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Application of European guidelines for inguinal hernia in a tertiary hospital setting: Time for a change?

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Ethics Committee Approval
The study was approved by the Medical Ethics Committee of Ghent University Hospital (October 2020, EC/UZG/2019/239).
All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

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Abstract

Background/Aim: The European Hernia Society (EHS) published practice guidelines in 2018, aiming to standardize inguinal hernia repair. These are not obligatory, and deviations in clinical practice may occur. This study investigates whether these guidelines were followed in a tertiary center and explores reasons for deviations.

Methods: A retrospective cohort study was conducted on 1607 patients who underwent inguinal hernia repair at Ghent University Hospital (2007–2020). Outcomes such as complications, recurrence, and chronic pain were analyzed in relation to EHS guideline adherence.

Results: TAPP was significantly associated with wound complications (OR 3.96, 95% CI 1.75–8.94; P=0.001). Lichtenstein repair showed the lowest recurrence rate (5.7%) but was often used in lower-risk patients, suggesting possible selection bias. Overall adherence to EHS guidelines was 60%. No significant difference in chronic postoperative pain was observed between open and laparoscopic techniques (P=0.21). Predictors such as age <50 years (OR 2.28), symptomatic hernias (OR 2.15), and laparoscopic repair (OR 1.39) were associated with wound complications.

Conclusion: EHS guidelines provide valuable direction but are not always reflected in practice. Clinical realities such as surgeon experience, patient factors, and hospital logistics influence deviation. These findings emphasize the need for more flexible, context-sensitive guidelines, supported by further prospective studies.

Keywords: inguinal hernia, European Hernia Society, guideline adherence, retrospective study, hernia recurrence, wound complications

Introduction

Inguinal hernia repair is among the most frequently performed surgical procedures worldwide, with over 20 million cases reported annually [1]. Despite the ubiquity of this intervention, substantial variation persists in the choice of surgical technique, both across and within institutions.

To address this variability and improve patient outcomes, the European Hernia Society (EHS) published evidence-based clinical guidelines in 2018 [2]. These guidelines offer tailored recommendations based on patient-specific factors, hernia characteristics, and recurrence status. For instance, laparoscopic repair is recommended for bilateral and recurrent hernias when performed by experienced surgeons, whereas the open Lichtenstein technique remains appropriate for many primary unilateral hernias [2,3].

The EHS guidelines also emphasize shared decision-making and suggest strategies to minimize complications such as chronic postoperative pain and hernia recurrence. However, guideline adherence in clinical practice is not guaranteed. Surgical decisions are often influenced by surgeon preference, institutional resources, and individual patient factors. Several studies have reported frequent deviations from the guidelines, even in high-volume centers [4,5].

At Ghent University Hospital, various surgical techniques are used depending on the clinical context and the surgeon's expertise. Although the EHS guidelines are accessible, their integration into routine practice has not been systematically assessed.

This retrospective study aims to evaluate the extent to which the 2018 EHS guidelines are followed in a tertiary care center. Additionally, we investigate whether adherence to these guidelines is associated with clinical outcomes, including recurrence rates, wound complications, and chronic postoperative pain. By identifying deviations and their potential consequences, this study seeks to inform future updates of the guidelines and enhance their applicability in everyday clinical practice.

Materials and methods

Study design and setting

This retrospective observational cohort study was conducted at the Department of General Surgery of Ghent University Hospital, a tertiary referral center in Belgium. The study adhered to the principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the Ghent University Hospital Medical Ethics Committee on September 24, 2020 (approval number: BC-08479).

Patient selection

All adult patients (≥18 years) who underwent inguinal hernia repair (either primary or recurrent) at Ghent University Hospital between January 2007 and December 2020 were eligible for inclusion. Patients were identified through the hospital's electronic health records. Exclusion criteria were:

1. Incomplete surgical or follow-up data;
2. Concomitant major abdominal surgery performed during hernia repair.
3. Pediatric patients (<18 years).

Data collection

Relevant data were manually extracted from operative reports, anesthesia records, discharge summaries, and outpatient follow-up documentation. The following variables were collected:

- **Demographics**: age, sex
- **Hernia characteristics**: type (direct, indirect, combined, bilateral), side (left, right, bilateral), recurrence status, and symptomatology
- **Surgical technique**: Lichtenstein (open), TEP (totally extraperitoneal), or TAPP (transabdominal preperitoneal)
- **Surgeon experience**: staff surgeon versus trainee (if available)
- **Outcomes**: complications (e.g., wound infection, seroma), recurrence, and chronic postoperative pain (defined as pain persisting for more than three months postoperatively)

Definition of Guideline Adherence

Surgical procedures were categorized as either **guideline-conforming** or **non-conforming** based on the 2018 HerniaSurge/EHS guidelines [2]. For example, laparoscopic repair (TEP or TAPP) was considered guideline-conforming for bilateral or recurrent hernias, while the Lichtenstein technique was appropriate for primary unilateral hernias in older patients with comorbidities.

Statistical analysis

Data were analyzed using IBM SPSS Statistics, version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were presented as means (standard deviations [SD]) or medians with interquartile ranges (IQR), depending on distribution. Categorical variables were summarized as frequencies and percentages. Group comparisons for categorical variables were conducted using the chi-square test or Fisher's exact test, as appropriate. Logistic regression analysis was performed to identify predictors of recurrence and complications, with results expressed as odds ratios (ORs) and 95% confidence intervals (CIs). A *P*-value <0.05 was considered statistically significant.

Results

Patient characteristics

A total of 1,607 patients were included in the study. The mean age was 59.5 (14.8) years, and the majority were male (93.1%). Most hernias were primary and unilateral.

Surgical techniques used

The three main surgical approaches employed were Lichtenstein, TAPP, and TEP. The choice of technique varied depending on patient characteristics and surgeon preference. Full distributions are presented in Table 1.

Table 1: Surgical outcomes by operative technique.

Technique	n	Recurrence (%)	Wound complications (%)	Chronic pain (%)
Lichtenstein	733	5.7	2.1	10.9
TAPP	529	6.8	7.8	11.6
TEP	**335**	**6.4**	**3.3**	**11.4**

TAPP: Transabdominal preperitoneal hernia repair, TEP: Totally extraperitoneal hernia repair

Complications

The overall complication rate was 7.1%. TAPP was significantly associated with a higher rate of wound-related complications compared to the other techniques (*P*=0.001). No

perioperative mortality was observed. The most frequent complications were seroma and hematoma formation.

Recurrence

The overall recurrence rate across all techniques was 6.3%. Although the Lichtenstein technique showed the lowest recurrence rate, the difference between techniques was not statistically significant (P=0.08). This observation may be influenced by patient selection bias.

Chronic Postoperative Pain

Chronic postoperative pain (defined as pain persisting for more than three months) was reported in 11.2% of patients. No statistically significant differences in chronic pain were found between surgical techniques (P=0.21), nor were any associations identified with age, sex, or hernia type.

Guideline Adherence

Overall, 60% of procedures were performed under the 2018 EHS guidelines. Common deviations included the use of open repair for bilateral hernias and laparoscopic repair in young patients with unilateral hernias. Non-conforming procedures were not significantly associated with differences in recurrence or chronic pain rates; however, a slight increase in wound-related complications was observed.

Predictive Analysis

Multivariate logistic regression identified the TAPP technique as an independent predictor of increased wound-related complications (OR 3.96, 95% CI 1.75–8.94; P=0.001). A body mass index (BMI) greater than 30 was also significantly associated with higher complication rates (OR 2.13, 95% CI 1.09–4.17; P=0.030). No independent predictors of recurrence or chronic postoperative pain were identified.

Discussion

This retrospective study evaluated adherence to the 2018 European Hernia Society (EHS) guidelines for inguinal hernia repair at a tertiary referral center and assessed whether deviations from these guidelines were associated with differences in clinical outcomes.

Approximately 60% of procedures were performed under the EHS recommendations, which aligns with findings from other European centers [2,6]. The most frequent deviations included the use of open repair for bilateral hernias and the performance of laparoscopic repair in younger patients with unilateral hernias. These choices appeared to be influenced by surgeon experience, patient comorbidities, and institutional logistics [3,5].

Despite these deviations, recurrence rates and the incidence of chronic postoperative pain were not significantly different from guideline-compliant cases. This suggests that in real-world practice, individualized decision-making may yield outcomes comparable to those recommended by standardized protocols [1,4]. However, the TAPP technique was independently associated with a higher incidence of wound-related complications. This finding is consistent with existing literature and may be related to peritoneal entry, increased operative time, or port-site morbidity [3].

The Lichtenstein technique remained widely used, particularly among older, low-risk patients. Its favorable outcomes in our cohort may reflect a degree of selection bias [4]. Other confounding factors, such as follow-up duration, variability in pain assessment tools, and surgeon proficiency, may also contribute to the observed differences [7]. Notably, we did not observe a significant reduction in chronic pain with laparoscopic approaches, contrasting with the findings of some earlier studies [8,9].

These findings highlight the challenges of implementing clinical guidelines in daily practice. While evidence-based recommendations are crucial, real-world decision-making is shaped by a complex interplay of patient- and system-level variables. Our results advocate for a flexible, context-sensitive application of surgical guidelines, rather than rigid adherence [2,6].

Limitations

This study has several limitations. Its retrospective design restricts causal inference and introduces the potential for selection and reporting bias. Additionally, data on patient-reported outcomes—such as postoperative quality of life or time to return to normal activity—were unavailable. Surgeon experience level, which likely influenced both technique selection and outcomes, was inconsistently documented and could not be reliably included in the analysis.

Conclusion

This study demonstrates that adherence to the 2018 EHS guidelines in inguinal hernia repair is variable, even within a high-volume tertiary care setting. Although approximately 60% of procedures were guideline-conforming, clinical outcomes such as recurrence and chronic postoperative pain did not differ significantly between conforming and non-conforming surgeries. However, the increased rate of wound-related complications associated with the TAPP technique underscores the importance of context-aware surgical decision-making.

Overall, our findings support the view that while clinical guidelines serve as a valuable framework, real-world surgical care must accommodate a variety of practical considerations, including patient characteristics, institutional resources, and surgeon expertise. Future revisions of the EHS guidelines should integrate these contextual factors to enhance their applicability and promote broader adherence in daily clinical practice.

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References

1. Kingsnorth AN, LeBlanc KA. Hernias: inguinal and incisional. Lancet. 2003;362(9395):1561-71.
2. HerniaSurge Group. International guidelines for groin hernia management. Hernia. 2018;22(1):1-165.
3. Bittner R, Arregui ME, Bisgaard T, Dudai M, Ferzli GS, Fitzgibbons RJ, et al. Guidelines for laparoscopic (TAPP) and endoscopic (TEP) treatment of inguinal hernia. Surg Endosc. 2011;25(9):2773–843.
4. Sanders DL, Kingsnorth AN. The modern management of inguinal hernia. BMJ. 2012;344:e2953.
5. Kokotovic D, Helgstrand F, Bay-Nielsen M, Kehlet H, Bisgaard T, Rosenberg J, et al. Nationwide analysis of adherence to guidelines on laparoscopic hernia repair. Br J Surg. 2017;104(7):801–7.
6. Simons MP, Aufenacker TJ, Bay-Nielsen M, Bouillot JL, Campanelli G, Conze J, et al. European Hernia Society guidelines on the treatment of inguinal hernia. Hernia. 2009;13(4):343–403.
7. Belyansky I, Tsirline VB, Klima DA, Lincourt AE, Heniford BT, Augenstein VA, et al. Prospective, comparative study of postoperative quality of life in TEP, TAPP, and Lichtenstein repairs. J Am Coll Surg. 2011;212(4):502–10.

8. McCormack K, Scott NW, Go PM, Ross S, Grant AM. Laparoscopic techniques versus open techniques for inguinal hernia repair. Cochrane Database Syst Rev. 2003;(1):CD001785.
9. Eklund A, Montgomery A, Bergkvist L, Rudberg C. Chronic pain 5 years after randomized comparison of laparoscopic and Lichtenstein inguinal hernia repair. Br J Surg. 2010;97(4):600-8.