

Research Article

A Comparison between Local and Spinal Anesthesia in Inguinalhernia Repair

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- Post-operative pain
- Lichtenstein technique

Abstract

Background: Inguinal hernia repair is one of the most common surgeries and can be performed under general, spinal or local anesthesia. The aim of this study was to compare the complications of local anesthesia (LA) with spinal anesthesia (SA) in surgical treatment of inguinal hernia.

Methods: We designed a randomized clinical trial study. Based on our inclusion and exclusion criteria, 60 patients were randomly selected and were put into 2 equal groups (LA and SA groups). All hernia repairs were performed by Lichtenstein technique. The early postoperative complications, surgery time, hospitalization time and pain score (by Visual Analogue Scale (VAS) score in millimeter) were evaluated.

Results: All patients were male. The mean age of LA and SA groups were 59.53 ± 9.62 and 59.16 ± 12.17 years, respectively ($P=0.89$). There was no significant difference in the body mass index (BMI), surgery time, surgery complications and hospitalization time between these two groups ($P>0.05$). The pain score at the 3, 6 and 12 hour periods after surgery was significantly lower in LA group ($P<0.0001$). But there was no significant difference between groups in pain score at the 24 hour period after surgery ($P=0.24$). Also, the LA group needed lower analgesic agents ($P=0.001$).

Conclusion: Our study showed that employing local anesthesia in inguinal hernia repair leads to reduction of postoperative pain at the first 12 hour period after surgery.

ABBREVIATIONS

LA: Local Anesthesia; **SA:** Spinal Anesthesia; **VAS:** Visual Analogue Scale; **BMI:** Body Mass Index; **SPSS:** Statistical Package for the Social Sciences

INTRODUCTION

Inguinal hernia is one of important surgeries in worldwide operation rooms. The goal of all these surgeries is reducing recurrence, postoperative pain, and cost and find out the most reliable and valuable methods [1]. There are different types of anesthesia including local, spinal, and general anesthesia. Various surgeons choose their own method based on their experience, postoperative pain, duration of return to the normal life and

recurrence rates [2]. Nowadays, using local anesthesia has become popular among surgeons especially for outpatient cases. The advantages of local anesthesia include simplicity, safety, extended postoperative analgesia, early mobilization without post anesthesia side effects and low cost. Also, spinal anesthesia may be used for inguinal hernia repair in outpatients. There are various studies with different results in this field of study [3-10]. Therefore, we designed this study to compare local anesthesia and spinal anesthesia in open hernia repair to show the outcomes of these two methods.

MATERIALS AND METHODS

Mehran Fazli et al. designed a clinical trial study (Iranian Registry of Clinical Trials Number of; IRCT201403316803N6)

and selected patients who were candidates for elective open surgical treatment of inguinal hernia repair at Imam Khomeini Hospital (Mazandaran University of Medical Sciences, Sari, Iran) between September 2012 and September 2013. Based on the study of Akcaboy et al. [6] and considering power analysis of 80% and value of 5% for error, the number of patients required for this study was calculated as about 60 patients.

Our inclusive criteria consisted of all patients ranged in age from 18-70 years old that experienced inguinal hernia and agreed to participate in this study. Our exclusive criteria included incarcerated hernia, hydrocele, femoral hernia, recurrent hernia, bilateral hernia, pregnant women, sensitivity to local anesthetic drugs, diabetes mellitus and coagulopathy disorder [7].

After selecting patients, we divided our patients by simple randomization method into two equal groups. 30 patients were put into the LA group who received local anesthesia and 30 patients were put into the SA group who received spinal anesthesia.

On arrival at the operating room, standard monitoring was established and all the patients received 10mg/kg Ringer's lactate solution. Then using an aseptic technique, a 25-gauge Quincke needle was inserted intrathecally via a midline approach in left lateral decubitus position [11]. After a successful dural puncture, spinal anesthesia was performed with 7 mg bupivacaine. Local anesthesia was applied through 10 ml 1% lidocaine, 2 ml 1:200,000 epinephrine and lidocaine, and 30 ml 0.5% bupivacaine mixture [11]. For local anesthesia, approximately 20 ml of the local anaesthetic mixture was infiltrated along the line of incision in the subcutaneous plane, around the pubic tubercle and the deep ring. After skin and external oblique aponeurosis incision, subaponeurotic infiltration of the mixture deep to the external oblique layer was done. Further infiltration was performed into the spermatic cord avoiding the testicular vessels, nerves and the vas deferens [12]. At the start of the operation, the patients were sedated via IV route with 1-2 ml midazolam (1 mg/ml); general anesthesia was not conducted on any patients [10]. Anesthesia was performed on all patients by one anesthesiologist and also, all surgery procedures (hernia repair by Lichtenstein technique) were performed by one surgeon.

We collected the patients' preoperative and postoperative data including age, gender, site of hernia, body mass index (BMI), surgery time, patients' pain intensity at the 3, 6, 12, and 24 hour periods after surgery by a visual analogue pain score (VAS), dose of analgesic, any early complications such as urinary retention, hematoma, infection and hospitalization time. To assess pain severity, we asked patients to rate their pain from 1 to 100 and the results were recorded as VAS values.

The difference in percentages (quality variables) was analyzed by chi-square test and Fisher's exact test. The mean difference was estimated by student's t-test, and data analysis was performed by SPSS version 16 software. A p value of smaller than 0.05 was considered to be statistically significant.

RESULTS

All participants were male. The mean age of the participants was 59.35± 10.88 years (median=64). There was no statistically significant difference in age, BMI, type and location of hernias between the groups (P<0.05) [Table 1].

The mean of surgery time for LA and SA groups were 50.17±10.04 minutes (median=45) and 50.83±9.10 minutes (median=47.5), respectively (P=0.79).

The investigation of the participants' pain intensity revealed that for the SA group the mean score of VSA at the 3, 6, 12, and 24 hour periods after surgery were 31.33±13.08, 43.60±11.92, 37.53±12.24, and 23.51±5.15, respectively. Also, for LA group, the mean score of VSA at the 3, 6, 12, and 24 hour periods after surgery were 22.00±4.19, 31.53±11.03, 25.86±6.68, and 24.30±4.58, respectively. A comparison between pain intensity of the LA and SA groups showed that at the 3, 6, and 12 hour periods after surgery the pain was significantly lower in the LA group (P<0.0001), but at the 24 hour period after the surgery no statistically significant difference was observed between these groups (P=0.24) (Table 2).

After surgery, the Pethidine injection was used to relieve pain if needed. The average dosage of Pethidine used for the LA and SA groups were 45±15.25mg (median=50) and 60.83±18.19mg (median=62.5), respectively. Statistically, the SA group needed a significantly higher dose of analgesic (P=0.001) [Table 2].

The mean of hospitalization time for the LA and SA groups were 1.13±0.34 days (median=1) and 1.03±0.18 days (median=1), respectively. There was no statistically significant difference in hospitalization time between these two groups (P=0.16) [Table 2].

The investigation of postoperative complications indicated 2 patients (6.7%) with urinary retention and 1 patient (3.3%) with hematoma in the SA group. No statistically significant difference was observed between these groups (P=0.076) (Table 2).

DISCUSSION

Any type of protrusion of abdominal-cavity contains caused by the weakness of abdominal wall in inguinal area is called inguinal hernia which generally can cause intestinal obstruction or bowel strangulation. Nowadays, the incidence and prevalence

Table 1: Participants' primary data.

Investigated factor	LA group	SA group	P value
Age (mean±SD)	59.53±9.62	59.16±12.17	0.89
BMI	normal	19(63.3%)	0.34
	overweight	10(33.3%)	
	fat	1(3.3%)	
Location of hernia(right side)	14(46.7%)	17(56.7%)	0.43

LA: Local Anesthesia; SA: Spinal Anesthesia; BMI: body mass index, SD: standard deviation

Table 2: Surgery time and postoperative complications.

Investigated factors	LA group	SA group	P value
Surgery time (minute)	50.17±10.04	50.83±9.10	0.79
Postoperative complications	Urinary retention	0	2(6.7%)
	Hematoma	0	1(3.3%)
	Infection	0	0
Pain killer dosage (Pethidine)	45±15.25mg	60.83±18.19mg	0.001
Pain intensity at the 3 hour period after surgery	22.00±4.19	31.33±13.08	0.000
Pain intensity at the 6 hour period after surgery	31.53±11.03	43.60±11.92	0.000
Pain intensity at the 12 hour period after surgery	25.86±6.68	37.53±12.24	0.000
Pain intensity at the 24 hour period after surgery	24.30±4.58	23.51±5.15	0.24
Hospitalization time (day)	1.13±0.34	1.03±0.18	0.16

LA: Local Anesthesia; SA: Spinal Anesthesia

of inguinal hernia is increasing [13]. Several types of anesthesia are used for repairing inguinal hernia such as general, spinal and local anesthesia which are different in complications of inguinal hernia repair such as pain, urinary retention, hematoma, wound infection and surgery time and cost [7,14,15]. The purpose of this study was to compare the complications of local anesthesia and spinal anesthesia in inguinal hernia repair.

The Lichtenstein repair used for the participants of our study is an approach which can be simply adopted to treat patients under spinal anesthesia due to its simple technique [1]. The average surgery time has been different in several studies [6,8,10]. For instance, Gultekin et al. observed that average surgery time of the LA and SA groups were 59±2.8 and 55±2.5 minutes, respectively [10]. In comparison with our study, their average surgery time was greater but they observed no statistically significant difference between these two groups that are similar to our findings.

No postoperative complications occurred in patients of the LA group. In fact, the urinary retention which is a common complication of spinal anesthesia did not occurred in LA group at all. Also, the other studies revealed that the prevalence of urinary retention among the patients who received local anesthesia was 0.1% [1-3,14,16]. On the other hand, the complications occurred in 10% of the patients of SA group, and 6.7% of them suffered from urinary retention. Several studies reported that the risk of occurrence of urinary retention after spinal anesthesia is up to 20% [1,14,16,17]. Erdem et al. reported that the range of postoperative complications of local and spinal anesthesia were 14.8% and 32.65%, respectively [18]; these results were greater than our results. In general, they observed no statistically significant difference in complications between these two groups that are similar to our results [18]. Gultekin et al. reported that under local anesthesia and spinal anesthesia, postoperative complications rates were 3% and 6%, respectively. These results were very close to our results. Gultekin et al. observed that there was no statistically significant difference between these two techniques. In addition similar to our results, none of the patients under local anesthesia suffered from urinary retention while it occurred to 3% of the patients under spinal anesthesia [10].

The treatment of postoperative pain is directly related to reduction of recovery time. Thus, regarding the reduction

of recovery time and mortality, the treatment of pain is very important [19]. Also, it is reported that surgery technique used for an open inguinal hernia repair has no effect on postoperative pain [20]. This study showed that at the first 12 hour period after surgery, the pain level of the patients received local anesthesia was significantly lower than those received spinal anesthesia. Therefore, consumption of pain killers in the LA group was significantly lower. Erdem et al. only studied pain level at the 4 hour period after surgery and observed no statistically significant difference between the LA and SA groups [18]. Moreover, Gultekin et al. scrutinized pain level at the 4, 8, 12, and 24 hour periods after surgery and observed no statistically significant difference between the groups [10]. A multicenter clinical trial was designed to investigate the pain level of patients under local, spinal and general anesthesia and it reported that primary pain level of patients after receiving local anesthesia was significantly lower compared with spinal and general anesthesia [14]. One of the main reasons reported for a significant reduction of pain under local anesthesia is using long-acting local anesthesia such as Bupivacaine, Ropivacaine and Levo-bupivacaine. This type of anesthesia remains for 6 hours that is longer than spinal and general anesthesia [1,14].

There was no statistically significant difference in hospitalization time between our groups. But Erdem's study showed that hospitalization time of patients who received spinal anesthesia was significantly greater than those who received local anesthesia [18].

CONCLUSION

In conclusion, the results of this study proved that employing local anesthesia in inguinal hernia repair leads to reduction of postoperative pain at the first 12 hour period after surgery. Thus, the consumption of painkillers is significantly reduced in comparison to spinal anesthesia technique.

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