

Comparative analysis of comorbidity, surgical complications, pharmacotherapeutic needs, and rehabilitation requirements in transabdominal preperitoneal hernia repair versus conventional operative treatment—current results and benefits

Konstantin Kostov¹, Vesselin Marinov Marinov², Stefka Achkova Ivanova³,
Niya Emilova Semerdzhieva⁴, Mariya Sevdelinova Chaneva⁴, Ventseslava Petrova Atanasova⁵,
Petar Yordanov Atanasov⁴, Maria Stamova Vakrilova Becheva⁶, Valentina Bojanova Petkova⁷

1 Department of General, Visceral and Emergency Surgery, University Emergency Medicine Hospital 'N. Pirogov', Sofia, Bulgaria

2 Clinic of Hepato-Biliary, Pancreatic and General Surgery, Acibadem City Clinic University Hospital 'Tokuda', Sofia, Bulgaria

3 Bulgarian Pharmaceutical Science Society, 2 Dunav Blvd., Sofia, Bulgaria

4 Clinic of Internal Medicine, University Emergency Medicine Hospital 'N. Pirogov', Sofia, Bulgaria

5 Bulgarian Pharmaceutical Union, Sofia, Bulgaria

6 Speciality 'Rehabilitator', Medical College, Medical University of Plovdiv, 120 Bratya Buxton Str., Plovdiv 4004, Bulgaria

7 Faculty of Pharmacy, Medical University – Sofia, Sofia, Bulgaria

Corresponding author: Stefka Ivanova (ivanovastefka_pharm@yahoo.com)

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Abstract

Background: Laparoscopic transabdominal preperitoneal (TAPP) inguinal hernia repair is a relatively new method of inguinal hernia surgical repair that, at theory, provides a good view of the inguinal anatomy and sac contents and, as a laparoscopic procedure, is considered less invasive and with fewer complications compared to total extraperitoneal (TEP) inguinal hernia repair.

Purpose: This study aims to assess the short-term outcome of laparoscopic transabdominal preperitoneal inguinal hernia (TAPP) repair.

Material and methods: The retrospective clinical data for 138 patients with unilateral and bilateral hernia, operated in the Department of General, Visceral, and Emergency Surgery of the University Emergency Medicine Hospital 'N. Pirogov' from 01 January 2022, to 01 January 2023, were included. The risk profile of the patients, the intraoperative and postoperative complications, the duration of hospital stay, the frequency, and the type of analgesics used were analyzed.

Results: Forty-one women (29.7%) were included; men comprised 97 (70.29%) of the cohort. Of the selected group, 63 (45.7%) patients had indirect inguinal hernias, 34 (24.6%), and 25 (18.1%) were diagnosed with direct inguinal hernia and accreta inguinal hernia, respectively. A history of repeatedly occurring hernias was found in 16 patients (11.6%). The average hospital stay was 32 hours (or 1.3 days) and ranged from 24 hours (1 day) to 48 hours (2 days). Complications occurred in 11 (7.97%) patients.

The need for analgesics and anti-inflammatory agents was reliably reduced compared to the patients undergoing conventional surgical treatment of inguinal hernia. The patients were followed for three months post-discharge for the occurrence of surgical morbidity associated with the TAPP hernia repair. None of the patients used an antimicrobial agent, as indicated by a possible complicating bacterial infection. Rehabilitation was started within the first 12 hours after the operation, thus contributing to a significantly shorter hospital stay compared to patients undergoing conventional surgical repair of an inguinal hernia.

Conclusion: Our results demonstrate that TAPP inguinal hernia repair is a safe procedure with reduced postoperative pain. It has fewer complications, with no significantly longer operative time and a shorter overall hospital stay.

Keywords

inguinal hernia, TAPP, laparoscopic surgery, outcome

Introduction

Inguinal hernia is a commonly encountered surgical pathology worldwide, including Bulgaria. The disease can occur at any age, with an incidence of around 25% in men and 27% in women (Hammoud and Gerken 2019). Nowadays, mini-invasive operations for inguinal hernia are widely used due to their excellent outcomes (Yang and Liu 2016a; Baylón et al. 2017). The most commonly used methods are the transabdominal preperitoneal (TAPP) and the totally extraperitoneal (TEP) techniques (van den Heuvel and Dwars 2013; Yang and Liu 2016b). TAPP surgery gives a better view of the inguinal anatomy, and the procedure also has a steep learning curve (Ahmad et al. 2023). TAPP provides the opportunity for intraoperative detection of asymptomatic contralateral inguinal hernias; thus, a contralateral inguinal hernia can be repaired even in cases of implication (van den Heuvel and Dwars 2013; Mancini et al. 2019).

Laparoscopic hernia repair is recommended if it is performed by experienced surgeons trained in groin hernias. The following list contains the advantages of laparoscopic hernia repair compared with the Lichtenstein method:

1. The operation time is longer for the TAPP procedure, but the latter is associated with fast recovery, less postoperative pain, no nerve damage, and chronic pain that is rare.
2. Recurrence rate is equal to or lower than open surgery repair.
3. The rate of perioperative complications may be equal to the Lichtenstein method, but the number of postoperative complications is reduced.
4. Pharmaceutical care is greatly reduced.
5. Medical costs are high, but they are feasible in terms of social medical economics due to early recovery and an early return to work and activities.
6. It is the best approach for bilateral inguinal hernias.

In summary, laparoscopic techniques are associated with faster recovery and lower chronic pain risk, with the added advantage of being cost-effective (Olmí et al. 2007).

Hernia repairs with synthetic meshes are routinely used in surgical procedures worldwide. Hernia repair meshes are

made from synthetic or biological materials and come in a variety of shapes and configurations. Despite the numerous devices currently on the market, the search for the ideal mesh is still ongoing. The arrival of innovations in medicine and especially in surgery is paving the way for the active use of 3D printing (additive technologies), which offers great potential for biomedical applications and especially for hernia repair (Dimitrov et al. 2023; Ilieva et al. 2023).

In the manufacture of hernia meshes, the gold standard seems to be polypropylene (PP), but in recent years there has been intensive research into the use of other polymers with a well-established safety profile, such as polyacrylic acid, polyethylene oxide, and various natural polymers such as chitosan, sodium alginate, etc. (Doseva et al. 2002; Dimitrov et al. 2004).

Purpose

This study aims to assess the short-term outcome of laparoscopic transabdominal preperitoneal inguinal hernia (TAPP) repair. The risk profile of the patients, the type of anesthesia applied, the intraoperative and postoperative complications, the duration of hospital stay, and the type of drug treatment used were analyzed.

Material and methods

The retrospective clinical data for 138 patients with unilateral and bilateral hernia, operated in the Department of General, Visceral, and Emergency Surgery of the University Emergency Medicine Hospital 'N. Pirogov' from 01 January 2022, to 01 January 2023, were included. The diagnosis was based on history, physical examination, ultrasound, and computer tomography (CT).

Criteria for inclusion in the study were: 1. Patients aged over 18 years. 2. An inguinal hernia diagnosed based mainly on clinical examination and ultrasound (direct hernia, indirect hernia, a mix of direct and indirect hernia, recurrent hernia, incarcerated hernia, strangulated hernia). 3. The American Society of Anaesthesiologists (ASA) grades I, II, and III.

The exclusion criteria were: 1. Patients with strangulated hernia with over six hours of delayed hospitalization or with peritonitis. 2. Patients with serious co-morbidities such as progressive Basedow disease, severe diabetes mellitus with complications, unstable angina, renal failure, or progressive tuberculosis. 3. Patients with increased abdominal pressure due to ascites or peritoneal dialysis.

The collected data were processed using the statistical package for social sciences (SPSS), and the descriptive statistics results were reported. The patients were followed for three months post-discharge for the occurrence of surgical morbidity associated with the TAPP hernia repair.

Results

The male patients comprised the majority of the study group (70.3%, $n = 97$). Forty-one (29.7%) of the patients were women. The age range in this retrospective analysis varied from 19 to 74 years (average 39.8 years.).

Of the selected group, 63 patients had indirect inguinal hernias, 34 had direct inguinal hernias, 25 had accreta inguinal hernias, and 16 had recurrent hernias (Table 2).

Table 1. Risk profile.

Variable	N, %
Gender men/women	97 (70.3%)/41 (29.7%)
Age, years	39.8± (19–79)
Arterial hypertension	27(19.57%)
Diabetes mellitus	13 (9.42%)
Ischemic heart disease	1(0.72%)
History of myocardial infarction	2 (1.45%)
History of stroke	1(0.72%)
Chronic heart failure	-
Atrial fibrillation	-

Nineteen of the patients (13.8%) had preoperative painful compaction of tissue in hernial defects (omentum and bowel accreted). In these cases, adhesiolysis was performed. Adhesiolysis was needed in 37 (26.8%) cases, while others were performed straight with hernia closure.

Table 2. Surgical diagnosis.

Surgical diagnosis	N, %
Indirect inguinal hernia	63(45.65%)
Direct inguinal hernia	34(24.64%)
Accreta inguinal hernia	25(18.12%)
Recurrent inguinal hernia	16(11.59%)
	138(100%)

The operating time varied between 29 and 105 minutes (an average of 53.6 minutes) for unilateral hernias and was between 57 and 157 minutes (an average of 121.9 minutes) for bilateral hernias.

The hospital stay ranged from 24 to 48 hours (an average of 1.3 days). Complications occurred at a rate of 7.9% ($n = 11$). Three of the patients had a seroma-drained vein with a small puncture. In four (2.9%), we had a wound infection that was healed with a dressing. Another four

Table 3. Incidence of adhesiolysis during TAPP hernia repair.

Adhesiolysis	N, %
Adhesiolysis performed	37(26.81%)
No need of adhesiolysis	101(73.19%)
	138(100%)

patients (2.9%) had haematoma, which was managed with conservative treatment (in two patients). In the other two patients, haematoma necessitated surgical treatment with a small puncture (Table 4). Complications were also affected by comorbidities. Some of the patients had arterial hypertension, diabetes, and obesity.

No deaths were recorded during the hospital stay or during the period of follow-up.

Table 4. Complications rate.

Surgical complications	N, %
Seroma	3 (2.2%)
Wound infection	4 (2.9%)
Haematoma	4 (2.9%)
	11 (7.9%)

Discussion

Inguinal hernia repair is one of the most frequently performed surgical procedures globally (Antoniou et al. 2013). Lichtenstein hernia repair is a traditional technique in all countries. However, in the last decades, laparoscopic technique (TAPP) for the repair of inguinal hernia has become widely applied because, despite being technically demanding, it has been proven to be a safer procedure. Claus et al. reporting their experience with the TAPP approach, have underlined that the procedure is distinguished for its invasive surgery benefits; among these were the less frequent usage of analgesia for pain relief and the early recovery (Claus et al. 2016). Simons et al. demonstrated that the operative time was moderately prolonged in the TAPP compared to the Lichtenstein repair technique (Simons et al. 2009). According to our analysis, the operating time for unilateral hernias varied between 29 and 105 minutes (an average of 53.6 minutes). For bilateral hernias, it was between 57 and 157 minutes (an average of 121.9 minutes). Our results were comparable to the operative times reported in other studies (Sultan et al. 2019).

Neumayer et al. (Neumayer et al. 2004) showed that intraoperative complications were more frequent with a laparoscopic procedure, which did not correspond with our results. The laparoscopic skills of surgeons in hernia repair are essential. Also, spermatic cord structures demonstrated less injury in TAPP compared to the open method, possibly due to the laparoscopic view, which is magnified. In our study, no intraoperative complications were recorded. Grant demonstrated more wound infections, hematoma, and seroma following laparoscopic repair (Grant 2002). We had noticed complications in eleven cases (7.9%). Three of the patients (2.2%) had a seroma-drained artery with a small puncture. In four patients (2.9%), we had a wound infection that was healed with a dressing. In

another four patients (2.9%), haematoma was diagnosed. They were managed conservatively in two cases, and in the other two patients, haematoma was treated with a small puncture.

TAPP repair was associated with earlier toleration of oral feeds, lesser postoperative pain, earlier hospital discharge, an earlier return to usual activities, and less persisting pain.

Conclusion

The presented study confirms that hernia repair by TAPP is a safe procedure with reduced postoperative pain, a significantly reduced need for perioperative drug therapy, and a dramatically reduced postoperative recovery period

for the patients. There are fewer intraoperative complications, and the operative time is not significantly longer.

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