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Is Same-Day Inguinal Hernia Surgery Possible?

Recai Capoglu[1], Cagri Tiryaki[2], Ertugrul Kargi[3], Emre Gonullu[4], Neset Nuri Gonullu[5], Oguz Ozbay[5]

[1]*Department of General Surgery, Kocaeli Karamursel State Hospital, Kocaeli, Turkey*

[2]*Department of General Surgery, Kocaeli Derince Training and Research Hospital, Kocaeli, Turkey*

[3]*Department of General Surgery, Abant İzzet Baysal University, School of Medical, Bolu, Turkey*

[4]*Department of General Surgery, Eskisehir State Hospital, Eskisehir, Turkey*

[5]*Department of General Surgery, Kocaeli University, School of Medical, Kocaeli, Turkey*

The Lichtenstein hernia repair is associated with low recurrence rates and short operation times, and can be performed under local anesthesia. Thus, this is among the most-preferred methods used in recent years. Our objective was to explore the same-day discharge rates, and the causes of delayed discharge and re-admission to hospital, of patients treated using the Lichtenstein repair method, to evaluate the feasibility of performing same-day hernia surgery in clinical practice. One hundred of a total of 236 patients diagnosed with unilateral inguinal or femoral hernias, who required surgical treatment, and who agreed with the conditions of the study, were prospectively included. All patients were treated using the Lichtenstein mesh repair method, under local anesthesia between June 2006 and January 2008. We investigated the types and locations of hernias, duration of surgery, seniority of the surgeon, the feasibility of same-day surgery in subgroups stratified by ASA risk scores, and postoperative complication rates, in patients who underwent inguinal surgery under local anesthesia. The rates of pain and postoperative complications were very low in hernia patients who underwent same-day surgery under local anesthesia. The operation reduces the length of hospital stay and helps patients mobilize earlier. Both the literature, and our data, indicate that inguinal hernia repair under local anesthesia is safe and effective, reducing anesthesia-related complications and the length of hospital stay; is cost-effective; and is applicable in all patients.

Key words: Inguinal hernia – Local anesthesia – Lichtenstein hernia repair – Same-day surgery

Corresponding author: Ertugrul Kargi, MD, Department of General Surgery, Abant Izzet Baysal University Medical School, 14280, Golkoy, Bolu, Turkey.
Tel: +90 374 2534656 3459; Fax: +90 374 253 45 15; E-mail: ertugrulkar92@gmail.com

Repair of an inguinal hernia, an anterior abdominal wall defect, is one of the most commonly performed operations in general surgery, and contributes significantly to healthcare costs worldwide. Throughout life, the risk for development of inguinal hernia in males is 27%, and 3% for females. Every year, ~20 million hernia repairs are performed worldwide. Although the rates differ by country, they range from 100–300/100,000 of the population.[1]

Many new methods of inguinal hernia surgery have been introduced in recent years. Surgical treatment is now usually same-day, principally in the United States. It is important that the chosen repair technique should be easy to learn and apply, and all of the possible complications, patient postoperative comfort, the need for the patient to take time off before recommencing work, the relapse rate, and cost, should be taken into account. The Lichtenstein hernia repair is associated with low recurrence rates and short operation times, and can be performed under local anesthesia. Thus, this is among the most-preferred methods used in recent years. Our objective was to explore the same-day discharge rates, and the causes of delayed discharge and readmission to hospital, of patients treated using the Lichtenstein repair method, to evaluate the feasibility of performing same-day hernia surgery in clinical practice.

Materials and Methods

Patient population

This research was conducted at a clinic of a Department of General Surgery of a University Medical Faculty Hospital. One hundred patients diagnosed with unilateral inguinal or femoral hernias, who required surgical treatment, and who agreed with the conditions of the study, were prospectively included. All patients were treated using the Lichtenstein mesh repair method, under local anesthesia. Patients aged 18–70 years, who were diagnosed with inguinal or femoral hernias, who were known to exhibit no hypersensitivity to the drugs to be used, and who were of class I-II and class III (controlled disease), according to the classification of the American Society of Anesthesiologists (ASA), were included. Informed consent was obtained from all participants. The study was approved by our local Ethics Committee.

Procedures

Local and systemic examination of all patients was performed prior to surgery and laboratory data were requested according to the criteria of the ASA. PT and PTT levels were measured in all patients. A standardized test assessing daily activities was administered both before surgery, and at 1 week and 3 months after surgery. After a patient arrived at the hospital on the day of surgery, premedication with an NSAID suppository was administered 30 minutes before the operation, vascular access was established, and (under monitoring), a single dose of prophylactic antibiotic (a first-generation cephalosporin) was given.

Anesthesia

All patients were operated upon under local anesthesia. A maximum amount of 80 mL of anesthetic mixture was prepared by diluting a 2% (w/v) citanest solution with normal saline, in the volume ratio 1:4. The anesthetic was administered using a 20-mL plastic syringe and a 22-G spinal needle. The entry point was approximately 2.5 cm medial to the anterior superior iliac spine. Iliohypogastric and ilioinguinal nerve blocks were achieved by radial injection in different directions, commencing below the external oblique fascia and continuing to the preperitoneal space. Anesthesia was established in the areas in which thoracic nerves 10, 11, and 12 are distributed, via intradermal and subcutaneous injections on the line between the anterior iliac spine and the navel. Anesthesia of areas in which the femoral recurrent branches of the lateral femoral cutaneal and genitofemoral nerves are scattered was achieved by intradermal and subcutaneous injection both below and at the levels of the inguinal ligament, between the lateral margin of the anterior superior iliac spine and the pubic tubercle. The point of skin incision was marked, and intradermal and subcutaneous infiltration was performed on this line.

If the nerve blockade was insufficient, the spermatic cord was partially entered after opening the external oblique fascia, and nerve blocking was performed directly around the inner ring, to the neck and interior of the hernial sac.

Surgical technique

Lichtenstein procedure: The skin, subcutaneous layer, and Camper's and Scarpa's fascia were passed by a Bassini inguinal incision; the musculus oblique externus aponeurotic was found; the outer ring was palpated and reduced by an incision parallel to the inguinal canal; the oblique externus medial leaf was

dissected; the lateral leaf was dissected until the Poupart ligament and iliopubic tract were exposed; and the cord was suspended. To treat an indirect hernia, the hernial sac was dissected to the level of the neck; the sac was opened and the contents thereof returned to the abdomen; and the sac was connected and excised (via high-ligation). To treat a direct hernia, the hernial sac was suturated to the abdomen via continuous sutures and the cord then suspended. A polypropylene mesh of dimensions matching the rear wall (approximately 7.5 × 15 cm) was prepared and placed so that the long axis lay parallel to the cord. We were careful to ensure that the mesh covered the entire area between the tendon conjoint and the inguinal ligament, that the mesh did not disrupt the circulation of the cord, and that about one-third of the mesh area remained on the (lateral) inguinal ligament side and two-thirds on the medial tendon conjoint side. Prolene sutures (2/0) were used to fix the mesh. We also ensured that the mesh covered the region where soft tissue met the pubic tubercle at the inferio-medial edge; the mesh overlapped this region by greater than 2–3 cm, to prevent recurrence. The mesh was fixed on Poupart's ligament on the outside, and on the tendon conjoint and anterior rectus sheath on the inside, by interrupted sutures. Individual fixing sutures were placed on the line cut for passage of the cord. Finally, the musculus obliquus externus aponeurosis was permanently closed with 2/0 Vicryl sutures.

Evaluations

After completion of hernia repair, but before closing the layers, the repair was checked by asking all patients to cough and strain. The amount of local anesthetic used, the operative time, postoperative analgesic requirements, and length of hospital stay (and the reasons for such stays) were recorded.

In the postoperative period, all patients were asked to evaluate pain experienced during surgery as none, mild, too much, or severe, and anesthesia as adequate or inadequate. All patients were asked whether they would be prepared to undergo surgery again, if needed, using the same method, and whether they would recommend the method to others. Patients who had earlier undergone hernia surgery using other anesthetic methods were asked to compare the two methods. Patients younger than 70 years of age, who did not live alone, who lived a maximum of 50 km from the hospital, who had access to transportation facilities, who did not require home monitoring, who were orientated and cooperative, who had normal urinary function, and whose vital functions were stable for at least the final 1 hour of monitoring, were discharged on the same day. All such patients were telephoned on postoperative days 1 and 3 for check-ups, and invited to the hospital for a check-up on day 7.

Table 1 Descriptive characteristics of all patients (N = 100)

Gender, n (%)	
Male	96 (96)
Female	4 (4)
Age, years (mean ± SD)	53.77 ± 15.97
Hernia, n (%)	
Right	52 (52.0)
Left	36 (36.0)
Bilateral	12 (12.0)
Type of hernia, n (%)	N = 112
Direct	33 (29.4)
Indirect	63 (56.3)
Femoral	3 (2.7)
Pantaloon	13 (11.6)

The problems in patients who could not be discharged were recorded. If a patient who was discharged called the hospital with respect to his/her surgery, or if s/he came back to the hospital, the reasons for the call or visit were recorded. Preoperative and postoperative (at 1 week and 3 months) daily activities were recorded using a standard form.

All data were evaluated using SPSS version 13.0 for Windows. Differences between patients discharged without any problems on the day of surgery, and those who could not be discharged or who were readmitted after discharge, were compared in terms of demographic and medical details, risk factors, and preoperative and postoperative daily activity levels.

Results

One hundred (42.4%) of a total of 236 patients who underwent inguinal hernia surgery under local anesthesia between June 2006 and January 2008, the period of our study, received local anesthesia only; 96 (96%) were male and 4 (4%) female. Patient age ranged from 18–77 years (mean: 53.77 +15.97 years, median: 55 years; Table 1). Twenty-eight patients were university graduates, 40 high-school graduates, 5 secondary-school graduates, 23 primary-school graduates, and 4 had never been to school.

Table 2 Comparison of patients who were discharged on the same day with those discharged on the following days

	Those discharged on the same day (N = 85)	Those discharged on following days (N = 15)	*P*
Age, years (mean ± SD)	53.2 ± 16.21	57.42 ± 14.45	0.333
Education n (%)			
University graduate	24 (28.2)	4 (26.3)	0.586
Not university graduate	61 (71.8)	11 (73.7)	
ASA score			
ASA I	42 (49.4)	4 (26.7)	<0.001
ASA II	38 (44.7)	5 (33.3)	
ASA III	5 (5.9)	6 (40.0)	
Location of hernia			
Unilateral	79 (92.9)	9 (60.0)	0.002
Bilateral	6 (7.1)	6 (40.0)	
Type of hernia			
Unilateral direct	22 (30.6)	2 (40.0)	0.644
Unilateral indirect	50 (69.4)	3 (60.0)	
Surgery time (min)	53.41 ± 14.15	65.67 ± 14.00	0.003
Surgeon			
Resident physician	32 (37.6)	5 (33.3)	0.949
Chief resident physician	26 (30.6)	5 (33.3)	
Specialist	27 (31.8)	5 (33.3)	

Fifty-two patients had right-side, 36 left-side, and 12 bilateral inguinal hernias, and the most common hernia of the 112 was indirect hernia (56.3%; Table 1).

Upon preoperative risk assessment, 46 (46%) patients were of grade ASA I, 43 ASA II, and 11 ASA III (with controlled disease). Thirty-two surgeries were performed by specialists, 31 by chief assistants, and 37 by resident physicians. Surgery time ranged from 30–65 minutes in patients with unilateral direct hernias, 25–75 minutes in patients with one-sided indirect hernias, 30–70 minutes in patients with pantaloon hernias, and 60–100 minutes in patients with bilateral inguinal hernias. In patients with unilateral femoral hernias, the surgery time was 50 minutes, and 100 minutes in those with bilateral femoral hernia.

Eighty-five patients were discharged on the same day and 15 on later days. Three patients could not be discharged on the same day because of prolongation of surgery, because the surgery was performed late in the day, or because the family did not want him/her to be discharged. Three patients were not discharged on the same day because of development of complications (2 patients developed scrotal hematomas, and 1 experienced perioperative vagal stimulation); 7 because of postoperative clinical reasons (sickness, pain, etc.); and 2 because of additional diseases (a patient with hemophilia required factor replacement therapy after surgery, and a patient with chronic renal failure required dialysis). No patient discharged from the hospital on the same day was readmitted. One of the 2 patients who telephoned the hospital complained of nausea, and the other of pain in the testicles.

No significant difference was evident between patients who were or were not discharged on the same day in terms of mean age or educational level (Table 2). A significant between-group difference was evident between ASA scores and duration of hospital stay (Table 2), attributable to the fact that we treated ASA III patients with controlled disease. In such patients, same-day surgery was appropriate for only 45.5%, but for 89.9% of patients in the other groups (91.3% for ASA I and 88.4% for ASA II patients).

Those who underwent unilateral hernia surgery were discharged on the same day significantly more frequently than those who underwent bilateral hernia surgery (Table 2). No significant difference between hospital discharge on the same day (or not) was evident when patients with unilateral direct hernias and unilateral indirect hernias were compared (Table 2).

The surgery time of patients who could not be discharged from the hospital on the same day was significantly longer than that of patients discharged on the same day (Table 2). There was no significant association between the seniority of the physician performing the surgery and the rate of discharge on the same day.

Discussion

Open tension-free repair using the Lichtenstein method is considered to be the gold standard technique for inguinal hernia surgery.[1] The method is easy to learn and practice from the standpoint of surgeons, and is associated with lower recurrence and complication rates compared with other methods, especially laparoscopic surgery.[2] However, compared to surgery performed using other anesthetic techniques (spinal anesthesia and general anesthesia), inguinal hernia surgery with local anesthesia is still not universally applied. This is because the technique requires sharp dissection (so that the patient feels less pain), a higher level of patient compliance, and a surgeon with sufficient experience in performing surgery under local anesthesia.

The contemporary literature contains several studies comparing local anesthesia and other anesthesia techniques used during inguinal hernia surgery, from different viewpoints. In a study conducted in Wales, although inguinal hernia surgeries performed using local anesthesia yielded more satisfactory results than those performed under general anesthesia, it was noted that only 15% of all surgeons recommended surgery under local anesthesia as first-line treatment to most patients.[3] The Royal College of Surgeons, the main professional organization involved in surgical research and practice in the UK, has expressed the opinion that same-day inguinal hernia surgeries performed under local anesthesia should comprise more than 50% of all such surgeries, but the rate of same-day surgery in the UK is currently ~30%.[4] In our center, 100 (42.4%) of a total of 236 patients who underwent inguinal hernia surgery, during the period when our research was conducted, were treated under local anesthesia. This ratio is close that targeted by general surgery clinics today.

In our study, same-day surgery was successful in 85 of 100 patients treated under local anesthesia. No patient developed any complication involving urinary retention or permanent sequelae. In a 2003 Turkish study on 96 inguinal hernia patients, of whom 47 were operated under local anesthesia and 49 under spinal anesthesia, the rate of early complications was 14.8% in the former and 32.6% in the latter (spinal anesthesia) group. The length of hospital stay and cost were less in the former.[5] In a prospective Turkish study, unilateral tension-free Lichtenstein hernia repair surgeries performed under local or spinal anesthesia in 200 patients were analyzed in terms of postoperative complications, pain, and surgery time.[6] No significant between-group difference was observed in the extent of surgical complications, and it was concluded that inguinal hernia repair under local anesthesia afforded important advantages when all complications were considered, given the fact that the complications arising from spinal anesthesia per se were not observed in the local anesthesia group. Although no significant between-group difference in the pain level, assessed using a visual analogue scale (VAS) at 4, 8, 12, and 24 hours postoperatively, was evident, patients operated upon under local anesthesia reported less pain than those operated upon under spinal anesthesia. No significant between-group difference in surgery times was noted.

ASA risk scoring considers additional diseases and activity level, and is performed prior to almost all operations. Significant relationships have been noted between ASA risk scores and postoperative clinical outcomes, morbidity, and mortality.[7,8] The low complication rates in our study group, comprised of ASA I and II patients, and ASA III patients (with controlled disease) aged 18–79 years, together with the findings of past research, suggest that inguinal hernia surgery under local anesthesia is both economical and more reliable than other approaches, protecting patients from complications associated with other types of anesthesia. Recent research has shown that same-day surgery for patients undergoing inguinal hernia repair under local anesthesia is reliable, and applicable to patients of various ages differing in terms of surgical risk, who were not included in our group.[9–11] However, inguinal hernia patients in our ASA III risk group (with controlled disease) were discharged later than ASA I and II patients. Same-day surgery was performed on 89.9% of the latter patients, but only 45.5% of the former, showing that when inguinal hernia surgery with local anesthesia is planned, ASA risk status must be considered if outpatient surgery is contemplated.

The experience level of the attending physician did not affect discharge time or complication rates. Another study found that intern surgeons could perform same-day inguinal hernia surgery under local anesthesia, with supervision, without causing any notable pain. The same study showed that surgery was performed safely at a lower cost, with a shorter hospital stay, and with less demand on resources, compared with the use of other anesthetic methods.[12] When patients treated under local and general anesthesia were compared, postoperative

nausea was less, patients returned to normal activities sooner, and experienced less anesthesia-induced postoperative complications, when local anesthesia was used. In addition to those mentioned previously, these constitute further reasons for choosing local anesthesia in appropriate cases.[13,14]

We performed simultaneous bilateral inguinal hernia repair surgery on 12 patients. Simultaneous repair affords benefits such as a reduction in psychologic stress, fewer work days lost, and lower cost. Until recently, few data on the use of local anesthesia in same-day surgery to treat bilateral inguinal hernias had appeared. One of the most comprehensive works is that of Amid *et al*, who worked with 2953 patients aged 25–76 years who underwent simultaneous bilateral inguinal hernia repair between 1971 and 1995.[15] Surgeries were performed under local anesthesia in 98.3% of these patients; only morbidly obese patients and those with irreducible inguinal hernias were operated upon under epidural or under general anesthesia. Of all patients, 99% were discharged on the same day. The remaining 1% were readmitted for medical or personal reasons unrelated to surgery. The delay in return to work was 1–2 weeks depending on physical work requirements. The frequency of all complications, including neuralgia, testicular atrophy, hydrocele, and infections, was less than 2%. We found that the rate of discharge of patients who underwent unilateral inguinal hernia surgery under local anesthesia was higher than that of patients who underwent bilateral inguinal hernia surgery. The reasons for prolonged hospital stays in the latter cases were that 3 patients required longer operative times (delaying surgery); 2 complained of pain and nausea; and 1 developed a scrotal hematoma. Thus, it is best to conduct operations early in the day, and the extent of surgical experience with bilateral repair under local anesthesia needs to be increased, by treating more patients, so that same-day surgery becomes increasingly acceptable.

As found in many studies, both pain levels and postoperative complication rates are very low in hernia patients who undergo same-day surgery under local anesthesia. Such operations reduce the length of hospital stay, and patients can be mobilized earlier.[16]

Conclusions

We investigated the types and locations of hernias, duration of surgery, seniority of the surgeon, feasibility of same-day surgery in subgroups stratified by ASA risk scores, and postoperative complication rates, in patients who underwent inguinal surgery under local anesthesia between June 2006 and January 2008 in our center.

As is true of general populations, of 112 inguinal hernias in our 100 patients who underwent surgery, 33 were direct, 63 indirect, 3 femoral, and 13 Pantaloon hernias. Surgery time ranged from 30–65 minutes in those with unilateral direct hernias, 25–75 minutes in those with unilateral indirect hernias, 30–70 minutes in those with Pantaloon hernias; and 60–100 minutes in those with bilateral inguinal hernias. In patients with unilateral femoral hernias, the surgery time was 50 minutes, and 100 minutes in those with bilateral femoral hernias.

A total of 100 (42.4%) of our 236 patients who underwent inguinal hernia surgery between June 2006 and January 2008 (our research time window) were treated under local anesthesia. This is close to 50% of patients, the rate targeted by general surgery clinics today.

Eighty-five (85%) of our 100 patients who underwent inguinal hernia surgery under local anesthesia were discharged on the same day. The factors preventing same-day discharge were prolongation of surgery, delay of surgery to later hours of the day, development of surgical complications (scrotal hematoma, perioperative vagal stimulation), postoperative nausea and pain, and the need to treat comorbid diseases (hemophilia, chronic renal failure).

We found no significant difference between the mean age of patients discharged on the same day, or not. No significant difference was evident between education level and time to discharge. No significant association was evident between seniority of the surgeon and the rate of same-day discharge.

Statistically significant associations were found between ASA scores and time to discharge, attributable to late discharge of ASA III patients with controlled disease. The same-day surgery rate was 45.5% for such patients, but 91.3% for ASA I patients and 88.4% for ASA II patients. Thus, planning of same-day inguinal hernia surgery under local anesthesia requires consideration of ASA risk category.

No significant difference between discharge (or not) on the same day was evident when patients with unilateral direct and unilateral indirect hernias were compared. However, unilateral hernia surgery patients were discharged on the same day significantly more frequently than those who underwent

bilateral hernia surgery, suggesting that the applicability of same-day surgery is associated with whether the hernia is unilateral or bilateral, rather than the type of hernia. In addition, the most common causes of failure to be discharged on the same day after bilateral hernia surgery were performance of the surgery during late hours of the day, and prolonged surgery time. Therefore, bilateral inguinal hernia surgery must be performed in the early hours of the day if same-day discharge is planned.

The rates of pain and postoperative complications were very low in hernia patients who underwent same-day surgery under local anesthesia. The operation reduces the length of hospital stay and helps patients mobilize earlier. Both the literature, and our data, indicate that inguinal hernia repair under local anesthesia is safe and effective, reducing anesthesia-related complications and the length of hospital stay; is cost-effective; and is applicable in all patients.

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