(38.1%)
Bilateral H.	4(3.6%)	6(5.7%)
Indirect H.	55(50%)	57(54.3%)
Direct H.	47(42.7%)	40(38.1%)
Pantaloon H.	7(6.4%)	6(5.7%)
Sliding H.	1(0.9%)	2(1.9%)

Under L.A the operative time was between(30-45)min.with average 37.5min.The amount of L.A needed was 35-40ml.Six patients developed vasovagal reactions early in the operation had good response to i.v atropine,antiemtic and i.v fluid,and the operation was completed smoothly without interruption.One patient needed GA.More than half of the patients had mild pain during the procedure table(3).

Table (3): Intraoperative parameters of local anesthesia

1.operative time	37.5(30-45)min.
2.vasovagal reactions	6 (5.4%)
Nausea	4(3.6%)
Bradycardia & hypotention	2(1.8%)
3.converation rate	1(0.9%)
4.pain control	50(45.5%)
No pain	
Mild pain	59(53.6%)
Moderate pain	0(0%)
Sever pain	1(0.9%)

Regarding the early postoperative complications:

Table (4): Early postoperative complications.

Variables	LA. n.110	GA. n.105	P.value
hematoma	3(2.7%)	2(1.9%)	NS
Wound infection	1(0.9%)	1(0.95%)	NS
Pulmonary Cx.	No	5(4.7%)	< 0.05
Scrotal swelling	2(1.8%)	1(0.95%)	NS
Urine retention	No	4(3.8%)	< 0.05
UTI	No	1(0.95%)	NS

Table (5): operative time and rate of the day case.

Variables	LA. n.110	GA. n.105	P.value
Operative time	37.5(30-45)min.	32.5(25-40)min.	NS
Day case	88(80%)	42(40%)	< 0.05

Regarding Postoperative pain control

Table (6): Postoperative pain control.

Analgesia requirement (1st 6hr)	LA. n.110	GA. n.105	P.value
Injectable (tramal amp.)	11(10%)	38(36.2%)	< 0.05
Oral (paracetamol OR NSAID)	74(67.3%)	67(63.8%)	< 0.05
Analgesia requirement	75%	100%	< 0.05

Regarding the long term follow up:

Table (7): Long term follow up.

variables	LA. n.110	GA. n.105	P.value
Duration of follow up	1yr.	1yr.	NS
Chronic groin pain	20(18.2%)	14(13.3%)	NS
Recurrence rate	No	No	=
Satisfaction rate	98(89%)	73(69.5%)	< 0.05

Discussion

The use of local anesthesia during inguinal hernia repair was practiced since the introduction of more safe local anesthetic drugs and the accurate delineation of peripheral nerves using nerve stimulators (24). Regarding the Intraoperative parameters of local anesthesia, in this study conversion for general anesthesia occurred in 1 patient (0.9%) due to severe pain and anxiety, vaso-vagal reactions occurred in 6 patients and we have no transient femoral nerve block. In comparison to other studies done by Torben Callesen et al in Denmark where his results were 4 patients converted for general anesthesia, 2 patients with vaso-vagal reactions, and 2 patients complained from transient femoral nerve block in 1000 inguinal hernias repair. (31) Conversion rate was nil in study done by P SANJAY and A WOODWARD in UK (32). A study by Glassow F also reported no conversion rate (33). A potential problem of local anesthetic inguinal hernia repair is toxicity especially in obese patients who require large volumes. The low percent of local anesthetic solution used in this study and sometime with addition of adrenaline 1:200000 allowed us to use large volumes of the solution especially necessary for obese

patients. In our study the early postoperative complications revealed. There was no statistically significant difference in the incidence of early complications between the two study groups except for the higher incidence of urinary and pulmonary complications in the GA group compared to LA group. This results were similar to study done by Alan Woodward et al in UK. (35) P. Sanjay in UK show No significant difference was noticed in incidence of urinary retention, haematoma and wound infection rates. (36) Comparison of general and local anesthesia either in randomized done by Song D et al (37) or non-randomized studies done by Pieper C (37), has shown a similar incidence of urinary retention between local and general anesthesia. In our study we found excellent postoperative pain control in study group (LA), in comparison with control group (GA), which is similar to study done by Alan Woodward et al in UK (p.value < 0.05). (35) Regarding the long term follow up, In this study 51.2% of the hernias underwent surgery using local anesthesia and a day-case rate of around 80% was achieved while general anesthetic repair were performed in 48.8% resulted in a day-case rate of 40%. Kark AE et al, Kingsnorth

AN et al, Amid PK et al, Amid PK et al, Robbins AW et al, in different Specialist hernia centres both in the UK (British Hernia Centre) and North America (Shouldice Clinic, Lichtenstein Hernia Institute and The Hernia Center in New Jersey) have achieved excellent results in terms of day-case rates and long-term recurrence and set the standards for inguinal hernia repair (39,40,42–46). Alan Woodward et al in UK was found significant day case rate 82.6% in local anesthesia and 45.6% in general anesthesia.(35) P. Sanjay in UK found in his study highly significant day case rate 91% in local anesthesia and 52% in general anesthesia.(36) In our study there was no statistically significant difference in the incidence of chronic groin pain between the general and local anesthetic groups where we have 18.2% following a local anesthesia and 13.3% following general anesthesia. Alan Woodward et al and P. Sanjay et al in UK both of them shows similar results.(35,36) While Kark AE et al show a very low incidence of chronic groin pain following a local anesthetic inguinal hernia repair (1% at 1-year follow-up).(38) There were no recurrence rate in both groups during the period of follow up which was 1yr(3-22) months. Alan Woodward et al show 1.2% long term recurrence rate and there was no statistically significant difference between GA and LA groups.(35) In this study there was higher rate of satisfaction in study group(LA) in comparison with control group(GA), where 98(89%) patients were satisfied with a repair under local anaesthesia and 73(69.5%) patients were satisfied with a repair under GA. P. Sanjay et al shows good satisfaction where 69 (98%) patients were satisfied with a repair under local anaesthesia and 67 (95%) patients would have the procedure performed under local anaesthesia if needed on the opposite side.(36) Alan Woodward et al shows high satisfaction rate where the satisfied patients in the LA group

were 66.9% compared with the GA groups 45%.(35)

Conclusions:

The use of LA results in increased day-case rates, lesser postoperative analgesic requirements and fewer pulmonary and micturition problems. Both anesthetic techniques are associated with good outcomes and excellent patient satisfaction.

Recommendations:

We recommend to use local anesthesia in inguinal hernia repair in:

1. High risk patients whose unfit for general anesthesia.
2. Elderly patients especially those with cardiovascular and pulmonary diseases.
3. To enroll more patients not necessarily have comorbid conditions.

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