

Early-Stage Quantitative Analysis of the Effect of Laparoscopic versus Conventional Inguinal Hernia Repair on Physical Activity

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Rezumat

Analiza cantitativă precoce a efectelor laparoscopiei comparativ cu tehnicile convenționale în cura herniei inghinale pe activitate fizică

Scop: De a compara efectele laparoscopiei versus tehnicile chirurgicale convenționale în cura herniei inghinale pe activitatea fizică a pacienților.

Materiale și metode: Nouăzeci și trei de pacienți (cu vârste cuprinse între 20 și 59 de ani) care s-au prezentat din necesitatea unei cure chirurgicale a herniei inghinale la spitalul privat Safa, Secția de Chirurgie Generală, au fost evaluați prospectiv între noiembrie 2011 și martie 2013. Vârsta medie a pacienților a fost de 46,1 ($\pm 12,9$) ani. Aceștia au fost repartizați în 3 grupuri conform tehnicii reparatorii a herniei utilizate. Treizeci de pacienți au fost supuși metodei laparoscopice extraperitoneale totale (TEP), 31 tehnicii transabdominale preperitoneale (TAPP) și 32 au fost tratați cu ajutorul metodei Bassini modificate de herniorafie inghinală (MBPMG). Toți pacienții au fost examinați în cadrul clinicii de terapie fizică și reabilitare chiar înaintea operației. Funcțiile izokinetice și izometrice ale mușchilor membrelor inferioare au fost măsurate cu ajutorul dispozitivului de testare izokinetică Cybex. Durata spitalizării pacienților, nevoia de analgezice în perioada postoperatorie, scorurile pe scala Visual Analogue Scale (VAS), timpul scurs până la revenirea la serviciu și complicațiile postoperatorii au fost de asemenea comparate.

Rezultate: Nevoia postoperatorie de analgezice a pacienților, utilizarea scorului VAS (între 0–10), rata complicațiilor și scorurile VAS ale pacienților în corelație cu rezultatele de mobilitate au fost similare celor descrise în literatură. În a 3-a zi postoperator, măsurătorile înregistrate de dispozitivul de testare izokinetică Cybex au demonstrat pierderi mai mari de forță musculară la nivelul membrelor inferioare după procedura tip MBPMG decât după TAPP și TEP. Evaluarea izokinetică și izometrică a tuturor cazurilor a revelat că scăderea medie a forței musculare în asociere cu metodele laparoscopice este cu două treimi mai mică decât în cazul tehnicii convenționale. În cadrul unui interval de încredere de 95% (CI), semnificația statistică a datelor a fost acceptată la valori ale P mai mici de 0,05 ($p < 0,05$).

Concluzii: Datele cantitative au arătat că abordul laparoscopic al herniilor inghinale are un impact favorabil asupra activității fizice postoperatorii a pacienților și asupra întoarcerii acestora în câmpul muncii comparativ cu chirurgia deschisă.

Cuvinte cheie: cura laparoscopică a herniei inghinale, cura herniei inghinale prin metoda Bassini modificată (MBPMG), dispozitivul de testare izokinetică Cybex

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Abstract

Aim: To compare the effects of laparoscopic versus conventional inguinal hernia repair techniques on patients' physical activity.

Materials and Methods: Ninety-three patients (between 20 and 59 years old) who presented with a need for inguinal hernia repair at the private Safa Hospital, General Surgery Clinic, were evaluated prospectively between November 2011 and

March 2013. The patients' mean age was 46.1 (± 12.9) years. They were divided into three groups according to hernia repair technique. Thirty underwent total extraperitoneal repair (TEP), 31 had transabdominalpreperitoneal repair (TAPP) and 32 had modified Bassini prolene mesh grafting (MBPMG). All patients were examined in the physical therapy and rehabilitation unit just before and after the operation. Lower extremity muscles' isokinetic and isometric functions were measured with the Cybex isokinetic testing device. Patients' length of stay in hospital, need for analgesics in the postoperative period, visual analogue scale (VAS) scores, time of return to work and postoperative complications were also compared.

Results: Patients' need for postoperative analgesics, the use of VAS scoring system (between 0–10), complication rates and the patients' VAS scores on movement results were similar to those in the literature. On the postoperative third day, measurements recorded by the Cybex isokinetic testing device showed that the loss of strength in the lower extremities after the MBPMG procedure was greater than with TAPP and TEP. The isokinetic and isometric assessment of all cases revealed that postoperative mean muscle strength loss was two-thirds less in association with the laparoscopic procedure. Within a 95% confidence interval (CI), the significance of findings was accepted at P-values of less than 0.05 ($p < 0.05$).

Conclusion: The quantitative data showed that there is a more favourable impact from laparoscopic hernia repair versus open surgery on patients' physical activity and return to active work.

Key words: Laparoscopic inguinal hernia repair, inguinal hernia repair with modified Bassini technique (MBPMG), Cybex isokinetic testing device

Introduction

Hernias in the inguinal and femoral regions are generally classified together and called groin hernias. Groin hernias are found in 3%–8% of the general population (1), and the treatment is surgical. Eighty-six percent of these are seen in men, while 84% of femoral hernias occur in women (2,3). Inguinal hernias comprise 80%–83% of all hernias (50% indirect inguinal, 25% direct inguinal, 5% femoral). Indirect inguinal hernias are the most frequent type in both genders, while femoral hernias occur more frequently in women (1,4). According to Sabiston, hernias in the inguinal region comprise 75% of all hernias; 50% of these hernias are indirect and 24% are direct (5).

From the past to the present, various repair methods have been employed without complete success in preventing recurrence. Towards the end of the nineteenth century, McVay and Bassini described the pathological anatomy of the inguinal canal in detail and developed appropriate techniques for repair.

The golden era for hernia surgery is accepted as the years between 1750 and 1850. Hernia surgery went through age-skips when scientists such as Hunter, Cooper, Hasselbach, Scarpa, Gimbernant, Thompson and Morton made contributions with their anatomic definitions (1).

The role of the posterior wall of the inguinal canal in hernia etiopathology and in the repair technique has only of late been realized. Defects in the transverse fascia and transverse muscle aponeurosis play important roles in the process of hernia formation. The aim of repair is to reform the structure whilst avoiding tensile stress in the transverse fascia. Old age increases the incidence of inguinal hernia, strangulation and need for hospitalization (6). The high rate of recurrence and testicular complications from the classical anterior repair lead surgeons to seek other methods.

The onset of the video endoscopy era in 1986 and the development of laparoscopic cholecystectomy in 1987 led to the expeditious development of surgical techniques, with progression also in hernia repair operations. The first laparoscopic hernia intervention was described by Ger (7). The current techniques, however, vary and include the transabdominalpreperitoneal (TAPP) approach described by Arregui (8) and the total extraperitoneal (TEP) repair described by McKernan (4). Laparoscopic inguinal hernia repair has become one of the most frequent laparoscopic operations. Nationally in Turkey, only approximately 15%–20% of all hernias are operated on laparoscopically, but this is increasingly becoming an accepted method of treatment. It has various advantages over the conventional open repair, such as reduced postoperative pain and decreased time until return to daily activities and to work (5).

In this study, we aimed to compare open inguinal hernia repair versus laparoscopic repair (TAPP and TEP) with respect to isometric and isokinetic assessment of physical activity parameters, length of stay in hospital, need for analgesics after operation, visual analogue scale (VAS) scores, time of return to work and postoperative complications.

Materials and Methods

Ninety-three patients with an age range between 20 and 59 years, who presented with inguinal hernias to Safa Hospital's General Surgery Department between November 2011 and March 2013, were included. The surgical approaches employed were randomly distributed. TEP was employed in 30 patients, TAPP in 31 patients and modified Bassini prolene mesh grafting (MBPMG) in 32 patients. All operations were carried out by the same surgeon under the same conditions (i.e. operating room, nursery). The patients were followed-up postoperatively. Patients who had severe heart failure, rheumatoid arthritis, any joint diseases, hip or knee prostheses, severe hypertension or neurological sequela were not included.

Local Ethical Board approval was obtained prior to the study. Each patient was informed about the surgical technique and the possible complications. Written consent was obtained before the operation. A standard three-port technique was employed for TAPP and TEP. Pneumoperitoneum was created with CO₂ to a pressure of 10–12 mmHg. A polypropylene 10 x

15-cm mesh was then placed in the preperitoneal plane and a tacking device was used to fix the mesh. The peritoneum was then closed with either tacks (AMH) and the abdomen was deflated. Routine port-site closure was performed using Vicryl sutures (JBR) for deep fascia in the umbilical wound, and by either 3/0 Prolene™ for skin or VicrylRapiDe™ subcuticular sutures. A modified Bassini technique was employed for conventional open hernia repair. In the modified Bassini repair, the inguinal canal was opened and the spermatic cord was seen with an oblique incision. The transverse abdominis was sutured to the inguinal ligament. The periosteum of the pubis was incised multiple times, followed by reapproximation of the external oblique over the spermatic cord. The floor of the inguinal canal was repaired with continuous sutures through the internal oblique and transverse fascia. A polypropylene 15 x 8-cm mesh was then placed on the repair plane with either 3/0 Prolene™ for skin or VicrylRapiDe™ subcuticular sutures.

Complications that took place in the first 30 days were considered early complications, and those seen later were considered late complications. The late complications were not assessed in this study due to the limited postoperative follow-up period.

Before each operation, the isokinetic and isometric values of the patient's lower extremity muscle functions were measured with the Cybex isokinetic testing device in the physical therapy and rehabilitation unit. The patients were seated upright in the device at an angle of 90 degrees. Bilateral lower extremity muscle strength was measured in orders of 30 degrees and 60 degrees isometrically for extension and flexion muscles, and at velocities of 90 degrees per second and 180 degrees per second for extension and flexion muscles. The strength differences between the right and left lower extremities were recorded. On the third postoperative day, the same measurements were obtained and recorded for all patients.

All patients were operated on under general anaesthesia given preoperatively with 1 gr cefazolin sodium prophylactically. Musclepower and torque loss was calculated for all groups.

In all patients, a pain evaluation was done in the postoperative first 24 hours using VAS scoring. Diclofenac sodium was given intramuscularly if postoperative analgesia was needed, and these cases were recorded. In the first 24 hours, the upstairs-climbing test was used to assess motion pain. Patients were made to climb 20 steps, each of which was 20 cm high. At the end of this test, pain assessment was done using VAS scoring and the results were recorded.

Statistical analysis

We used the Statistical Package for Social Sciences for Windows (SPSS, version 14.0, Chicago, IL, USA) for analysis. All probability values are the result of 2-sided tests, and P-values of less than 0.05 ($p < 0.05$) are reported as significant, with a 95% confidence interval.

Results

Of the 93 patients included, 32 underwent the MBPMG procedure, 30 had TEP and 31 had TAPP repair. The patients' mean age was 46.1 ± 12.9 years; 13 were female (F) and 80 were male (M). Among patients who underwent MBPMG repair, 4 were F and 28 were M (mean age 46.7 ± 12.4 years). Among those who underwent TEP repair, 4 were F and 26 were M (mean age 44.4 ± 15.3 years). Among those who underwent TAPP repair, 5 were F and 26 were M (mean age 45.7 ± 11.1 years).

Patient characteristics

The patient characteristics are given in Table 1.

Complications

Early-stage complications

Four of the 32 patients (12.5%) in the MBPMG repair group had complications. One had hematoma, one had urinary retention, one had atelectasis and one had wound-site infection. Complications occurred in two of the 31 patients (6.4%) in the TAPP repair group. One had urinary retention and the other had atelectasis. Seroma developed in one (3.3%) of the TEP repair cases. With regard to the rates of complications between MBPMG and TAPP, no significant difference was recognized ($p > 0.05$).

VAS scoring (0–10) in the postoperative first 24 hours

The mean VAS scores within the postoperative first 24 hours were 4.7 for the MBPMG repair group, 1.6 for the TAPP group and 1.8 for the TEP group. The mean VAS score in the MBPMG repair cases was statistically significantly higher than those of TAPP and TEP ($p < 0.05$).

Postoperative need for analgesia

Twenty-four (75%) of the patients who underwent MBPMG repair, 7 (22.5%) of the TAPP cases, and 6 (20%) of the TEP

Table 1. Operation type, properties and operation duration

Operation type	MBPMG	TAPP	TEP
Number of cases (n)	32	31	30
Type of hernia (n)			
(indirect, direct, both)	21, 5, 6	20, 4, 7	20, 3, 7
Localization of hernia (n) (Right, left, bilateral)	14, 14, 4	15, 11, 5	16, 10, 4
Mean duration of operation (minutes)	39.6	55	67
Primary/Recurrence (n/n)	27/5	26/5	26/4

cases needed postoperative analgesia. When comparing MBPMG with the laparoscopic procedures (TEP and TAPP), the need for analgesia in the first 24 hours was significantly higher in the MBPMG group ($p < 0.05$) (Table 2).

Pain scores for climbing stairs during pre- and postoperative periods (postoperative 12th hour)

The patients' mean pain scores during stair-climbing in the MBPMG group were 1.0 in the preoperative period and 5.7 in the postoperative period. These scores were 1.0 and 2.2, respectively, in the TAPP repair group ($p < 0.05$), and were 1.0 and 2.0, respectively, in the TEP repair group ($p < 0.05$). Pain scores during stair-climbing in the postoperative period were significantly higher in the MBPMG cases than in the laparoscopic procedure groups (TAPP and TEP) ($p < 0.05$).

Mean length of stay in hospital

The mean length of stay in hospital was 1.2 days in the MBPMG group, 1.0 in the TEP group and 1.0 in the TAPP group. There were no significant differences between the groups with respect to mean length of stay in hospital ($p > 0.05$).

Return-to-work time

The mean time to return to work was 11.5 days in the MBPMG group, 6.3 in the TEP group and 5.1 in the TAPP group. The mean time to return to work in the TEP and TAPP groups was significantly shorter than in the MBPMG group ($p < 0.05$).

Preoperative and postoperative isokinetic evaluation

Postoperative mean muscle strength loss according to isometric evaluation at 30 degrees of extension was 37% in the MBPMG group and 14% in the TEP repair group. At 60 degrees of extension, the mean muscle strength loss was 38% in the MBPMG group, 10% in the TAPP group and 12% in the TEP group. Isokinetic evaluation revealed mean muscle torque loss at 90 degrees/second velocity of extension as 40% in the MBPMG group, 12% in the TAPP group and 14% in the TEP group. At 180 degrees/second velocity of extension, the mean torque loss was 43% in the MBPMG group, 13% in the TAPP group and 17% in the TEP group. Mean muscle strength loss at 30 degrees flexion was 35% in the MBPMG cases, 11% in the TAPP group and 7% in the TEP cases. In isokinetic evaluations, the mean muscle torque loss at 90 degrees/second velocity of flexion was 41% in the MBPMG group, 9% in the TAPP group and 7% in the TEP group (Table 3).

Patients whose lower extremity muscle strengths were similar on isokinetic evaluation in the preoperative period were re-evaluated on the postoperative third day and compared according to type of operation. Muscle strength loss was significantly greater in the MBPMG group than in the TAPP and TEP groups ($p < 0.05$) (Tables 4, 5).

Discussion

Inguinal hernia repair is one of the most frequently carried

Table 2. Need for analgesia according to operation type

Operation Type	Need for analgesia ratio (need/total)
TAPP	7/31
TEP	6/30
MBPMG	24/32

Table 3. Postoperative strength loss distribution according to type of operation

	MBPMG	TAPP	TEP
30° e isometric	37%	14%	14%
60° e isometric	38%	10%	12%
90°/sec e isokinetic	40%	12%	14%
180°/sec e isokinetic	43%	13%	17%
30° f isometric	35%	12%	9%
60° f isometric	35%	11%	7%
90°/sec f isokinetic	42%	13%	16%
180°/sec f isokinetic	41%	9%	7%

Table 4. Comparison of MBPMG and TAPP repairs with respect to postoperative muscle strength loss

	MBPMG	TAPP	P value
30° e isometric	37%	14%	P=0.034
60° e isometric	38%	10%	P=0.033
90°/sec e isokinetic	40%	12%	P=0.033
180°/sec e isokinetic	43%	13%	P=0.032
30° f isometric	35%	12%	P=0.034
60° f isometric	35%	11%	P=0.034
90°/sec f isokinetic	42%	13%	P=0.033
180°/sec f isokinetic	41%	9%	P=0.031

Table 5. Comparison of MBPMG and TEP repairs with respect to postoperative muscle strength loss

	MBPMG	TEP	P value
30° e isometric	37%	14%	P=0.034
60° e isometric	38%	12%	P=0.032
90°/sec e isokinetic	40%	14%	P=0.032
180°/sec e isokinetic	43%	17%	P=0.032
30° f isometric	35%	9%	P=0.032
60° f isometric	35%	7%	P=0.031
90°/sec f isokinetic	42%	16%	P=0.032
180°/sec f isokinetic	41%	7%	P=0.031

out operations worldwide, and laparoscopic approaches have become more common. Due to less pain, less need for analgesia, less loss of manpower, earlier return-to-work time and better cosmetic results associated with this approach, laparoscopic hernia repair is mostly preferred (9–17).

Many studies report on the favourability of laparoscopic surgery in terms of the need for analgesia in the postoperative period. In a study by Pawanindra and colleagues, there was a conspicuous decrease in the need for analgesia in TEP repair cases relative to MBPMG: in the postoperative first 12 hours,

the need for analgesia in the TEP repair cases was an average of 2.60 tablets of diclofenac sodium, and in the MBPMG repair cases, it was 5.76 tablets (10). In our study, 24 of the 32 MBPMG patients needed postoperative analgesia, whereas 6 of the 30 TEP patients and 7 of the 31 TAPP patients did. Our results for postoperative need for analgesia were similar to those of previous studies.

Eklund et al. used a visual analogue scale (VAS) (0–440 mm), which revealed that the TEP group experienced less pain one week postoperatively (105 mm) compared to the Lichtenstein group (175 mm). Cumulative pain scores recorded during the first postoperative week were 105 mm in the TEP group and 175 mm in the Lichtenstein group. Neumayer et al. used a VAS (0–150 mm) showing that the open abdomen group had significantly higher levels of pain shortly after surgery than those in the laparoscopic group by 10.2 mm (95% CI 4.8–15.6). Colak et al. showed that the mean VAS was significantly lower with TEP compared to open mesh repair ($p=0.001$). Bringman et al. reported a mean VAS lower in the TEP group than Lichtenstein the group in the postoperative first 2 hours ($p=0.009$). Langeveld et al. showed significantly lower VAS scores for TEP at days 1, 2 and 3 and on weeks 1 and 4 (overall $p<0.001$). Gokalp et al. used pain analogue scores, which showed no significant difference (12, 15–17).

The VAS is frequently employed to evaluate pain in the postoperative period. The reliability of VAS scoring is decreased by the variation of pain thresholds from one person to another. However, the test is widely employed for its easy-to-apply nature. Brigman and colleagues (9) showed that the mean VAS score in the postoperative first 24 hours was 3.34 for TEP repairs and 6.4 for the MBPMG repair cases. Lal and colleagues (10) found that the mean VAS scores in the postoperative first 12 hours were 2.64 for TEP and 3.52 for MBPMG. In our study, when we compared the MBPMG group with the TAPP group, the VAS mean score was 4.7 for MBPMG and 1.6 for TAPP repair cases. In comparing MBPMG with TEP, the mean VAS score was 4.7 for MBPMG and 1.8 for TEP repair cases. The results of our study show that scores with VAS evaluation are better for laparoscopic approach than open surgery repair. These conform to the results of previous studies.

A study by Langeveld et al. looked at a population with a median age of 55 and an ASA score of one, and recommended laparoscopic technique during herniorrhaphy for the general population (12). The study was elegantly performed to show that the laparoscopic approach allowed for less postoperative pain, faster recovery for daily activities, and a quicker return to work, among other evaluated variables. A meta-analysis of randomized controlled trials by Schmedt et al. further supported the advantage of laparoscopic procedures compared to Lichtenstein repair in terms of local complications and pain-associated parameters (14). Langeveld et al. showed that laparoscopic surgery is now less expensive than open surgery (12). This indicates that a global increase in laparoscopic surgery experience may be improving its cost-effectiveness.

There were no important distinctions between the type of complications following the open and laparoscopic procedures.

Urinary retention was the most frequent complication, with a trend toward higher rates in the laparoscopic group. Our study demonstrated a trend of urinary retention in the MBPMG group.

On multivariate analysis, the age, surgical approach, hernia site (unilateral versus bilateral), gender, amount of intra-operative intravenous fluids and ASA score were not found to contribute significantly to length of stay. After adjusting for patient and operative characteristics (including benign prostatic hypertrophy), the results did not change significantly.

In the past literature, mean return-to-work time has been found to be shorter in TEP repair than in open surgical repair. In the study by Lal and colleagues (10), mean return-to-work time was 12.8 days in the TEP group and 19.3 in the open surgery group. In another study (12), mean return-to-work time was 11 days in the laparoscopy group and 42 in the MBPMG repair group. In our study, mean return-to-work time was 11.5 days with MBPMG repair, 6.3 with TEP and 5.1 with TAPP. As compared to the past literature, the shortness of mean return-to-work time found in the laparoscopic approach group may be related to the types of work in which patients were employed and variations in patients' reluctance to return to work.

The mean length of stay in hospital after inguinal hernia repair was found to be 13.6 hours in the TEP group and 12.4 hours in the open surgical repair group in a study by Andersson (13). In another study, mean length of stay in hospital was 1.48 days in the laparoscopic repair group and 1.4 in the open surgery group (15). In our study, mean length of stay in hospital was 1.2 days in open surgery cases, 1.0 in TAPP and 1.0 TEP. Our results show no difference between the three surgical approaches with regard to mean length of stay in hospital. In many surgery clinics, patients are discharged from the hospital on the same day of hernia repair. In our study, most of the patients could be discharged on the same day as the operation. However, we followed the patients for at least one day in order to obtain data for the evaluation parameters.

Most studies show that the choice of technique for inguinal hernia repair (TEP or Lichtenstein) has no effect on the discharge period. Since both techniques are a day-case approach, finding any time variation is not clinically important as the results are confounded by hospital routines and the time of day the procedure is done.

The period of patient discharge time was shorter in the TEP group when compared to the Lichtenstein group. TEP is more favoured than open abdomen repair in the working age group, as it provides a significantly faster return to work due to less postoperative pain, decreased infection rates and fewer chronic complications. On the other hand, open surgery allows for the option of local or regional anaesthesia, which is crucial for patients who are unsuitable for general anaesthesia. An example of this is the large proportion of elderly patients who need inguinal hernia repair, in whom Lichtenstein is a more clinically sound alternative, as return to work is irrelevant.

There are studies showing the superiority of laparoscopic surgery for pain on motion during the postoperative period. In a study by Hynes and colleagues (15), pain scores on an average of 25-stair climbing tests revealed mean VAS scores of

2.0 with the laparoscopic technique and 5.4 with the open surgery technique. In our study, the mean pain scores on motion were 5.7 with open surgery, 2.0 with TEP and 2.2 with TAPP. The results of our study conform to those of Hynes and Kevin (14), and confirm that pain on motion during the postoperative period is seen less with the laparoscopic hernia repair procedure.

Different studies report that postoperative pain is lower in patients who undergo TEP compared to Lichtenstein repair. It should be noted, however, that there are no standardized scales for evaluating pain across studies. Since pain perception and analgesic requirements are variable and can be influenced by cultural and environmental factors, a bias could be inevitable when patients are asked to grade their own pain levels. Thus, a more objective method of pain measurement is needed when performing these kinds of studies.

Gokalp et al., on the other hand, showed that there was no important distinction in pain scores between the open and laparoscopic techniques. This inconsistent result could be due to the distinctions in anaesthetic pain management between hospitals. Eklund et al. also reported that patients did not always use the prescribed analgesic drug after surgery. However, this is unlikely to have affected the results since it was observed in both groups (16–21).

At 12 weeks' follow-up, all studies showed that the pain distinctions between patients with the two surgical procedures vanished. Of all the results considered, short-term pain is one of the most conclusive factors, in that TEP causes significantly less pain in the healing phase. This has a direct correlation with the return to normal daily activity and work, but no obvious correlation exists in the long-term period.

Our values show that greater losses in muscle strength were more significantly associated with conventional inguinal hernia repair relative to laparoscopic approaches.

Conclusion

Our study compares laparoscopic hernia repair versus open surgical repair with regard to each technique's effect on physical activity and early return to work using a quantitative assessment. The lower need for postoperative analgesia, the patient's ability to return to daily activities in a shorter time and better cosmetic outcomes are a few of the primary reasons to prefer laparoscopic hernia repair. In the light of these findings, we believe the laparoscopic approach in inguinal hernia repair definitely occupies an important place in the management of this disease.

Declaration of conflict of interest

Fatih Ciftci declares no conflict of interest. Ibrahim Abdulrahman declares no conflict of interest. Faruk Ibrahimoglu declares no conflict of interest. Gamze Kilic declares no conflict of interest.

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