

Examination of pseudorecurrence cases after inguinal hernia surgery

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ABSTRACT

Introduction: Recurrence is a significant health concern following inguinal hernia surgery, and pseudo-recurrence is another significant problem among recurrence cases. This retrospective multicenter study aimed to examine pseudo-recurrence and its characteristics after laparoscopic inguinal hernia surgery.

Materials and Methods: Patients who underwent inguinal hernia surgery using the Transabdominal Preperitoneal Procedure (TAPP) and Total Extraperitoneal Procedure (TEP) procedures at various centers between 2007 and 2020 were included. Patient details, including gender, age, unilateral and bilateral sides, type of surgery, and postoperative diagnostic parameters, were obtained.

Results: Age mean of pseudo-recurrence patients was 62.58 ± 10.34 with 32-75 range. For inguinal hernia patients, age range was 20 to 89 with 52.14 ± 13.29 mean value. Age difference between inguinal hernia and pseudo-recurrence patients were statistically significant ($p < 0.05$). All pseudo-recurrence patients were males, and 95.7% of inguinal hernia patients were males. Gender differences were insignificant as below 5% percentage ($p < 0.05$). 77.0% of inguinal hernia, 78.9% of pseudo-recurrence patients had unilateral diagnosis, and differences were statistically insignificant ($p > 0.05$). 8.6% of TAPP patients and 5.9% of TEP patients were pseudo-recurrence, and differences were statistically insignificant ($p > 0.05$). All pseudo-recurrence patients were males, and only 4 of patients had unilateral diagnosis. Nine patients in TAPP procedure included five aspiration hematoma, one cord lipoma, and three aspiration seroma cases. Ten patients in TEP procedure included six aspiration hematoma, three aspiration seroma and one cord lipoma. Ages were ranged from 32 to 75.

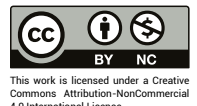
Conclusion: Pseudo-recurrence is highly prevalent in both TAPP and TEP procedures, creating unnecessary invasive procedures for patients and a significant burden on the healthcare system. Therefore, further clinical research and studies are needed to identify and treat pseudo-recurrences in inguinal hernia surgery using medical or other methods before surgery

Keywords: Inguinal hernia, pseudo-recurrence, recurrence



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Introduction

Inguinal hernias are a type of hernia that occurs in 75% of abdominal wall hernias and has a lifetime risk in 27% of men and 3% of women.^[1] While risk factors vary, predisposing factors include chronic obstructive pulmonary disease, smoking, prolonged weightlifting, abdominal aortic aneurysm, appendectomy, family history, peritoneal dialysis, and prostate surgery.^[2] Clinically, they are accompanied by groin pain, swelling in the area on both sides of the pubic bone, burning, and pain when coughing, and rumbling.^[3] Although the etiologies of medial and lateral inguinal hernias differ somewhat, sufficient mechanistic knowledge is not yet available.^[4] Treatment is generally surgical, and although laparoscopic methods are available, open surgery is also a widely preferred treatment method.^[5] While open surgery allows for effective repair in patients with weak tissue or comorbidities, the laparoscopic method is preferred for patients prone to pain, athletes, bilateral patients, or those with recurrence.^[6] The laparoscopic method is also preferred because it provides a quicker recovery time, minimal invasion, and pain relief.^[7]

Recurrence occurs in 11% of cases after inguinal hernia surgery, and chronic pain occurs in approximately 10-12%.^[8] Risk factors for recurrence include history of recurrence, surgical technique, and family history.^[9] Additionally, diabetes, overweight, postoperative infection, and smoking have also been reported to increase recurrence.^[10] Therefore, it is recommended that patient risk factors have a significant impact on recurrence, and the selected surgical method should be examined accordingly.^[11-14] Although recurrence after inguinal hernia surgery is a significant problem, pseudo-recurrence is observed in some cases. While there are studies in the literature on inguinal hernia and recurrence, no adequate studies have been found on cases of pseudo-recurrence after inguinal hernia surgery. Therefore, this study aimed to examine pseudo-recurrence after inguinal hernia surgery and its characteristics.

Materials and Methods

Research Model

The study was designed as a retrospective, multicenter study. Data were scanned through files and analyzed using a descriptive survey model.

Patients

Patients who underwent inguinal hernia surgery at various centers between 2007 and 2020 were included. According to the power analysis conducted in this context, the aim was to obtain a total of 64 patient files with an effect size of 0.30, an 80% confidence interval, and a significance level of 0.05. Patient inclusion criteria were as follows:

- Patients who have undergone surgery by the researchers,
- Age 18 and over,
- Have undergone inguinal hernia surgery,
- Have complete patient files with relevant data,
- Have no adverse health conditions that could affect the research results

The study's exclusion criteria were:

- Those under 18 years of age,
- Those with comorbid conditions that could affect the study results,
- Those with inconsistent data in their patient files.

Patients' gender, age, unilateral bilateral side, operation type and postoperative diagnostic parameters were obtained.

Ethical Approval

The study was approved by the Memorial Clinical Research Ethics Committee (No: 61351342/020-62, Date: July 31, 2025). The study was conducted in accordance with the Helsinki Declaration and Good Clinical Practices. Due to the retrospective nature of the study, the absence of personal information, and the approval of the ethics committee, no patient consent form was used.

Statistical Methods

Operation type and side parameters were described with frequencies and differences were analyzed with Fisher's Exact test. Age parameter was described with mean, standard deviation, median and ranges. Normality of age parameter was tested with Kolmogorov Smirnov test. Since distribution was non-normal, Mann Whitney U test was used for age differences. SPSS 25.0 for windows was used for analysis at 95% Confidence Interval and 0.05 significance level.

Results

In total, 19 patients (6.9%) had pseudo-recurrence, including 9 (8.6%) TAPP and 10 (5.9%) TEPP patients, and differences were statistically insignificant ($p>0.05$). Age mean of pseudo-recurrence patients was 62.58 ± 10.34 with 32-75 range. For inguinal hernia patients, age range was 20 to 89 with 52.14 ± 13.29 mean value. Age difference between inguinal hernia and pseudo-recurrence patients were statistically significant ($p<0.05$). All pseudo-recurrence patients were males, and 95.7% of inguinal hernia patients were males. Gender differences were insignificant as below 5% percentage ($p<0.05$). 77.0% of inguinal hernia, 78.9% of pseudo-recurrence patients had unilateral diagnosis, and differences were statistically insignificant ($p>0.05$). 8.6% of TAPP patients and 5.9% of TEP patients were pseudo-recurrence, and differences were statistically insignificant ($p>0.05$) (Table 1).

All pseudo-recurrence patients were males, and only 4 of patients had unilateral diagnosis. Nine patients in TAPP procedure included five aspiration hematomas, one cord lipoma, and three aspiration seroma cases. Ten patients in TEPP procedure included six aspiration hematoma, three aspiration seroma and one cord lipoma. Ages were ranged from 32 to 75 (Table 2).

In both TAPP and TEP procedures, pseudo-recurrence patients had higher age means than inguinal hernia patients

($p<0.05$). In inguinal hernia patients, age mean of TEPP patients were higher. However, age mean of TEPP patients were lower in pseudo-recurrence patients (Fig. 1).

Cord lipoma patients were unilateral, and had higher age means compared to bilateral aspiration hematoma. Unilateral aspiration hematoma had highest age mean, followed by bilateral aspiration seroma and unilateral aspiration seroma (Fig. 2).

Discussion

This study investigated the rate and characteristics of pseudo-recurrence in inguinal hernia operations, and retrospectively analyzed data from two centers. The results showed that pseudo-recurrence rates were quite high in inguinal hernia operations performed using both the TAPP and TEP procedures, with reported rates of 8.6% and 5.9%, respectively.

Inguinal hernias are a type of abdominal wall hernia more common in men, commonly known as inguinal hernias or direct hernias.^[1-3] While risk factors vary, the most commonly reported include gender, family history, prolonged weightlifting, peritoneal dialysis, certain lung diseases, or appendicitis surgery.^[2] The underlying cause and clinical presentation are evaluated by the surgeon, and surgical treatment is provided according to the patient's condition.^[5]

Table 1. Baseline characteristics of patient groups and difference analysis results

	Pseudo-recurrence		p
	No (n=256)	Yes (n=19)	
Age, mean $\pm$ SD	52.14 ± 13.29 54.00 (20.00-89.00)	62.58 ± 10.34 65.00 (32.00-75.00)	0.000 ^a
Gender, n (%)		0.448 ^b	
Female	11 (4.3)	-	
Male	245 (95.7)	19 (100.0)	
Side, n (%)			0.551 ^b
Unilateral	197 (77.0)	15 (78.9)	
Bilateral	59 (23.0)	4 (21.1)	
Operation type, n (%)			0.268 ^b
TAPP	96 (91.4)	9 (8.6)	
TEP	160 (94.1)	10 (5.9)	

^aMann Whitney U Test; ^bFisher's Exact Test; SD: Standard Deviation; TAPP: Transabdominal Preperitoneal Procedure; TEP: Total Extraperitoneal Procedure.

Table 2. Pseudo-recurrence patients' age, gender and side with operation type

Gender	Age	Side	Diagnosis	Operation type
Male	68	Unilateral	Aspiration seroma	TAPP
Male	49	Unilateral	Cord lipoma	TAPP
Male	70	Unilateral	Aspiration hematoma	TAPP
Male	65	Unilateral	Aspiration seroma	TAPP
Male	69	Unilateral	Aspiration hematoma	TAPP
Male	32	Unilateral	Aspiration seroma	TAPP
Male	68	Unilateral	Aspiration hematoma	TAPP
Male	66	Unilateral	Aspiration hematoma	TAPP
Male	54	Unilateral	Aspiration hematoma	TAPP
Male	66	Bilateral	Aspiration seroma	TEP
Male	63	Unilateral	Aspiration hematoma	TEP
Male	75	Unilateral	Cord lipoma	TEP
Male	62	Unilateral	Aspiration hematoma	TEP
Male	59	Unilateral	Aspiration hematoma	TEP
Male	64	Bilateral	Aspiration seroma	TEP
Male	73	Unilateral	Aspiration hematoma	TEP
Male	50	Bilateral	Aspiration hematoma	TEP
Male	63	Unilateral	Aspiration seroma	TEP
Male	73	Bilateral	Aspiration hematoma	TEP

TAPP: Transabdominal Preperitoneal Procedure; TEP: Total Extraperitoneal Procedure.

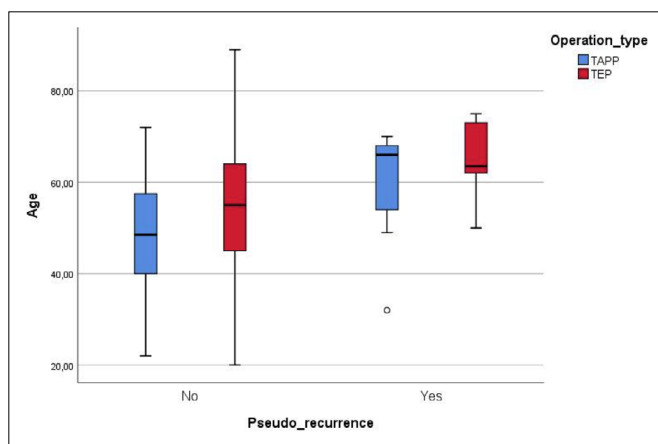


Figure 1. Age mean of patient groups according to operation procedures.

Recurrence after inguinal hernia surgery has been reported in the literature at approximately 11%,^[8] and risk factors include postoperative smoking, infection, and individual and clinical characteristics.^[10] Furthermore, not every case of suspected inguinal hernia recurrence is an inguinal hernia. In some cases, a false impression of recurrence can occur in suspected recurrence cases due to

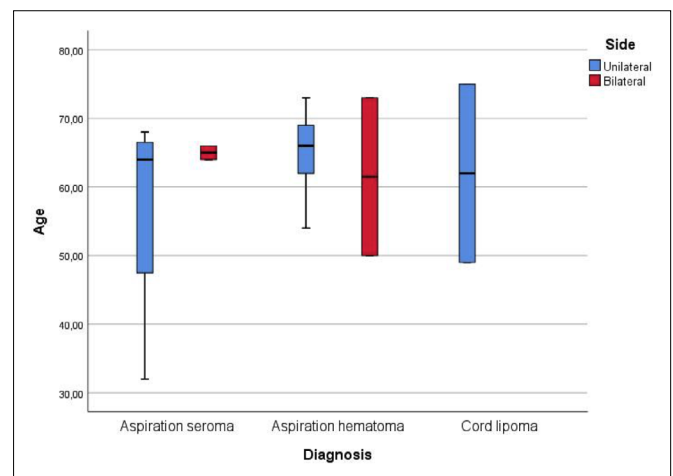


Figure 2. Age mean of patient groups according to diagnosis.

various reasons, such as aspiration seroma, aspiration hematoma, or cord lipoma. In these cases, it is very difficult to distinguish the difference even with the clinical presentation and the surgeon's manual examination. Consequently, inguinal hernia procedures are performed unnecessarily in a significant number of patients due to pseudo-recurrence.

Although demographic information and findings for inguinal hernia and recurrence are provided in the literature, studies on pseudo-recurrence cases are relatively limited. Among these, Tse et al.^[15] examined 143 patients after laparoscopic ventral and incisional hernias and reported 10 mesh bulges, 3 seromas, and 1 retained hernia contents. Gupta et al.^[16] reported 18 hematomas, 24 seromas, and 8 cord lipomas in 243 patients who underwent TEP and TAPP. Siddaiah-Subramanya et al.^[17] reported that both the risk factors for inguinal hernia and recurrence are similar. However, older age and male gender appear to be risk factors for inguinal hernia recurrence.^[18-23] In our study, the mean age of pseudo-recurrence patients was significantly higher. All pseudo-recurrence patients and 95.7% of inguinal hernia patients were male. 77.0% of inguinal hernia and 78.9% of pseudo-recurrence patients had unilateral diagnosis, and the differences were statistically insignificant. 8.6% of TAPP patients and 5.9% of TEP patients were pseudo-recurrence. Our results indicate that the differences between recurrence and pseudo-recurrence cases are not sufficient, either demographically or clinically, and that further differential diagnosis studies and risk factor studies are needed.

The research's contribution to the literature and surgical practice

The research's most significant contribution to the literature is its potential for significant impact on surgical practice and public health, potentially reducing healthcare burden. Furthermore, it contributes to the literature with findings that could contribute to individuals achieving a better quality of life with less invasive procedures.

The research's contribution to surgical practice is that it provides surgeons with more information about pseudo-recurrences in inguinal hernia cases, aims to reduce unnecessary surgical procedures, utilize healthcare resources effectively, and contribute to surgeons' professional well-being. Therefore, the research was designed with a pragmatic and progressive approach.

Conclusion

Pseudo-recurrence is highly prevalent in both TAPP and TEPP procedures, creating unnecessary invasive procedures for patients and a health burden for the healthcare system. However, there is a lack of sufficient research on this topic, both in practice and in the literature. Therefore, more clinical research and studies are needed to identify pseudo-recurrence cases in inguinal hernia surgeries before surgery

and to treat them with medical or other methods.

Multicenter studies with larger samples, cross-comparisons, and more variables are needed to understand pseudo-recurrence rates in inguinal hernia surgeries. Although neither procedure carries a high mortality rate, it is beneficial to clarify the differences between inguinal hernia and pseudo-recurrence in terms of outcomes and public health burden.

Limitations of the Study

The most significant limitation of the study is the lack of sufficient studies in this area, making it impossible to adequately compare the results with the literature. Although studies on inguinal hernias and recurrence have been conducted, no theoretical or clinical studies on pseudo-recurrence were found.

Another limitation of the study is the limited data in the research files. Pseudo-recurrence generally requires a long period of time or the screening of a large number of patients. This is why a retrospective study was used. In retrospective studies, the control of study variables depends on the consistency and content of the data recorded in the files rather than on the researcher. However, studies with more variables, prospective studies, and longer durations may provide a better understanding of pseudo-recurrence.

Disclosures

Ethics Committee Approval: Ethical approval was obtained from the Üsküdar University Ethical Committee (Date: 31/07/2025, No: 61351342/020-62).

Authorship Contributions: Concept – C.K., S.K.; Design – V.M., A.T., K.Y.; Supervision – C.K., S.K.; Funding – İ.K., S.R.M.; Materials – İ.K., S.R.M.; Data Collection – V.M., A.T., K.Y.; Analysis and/or interpretation – V.M., A.T., K.Y.; Literature Search – İ.K., S.R.M.; Writing – V.M., A.T., K.Y.; Critical Review – C.K., S.K.

Patient Consent: Not applicable due to retrospective design.

Consent for Publication: Not applicable.

Availability of Data and Materials: The data that support the findings of this study are not openly available due to reasons of sensitivity and are available from the corresponding author upon reasonable request.

Competing Interests: None.

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