Arch Clin Exp Med 2016;1(1):4-7 e-ISSN: 2564-6567

DOI: 10.25000/acem.289465 Research article / Araştırma makalesi

Day-case surgery for inguinal hernia: Lichtenstein inguinal hernia repair under local anesthesia performed by surgical residents

İnguinal herninin günübirlik cerrahisi: Cerrahi asistanları tarafından lokal anestezi altında gerçekleştirilen Lichtenstein inguinal herni onarımı

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Abstract

Aim: Lichtenstein inguinal hernia repair with local anesthesia as a day-case surgery is one of aspects of education in inguinal hernia surgery as a surgical training program. In this study, we aimed to present these surgery performed by residents.

Material and Methods: Forty years and older male patients diagnosed as primary inguinal hernia were included prospectively between June 2009 and March 2011. Surgical outcomes with respect to recurrence and chronic postoperative pain were studied.

Results: There were 151 patients with a mean age of 55.7±10.8. Intraoperative evaluation revealed direct in 84 (55.6%), indirect in 58 (38.4%) and combined hernia in nine (6.0%). Mean operation time was 51.2±13.2 minutes which was significantly higher in obese patients ($p<0.05$). Patients were discharged at postoperatively eight hours or less in 143 (94.7%). Most of the patients (90.7%) were reported to choose local anesthesia again. Eleven and four patients reported pain scores of 0.23±0.7 (range 0-4) and 0.07±0.4 (range 0-3) at 6th and 12th month evaluations, respectively. At the postoperative 1st day, 137 (90.7%) patients could return to daily activities. There were 28 (18.5%) hematoma and seroma formation, and 18 (11.9%) wound infection. There was no mesh reaction; however, two (1.3%) recurrences were detected after one year of the operation.

Conclusion: Lichtenstein inguinal hernia repair under local anesthesia as a day case surgery should be chosen as a primary treatment method, and can be performed by surgical residents under supervision in a safe manner.

Keywords: Hernia repair, Local anesthesia, Day-case surgery

Öz

Amaç: Lokal anestezi ile günü birlik cerrahi olarak uygulanan Lichtenstein inguinal herni onarımı, cerrahi eğitim programı kapsamın yapılan eğitimlerin başında gelmektedir. Bu çalışmada, asisten hekimlerin yaptığı bu ameliyatı incelemeyi amaçladık.

Gereç ve Yöntemler: Primer inguinal herni tanısı alan 40 yaş ve üstü erkek hastalar, Haziran 2009-Mart 2011 arasında ileriye dönük olarak çalışmaya dahil edildi. Tekrarlama ve kronik postoperatif ağrı açısından cerrahi sonuçlar çalışıldı.

Bulgular: Yaş ortalaması 55,7±10,8 olan 151 hasta vardı. İntraoperatif değerlendirme 84 (%55,6) direk fıtık, 58 (%38,4) indirekt ve dokuz (%6,0) direk-indirekt fıtık birlikteliği vardı. Ortalama operasyon süresi 51,2 ±13,2 dakikaydı ve bu obez hastalarda anlamlı derecede yüksekti ($p<0,05$). Postoperatif dönemde 143 (%94,7) hasta, ilk sekiz saat içinde taburcu edildi. Hastaların çoğu (%90,7) lokal anesteziyi tekrar seçeceğini ifade etti. Onbir hastanın ağrı skoru 6. ve 12. ay değerlendirmelerinde 0,23±0,7 (dağılım 0-4) ve 0,07±0,4 (dağılım 0-3) olarak tespit edildi. Postoperatif 1. günde, 137 (%90,7) hasta günlük aktivitelerine geri döndü. 28 (%18,5) hematom ve seroma oluşumu ve 18 (%11,9) yara enfeksiyonu vardı. Mesh reaksiyonu saptanmadı; Ancak bir yıl operasyondan sonra iki (%1.3) rekürrens tespit edildi.

Sonuç: Lichtenstein inguinal herni onarımı, lokal anestezi altında günlük cerrahi girişim olarak birincil tedavi yöntemi olarak seçilmeli ve ameliyat asistanlar tarafından gözetim altında güvenli bir şekilde yapılabilir.

Anahtar kelimeler: İnguinal herni onarımı, Lokal anestezi, Günübirlik cerrahi

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Ethical Committee Approval: Ethics committee approval was received for this study.
Etik Kurul Onayı: Bu çalışma için etik kurul onayı alınmıştır.

Conflict of Interest: No conflict of interest was declared by the authors.
Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

Financial Disclosure: The authors declared that this case has received no financial support.
Finansal Destek: Yazarlar bu olgu için finansal destek almadıklarını beyan etmişlerdir.

Geliş Tarihi / Received
10.12.2016

Kabul Tarihi / Accepted
23.12.2016

Yayın Tarihi / Published
30.12.2016

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Atıf yazım şekli: How to cite: Subasi IE, Yucel M, Hasbahceci M, Basak F, Alimoglu O. Day-case surgery for inguinal hernia: Lichtenstein inguinal hernia repair under local anesthesia performed by surgical residents. Arch Clin Exp Med. 2016;1(1):4-7.

Introduction

Inguinal hernia repair is one of the most commonly performed operations in general surgery [1-5]. After introduction of mesh for inguinal hernia repair, recurrences have been decreased to 5% or less [4]. But, postoperative chronic pain is getting more importance which has been reported in 25 to 30 % of the patients, and caused limitations during daily life in 5 to 8% of the patients [1,6,7].

The most commonly used mesh type is polypropylene, however, because of high incidence of chronic postoperative pain after inguinal hernia surgery, new meshes and fixation techniques are emerged.[1,4] Reducing the polypropylene content and increasing the pore size of the mesh is supposed to offer better outcomes in regard to the pain. Low-weight polypropylene mesh (lightweight mesh) is considered mostly as an appropriate choice [1,6,8].

Early mobilization, shorter length of hospital stay and less postoperative complications have been reported in patients operated under local anesthesia. Local anesthesia is reported as a safe method especially for the patients with high anesthetic risk (general or spinal) [2,5]. Inguinal hernia repair is common operation performed mostly in early period of surgical residency under supervision by attending consultants; however results of operations performed by surgical residents are not evaluated in detail [9].

Aim of this study was to evaluate outcomes of Lichtenstein inguinal hernia repair with local anesthesia as a day-case surgery performed by residents.

Materials and methods

Forty years and older male patients with a primary inguinal hernia were included prospectively. This study was approved by the local ethic committee. Preoperatively, all patients were informed about the surgical technique and written consent was taken. Patients with bilateral, scrotal or recurrent hernias, female patients, patients younger than 40-years-old were excluded from the study. Patients were grouped according to their ages as decades, and divided into three according to their body mass index (BMI) results as normal (BMI<25kg/m2), overweight (BMI 25-29.99kg /m2) and obese (BMI>30kg/m2). Length of stay in hospital was evaluated as less than 8 hours or more.

Lichtenstein inguinal hernia repair under local anesthesia was performed by surgical residents with supervision by the consultant surgeon. Before the study, several Lichtenstein inguinal hernia repairs were performed by consultant surgeons to teach technical details to the residents which were in postgraduate years 2 or more. Prophylactic antibiotics were not administered. Polypropylene lightweight mesh with a dimension of 6 to 11 cm (Parietene, Tyco Healthcare, Trevéoux, France, 40g/m2) was used for the study. Hair removal of the operative area was performed at the time of the operation. A 1:1:2 mixture of lidocaine with adrenaline (lidocaine HCl 20 mg/ml, adrenaline HCI 0.0125 mg/ml) (Jetokain, Adeka, Turkey), bupivacaine (Marcaine vial, AstraZeneca, Turkey) and normal saline was prepared. From this mixture, 10 ml was injected to the point at the 2 cm medial to the anterior superior iliac spine, 10 ml to the lateral side of symphisis pubis and to incision line. Tracings of ilioinguinal and iliohypogastric nerves were also anesthetized. For indirect hernia, high dissection and ligation of the hernia sac were performed. For direct hernia, plication of the hernia sac was applied. Mesh was located between inguinal ligament and conjoined tendon by 3/0 polypropylene suture.

Analgesics were not given to the patients unless they needed, and Paracetamol 500 mg per oral was choice of medication. All patients were discharged at postoperative 8th hours. But in cases of clinical necessity, the discharge was delayed. For the follow-up period, the patients were re-evaluated at 7th day, 4th week, 6th month and 12th month.

In this study, wound infection defined as presence of hyperemia over the incision and/or purulent drainage from the wound. In cases of hyperemia and drainage without infective findings lasting more than one month called as mesh reaction. Return time to normal daily activity was defined as the day in which patient can have ability to make his normal daily activities alone. Postoperative pain was evaluated with visual analog scale (VAS) and graded from no pain as 0 to the maximum pain as 10. Degree of satisfaction with local anesthesia was evaluated as very good, good, moderate, bad and very bad. Each patient was asked for his future preference of local anesthesia again as yes or no. Chronic postoperative pain was defined as the pain lasting more than 3 months in the absence of recurrence.

The parameters which were evaluated in this study were family history for inguinal hernia, BMI, American Society of Anesthesiology score (ASA), features of inguinal hernia such as side, type (indirect, direct or combined) and diameter, operation time, postoperative pain, hematoma and seroma formation over the wound, development of wound infection, length of stay in hospital, time to return to normal daily activity, mesh reaction, degree of satisfaction with local anesthesia and recurrence.

Statistics

Statistical analyses were performed through a computerized software package using Excel (Office XP from Microsoft). Statistical calculations were performed using NCSS (Number Cruncher Statistical System, 2007) and PASS Statistical soft-ware (Utah, USA, 2008). One-vay Anova test was used for analysis of normally distributed descriptive continuous variables which were expressed as mean±standard deviation (SD), median, frequencies and ranges. Mann-Whitney U test was used for comparison of descriptive variables without normal distribution. Tukey's HDS test was used to detect the groups which cause the difference. The Chi-square test was used to assess an association between qualitative variables. Differences were considered statistically significant if the p value was equal to or less than 0.05.

Results

There were 165 patients undergoing Lichtenstein inguinal hernia repair under local anesthesia between June 2009 and March 2011. Patients with successful application of local anesthesia and successful follow-up records composed the study group (n=151). Patients' demographic variables are detailed in Table 1. Mean age of the patients was 55.7±10.8 with a range of 40 to 90.

Hernias were present at the right and the left sides in 77 (51%) and 74 (49%) patients, respectively. Intraoperative evaluation of the hernias revealed direct hernia in 84 (55.6%), indirect in 58 (38.4%) and combined hernia in nine (6.0%). Mean diameter of the hernias was 4.9±2.4 cm with a range of 1 to 15 cm.

Table 1: Demographic variables of the patients.

		n	%
Age groups (year)	40-49	53	35.1
	50-59	44	29.1
	60-69	37	24.5
	≥70	17	11.3
BMI ($kg/m^{2)}$	Normal (<25)	53	35.1
	Overweight (25-29.99)	75	49.7
	Obese (>30)	23	15.2
Family history	Positive	45	29.8
	Negative	106	70.2
ASA score	1	95	62.9
	2	47	31.1
	3	8	5.3
	4	1	0.7

BMI: Body mass index, ASA: American Society of Anesthesiology Score

Mean operation time was 51.2±13.2 minutes. On obese patients, operation time was significantly higher than the others ($p<0.05$). Patients were discharged at postoperatively 8 hours or less in 143 (94.7%), while others were discharged after this period. Degree of satisfaction and future preference of local anesthesia of the patients were given in Table 2. In general, 90.7% of the patients were reported to choose local anesthesia again.

Postoperative pain scores were ranged from 0 to 6 with a mean score of 1.3±1.5 postoperatively at the 7th day. These scores decreased to 0.58±1.1 with a range of 0 to 6 at 4th week evaluation. Eleven and four patients were reported some degree of pain at 6th and 12th month evaluations (Table 3). At the postoperative 1st day, 137 (90.7%) patients could return to daily activities. Eleven (7.3%) and three (2%) patients reported this interval as 2nd and 3rd postoperative days, respectively. There were 28 (18.5%) hematoma and seroma formation in which five of them were evacuated by surgical exploration. Wound infection was developed in 18 (11.9%) patients that all were managed conservatively with antibiotic treatment. There was no mesh reaction; however, two (1.3%) recurrences were detected after one year of the operation.

Table 2: Degree of satisfaction and future preference of local anesthesia.

		n	%
Degree of satisfaction	Very good	81	53.6
	Good	43	28.5
	Moderate	8	5.3
	Bad	4	2.6
	Very bad	15	9.9
Future preference	Yes	137	90.7
	No	14	9.3

Table 3: Postoperative pain scores.

Time	n	Range	Mean±Standard deviation
7th day	21	0-6	1.3±1.5
4th week	18	0-6	0.6±1.1
6th month	11	0-4	0.23±0.7
12th month	4	0-3	0.07±0.4

Discussion

Performance of Lichtenstein inguinal hernia surgery under local anesthesia as a day-case surgery is accepted as the standard policy in many specialized and non-specialized centers [1,9-12]. The advantages of local anesthesia over general anesthesia are well documented with regard to less postoperative pain, lack of detrimental effect on pulmonary function, early mobilization helping to day-case surgery facilities [5,10,13,14]. In general, it was accepted that excellent outcomes in primary hernia repair could be achieved by using tension free open technique with local anesthesia [4,15].

Most of the inguinal hernia surgeries have been performed in outpatient clinics [13,14]. Local anesthesia has been also preferred method because of its advantage for patients such as less postoperative pain, early recovery and mobilization, and lack of specific complications of spinal and general anesthesia [13]. In the present study, it was possible to perform 94.7% of the operations as day case surgery. It was thought that use of local anesthesia was more important than the other parameters such as use of lightweight mesh or the type of the operation to reach this high rate.

Polypropylene based mesh materials used in hernia surgery help in strengthening the weakened native tissues by fibroplastic mesh-aponeurotic scar tissue complex [1,8,16]. But this inflammatory process may lead to some undesirable sequelae such as chronic pain and postoperative foreign body sensation [17]. It was suggested that reducing the polypropylene content and increasing pore size of the mesh were beneficial to diminish these unwanted effects secondary to the use of meshes [1,8]. However, these findings were usually come from animal studies, and there was some suspicion about the possible high rate of the recurrences following use of lightweight meshes weighing 35 to 50 g/m2, which could be explained by the technical factors [1,8,16,18-20].

Although assessment of inguinal hernia surgery has focused on recurrence, complications and costs, more recently there was an increased attention on chronic pain, discomfort and quality of life [21]. Definition of chronic pain relies on its chronicity lasting usually more than 3 months; however, there are several reports with different definitions of chronic pain indicating difficulty in classification, grading and measurement [1,2,10,21]. Patient-reported outcomes such as pain were believed to be an important index for improving outcomes in hernia surgery [8]. In this study, as a patient-reported outcome, the pain lasting more than 6 months was accepted as chronic postoperative pain which were seen in 11(7.3%) and four (2.7%) patients after 6 months and one year, respectively. Our rates were also comparable to the other studies that chronic postoperative pain was reported to occur in between 10-30% of the patients [2,9,22]. We thought that chronic postoperative pain was mild in nature, since over 90% of the patients were very satisfied in general, and the maximum pain score was up to 3 and 4. Use of lightweight mesh might be an important factor to get low rate of chronic postoperative pain in accordance with others [4,8].

Recurrences after Lichtenstein inguinal hernia repair were reported as low as 1 to 2 % in large series [23]. Although it was believed that specialization for inguinal hernia repair had positive effect to decrease the recurrence rates, it was also shown that this operation could be performed with low recurrence rates by non-specialized surgeons, even general practitioners with a special interest [1,14,15]. It was reported that Lichtenstein inguinal hernia repair could be performed alone by residents if a precise teaching organization by an experimented surgeon is available [9]. However, there were several reports indicating higher recurrence rates up to 7 % in cases of such operations performed by junior residents in comparison to senior residents with a recurrence rate of 1.1% [24]. In the present study, 1.3% recurrence was detected during the first year that was comparable to the other studies [23]. But longer follow-up period is needed to confirm a more accurate risk with regard to possible risk factors for recurrence such as use of the lightweight meshes and performance by residents.

Postoperative seroma and hematoma formation could be seen after inguinal hernia surgery, but it was reported more commonly after Prolene Hernia System or Perfix usage [10,14]. Wound infection is another important complication for inguinal

hernia surgery which was reported as up to 10% of the patients [14]. Although our complication rates were higher than the previously reported rates, lack of prophylactic antibiotic usage and acceptance of even hyperemia over the incision as a criterion for infection might be explanations for this issue. Lack of control group which included the cases performed by the consultant surgeons and short follow-up period especially for recurrence were the limitations of this study.

In conclusion, Lichtenstein inguinal hernia repair under local anesthesia as a day case surgery should be chosen as a primary treatment method, and can be performed by surgical residents under supervision in a safe manner.

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