Original Paper

Postoperative Pain after Inguinal Hernia Repair Using the Tension-Free Lichtenstein Procedure: A Retrospective Study

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ABSTRACT: Inguinal hernia surgery is a constantly evolving field, with ongoing research efforts aimed at enhancing surgical techniques and outcomes for patients. This retrospective study conducted between 2015 and 2020 in the First Surgical Clinic of Craiova Emergency Clinical Hospital focused on the occurrence and characteristics of postoperative pain following inguinal hernia repair using the tension-free Lichtenstein procedure. A total of 178 patients were included in the study, with 16.85% reporting postoperative pain. The average pain intensity was 6.4 on a scale of 1 to 10. Patients described the pain as numbness, burning sensation, stinging, pressure, and tingling sensations. Notably, 50% of patients reported pain related to weather changes. While the study explored potential relationships between patient demographics, hernia type, and postoperative pain, no statistically significant associations were found. Approximately 20% of patients with postoperative pain reported adverse effects on their work, and 10% used analgesics for pain management. This study highlights the multifaceted nature of postoperative pain following inguinal hernia repair, emphasizing the need for further research to identify individual risk factors and adherence to international guidelines for hernia management. The findings also underscore the importance of effective pain management strategies to improve patient comfort and quality of life post-surgery.

KEYWORDS: *Inguinal, hernia, repair, postoperative, pain, Lichtenstein.*

Introduction

Inguinal hernia surgery is currently a subject of ongoing research, with continuous advancements in devices and surgical techniques aimed at improving the quality of surgical procedures and, consequently, the quality of life for operated patients.

Each year, more than 20 million patients worldwide undergo these procedures [1].

While many of the postoperative complications related to hernia repair have been eliminated over time due to new discoveries, the issue of postoperative pain continues to be debated [1-4].

The etiology of pain after surgical repair of inguinal hernia with synthetic mesh is complex and highly variable [5].

Numerous risk factors for the development of pain have been described, but only a few of them have been thoroughly studied.

There are general factors that affect the operated organism regardless of the surgical area, as well as local factors related to the surgical procedure: timing of the operation, technique, and materials.

Postoperative pain is a common complication of surgical interventions, influenced by a wide range of predisposing factors such as preoperative pain, psychological vulnerability, previous surgical interventions, radiotherapy, etc.

Identifying and, if possible, eliminating some of these factors would be remarkable.

However, most patients undergoing hernioplasty do not exhibit this pattern of risk factors, making postoperative pain after inguinal hernia repair an ongoing subject of study, with multiple research studies currently underway.

The literature reported prevalence has a significant variation ranging from 0.7% to 75% [6,7].

This variation can be attributed to pain definition.

Clinically significant pain has a prevalence ranging between 10 and 12%, which decreases

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over time, while severe, debilitating pain ranges from 0.5% to 6% [1].

Chronic postoperative orchialgia occurs in about 10% of patients with chronic pain [1].

These percentages are influenced by the lack of a clear definition of pain or its characteristics that can be classified into different categories.

Commonly, this pain is defined as an unpleasant sensation or an emotional experience associated with probable or potential tissue damage [8,9].

The International Association for the Study of Pain has defined chronic pain as pain lasting more than 3 months after surgery [10,11], and this timeframe has increased with the use of synthetic meshes, as the inflammatory response of the body lasts longer [12].

The definition of chronic postoperative pain should include a pain threshold of at least moderate intensity which impacts daily activities [1].

Materials and Methods

Study design

A retrospective study was conducted in the First Surgical Clinic of Craiova Emergency Clinical Hospital, over a 6-year period, between 2015 and 2020.

All patients who received a mesh repair for inguinal hernia in the aforementioned clinic were included.

A questionnaire assessing postoperative pain was developed (Annex 1) and a telephone survey was carried out.

The questionnaire analysed presence of pain at the time of the questionnaire or in the previous week, pain intensity, pain frequency, pain characteristics, duration of painful episodes, and the necessity of analgesics.

Patients who could not be contacted (9 patients) or patient who had deceased (8 patients) were excluded from the study.

Procedure

All patients in the study underwent a Lichtenstein repair.

The inguinal canal was accessed through an oblique incision, the spermatic cord was identified and isolated and the hernia sac was identified, isolated, excess removed, and reduced.

For all cases, a lightweight polypropylene mesh was used, and mesh was never used in contaminated fields.

The mesh was fixed to the inguinal ligament and conjoint tendon, and the mesh was calibrated at the level of the deep ring.

Anatomical repair of the abdominal wall followed.

If nerves were encountered, they were either preserved if they could be repositioned away from the mesh or neurolysis was performed.

Systematic nerve identification was not practiced.

No drains were added.

Patients were discharged when gas passage was present and when patients felt confident in their active mobility.

Postoperative follow-up of these patients was performed by each attending physician through scheduled visits to the Outpatient Surgery Department, and after recovery, they were contacted by phone.

Ethical aspects

Specific information was collected in accordance with all legal considerations.

The study was conducted following the guidelines of the Declaration of Helsinki and approved by the Ethics Committee of the University of Medicine and Pharmacy of Craiova (protocol no. 119/17.12.2018).

Statistical analysis

Statistical analysis was performed using Microsoft Excel (Microsoft Corp., Redmond, WA, USA), along with the XLSTAT add-on for MS Excel (Addinsoft SARL, Paris, France), and IBM SPSS Statistics 20.0 (IBM Corporation, Armonk, NY, USA) for data processing.

Data were recorded using Microsoft Excel files and then statistically analysed to discover the relationship between postoperative pain and other recorded parameters among the patients.

A descriptive analysis of the study group (percentage of cases for qualitative data, mean and standard deviation for numerical data) and complex statistical tests (Chi-square and Fisher's exact test, Mann-Whitney test) were performed using the aforementioned statistical software.

The Chi-square test ($\chi 2$) was used to test the existence of a relationship between qualitative variables, and the non-parametric Mann-Whitney test was used to compare numerical data between study groups.

Results

Between 2015 and 2020, a total of 195 patients underwent inguinal hernia surgery using the tension-free Lichtenstein procedure and were considered eligible for inclusion in our study (Figure 1).

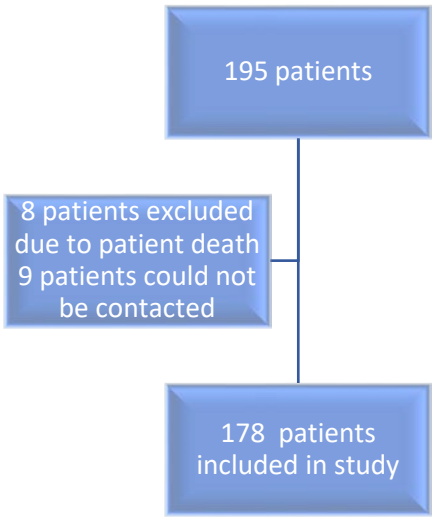

Figure 1. Chart flow of patient inclusion and exclusion.

However, seventeen patients were excluded from the analysis due to mortality during the study period (n=8) or unavailability for contact by phone (n=9).

Among the remaining 178 patients included in the study, the gender distribution showed that 15.73% (n=28) were female, while 84.27% (n=150) were male.

Geographically, 50.56% of patients originated from urban areas, while the remaining 49.44% came from rural regions (Table 1).

Regarding the classification of inguinal hernias, the majority of patients, 93.26% (n=166), underwent surgery for primary inguinal hernia, while 6.74% (n=12) presented with recurrent hernias (Table 1).

Following the Lichtenstein repair, postoperative pain was experienced by 30 patients (16.85%) out of the 178 patients who underwent the procedure.

Among them, 4 women (14.29%) and 26 men (17.33%) reported experiencing pain.

Notably, the age group of 60 to 80+years constituted the majority of patients who experienced postoperative pain, with 23 patients (76.67%), while only 7 patients (23.33%) were below the age of 60 (Table 1).

The intensity of postoperative pain varied among the affected patients.

On a scale from 1 to 10, with 1 being the mildest and 10 being the most severe, the average pain intensity reported by the patients was 6.4, with a standard deviation of 1.3.

Regarding the location of the postoperative pain, the majority of patients (19 out of 30) reported pain in the inguinal region, while 6 patients reported pain in the lower abdomen, and 5 patients reported pain in the groin area (Table 1).

When analysing the survey responses, 40% of patients reported experiencing pain at the time of the survey, while 63.3% of patients reported pain in the past week.

Among those with postoperative pain, only 10% reported daily pain, while 46.7% reported experiencing pain frequently and occasionally.

Notably, only one patient (3.3%) reported painful episodes lasting over 60 minutes. Pain of moderate intensity was reported by 13.3% of patients (Table 1).

The nature of the pain was described differently by patients, with 30% experiencing numbness, 13% a burning sensation, 20% a sting, 16.7% pressure, and 3.3% a tingling sensation.

Interestingly, 50% of patients reported pain related to weather changes, with pain being triggered during inclement weather.

Additionally, 70% of patients reported localized pain (Table 1).

Regarding pain triggers, 46.7% of patients reported pain in relation to physical activity, 30% experienced pain when rising from a chair (but not when sitting on one), 23.3% reported pain when bending their bodies, 30% described pain when ascending or descending stairs, and 20% reported pain when driving (Table 1).

A notable aspect to consider is the impact of reported pain on patients' work.

Among those reporting pain (n=30), 20% (n=6) indicated that pain adversely affected their work, and 10% (n=3) of patients reported using analgesics to manage this pain.

Additionally, one patient (0.6%) reported experiencing orchialgia and erectile dysfunction as a consequence of the surgery (Table 1).

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Table 1. General characteristics of patients and results of the questionnaire.

Male sex	26	86.67%
Rural environment	16	53.33%
Primary hernia	19	95.00%
Unilateral hernia	27	90.00%
Elective repair	19	63.33%
Age		
<40	1	3.23%
40-49	2	6.45%
50-59	5	16.13%
60-69	9	29.03%
70-79	9	29.03%
80+	5	16.13%
Questionnaire		
Pain now	12	40.0%
Pain in the last week	19	63.3%
Pain frequency		
Everyday	3	10.0%
Frequent	14	46.7%
Occasional	14	46.7%
Unable to answer	2	6.7%
Duration		
<60	27	90.0%
>60	1	3.3%
Unable to answer	2	6.7%
Intensity		
Small	24	80.0%
Moderate	4	13.3%
Unable to answer	2	6.7%
Pain characteristics		
Numbness	9	30.0%
Burning sensation	4	13.3%
Like a sting	6	20.0%
Stabbing pain	6	20.0%
Like a pressure	5	16.7%
Tingling sensation	1	3.3%
Unable to answer	3	10.0%
Weather-related pain	15	50.0%
Pain is localised	21	70.0%
Physical activity related pain	14	46.7%
Pain when getting up from a chair	9	30.0%
Pain when bending	7	23.3%
Pain when climbing up/down stairs	9	30.0%
Driving related pain	6	20.0%
Affects work	6	20.0%
Analgesic use	3	10.0%
Orchialgia	1	3.3%
Erectile disfunction	1	3.3%

We conducted statistical analyses to explore potential relationships between patient demographics and postoperative pain.

However, no statistical significance was reached between patient sex and pain prevalence (p=0.552, Chi-Square test), pain frequency (p=0.359, Chi-Square test), pain duration (p=0.273, Chi-Square test), weather-related pain (p=0.866, Chi-Square test), pain when getting up from a chair (p=0.472, Chi-Square test), pain when bending (p=0.842, Chi-Square test), pain when climbing up/down the stairs (p=0.887 Chi-Square test), driving-related pain (p=0.788, Chi-Square test), pain that affects work (p=0.788, Chi-Square test), or the use of analgesics (p=0.455, Chi-Square test).

Similarly, no statistical significance was found when comparing the results of the questionnaire with patient environment (rural, urban), age groups, hernia type (primary or recurrent), or hernia localization (unilateral/bilateral).

Moreover, no statistical differences were found between emergency and elective repair in terms of postoperative pain (Annex 2).

Discussions

Chronic pain following inguinal hernia surgery has been a subject of interest for numerous researchers.

Studies have highlighted the impact of surgical technique on postoperative pain.

The Hernia Surge Group (2018) and Alfieri et al. (2011) have emphasized the importance of adherence to international guidelines for groin hernia management to minimize the risk of chronic postoperative pain [1,3].

In our study, 6.74% of patients presented with recurrent hernias, and while we did not find a significant relationship between hernia type and postoperative pain, this observation raises the question of whether previous surgeries contribute to chronic pain.

Poobalan et al. (2003) conducted a review of chronic pain after inguinal herniorrhaphy and suggested that pre-existing chronic pain conditions may increase the risk of postoperative pain [2].

Inguinal hernia repair using the tension-free Lichtenstein procedure is a common surgical intervention.

In our study, we investigated the occurrence of postoperative pain and its impact on patients.

The results showed that 16.85% of patients experienced postoperative pain following the Lichtenstein repair.

The intensity of pain varied among affected patients, with an average pain intensity of 6.4 on a scale from 1 to 10.

The description of postoperative pain provided by patients varied, with some experiencing numbness, burning sensations, stinging, pressure, and tingling sensations.

This variety of pain experiences aligns with the findings from the International Association for the Study of Pain (IASP) (1979) and Merskey and Bogduk (1994), who emphasize the subjective and multifaceted nature of pain experiences [9,13].

Interestingly, we found that 50% of patients reported pain related to weather changes, with pain being triggered during inclement weather.

This phenomenon of weather-related pain has been reported in other chronic pain conditions and could be attributed to changes in barometric pressure and temperature affecting tissue inflammation and nerve sensitivity (Macrae, 2001) [11].

The geographical distribution of patients revealed a balance between urban and rural regions, which may be indicative of the prevalence of inguinal hernias in both settings.

However, this distribution did not show any statistical significance concerning pain prevalence, duration, or triggers.

Furthermore, no statistical significance was observed when comparing patient demographics, hernia type, or hernia localization with postoperative pain.

Regarding the impact of pain on patients' daily lives, approximately 20% of patients who experienced postoperative pain reported that it adversely affected their work.

This finding aligns with studies by Erhan et al. (2008) and Salma et al. (2015), which compared different hernia repair techniques and found that postoperative pain could lead to prolonged hospital stays and potential disruption of work activities [14,15].

Additionally, the works of Erhan et al. (2008) and Salma et al. (2015) contribute to the discussion by comparing different hernia repair techniques and their impact on postoperative pain.

These studies demonstrate that the choice of surgical approach can influence the incidence and severity of pain experienced by patients.

As our study focused on the Lichtenstein procedure, further research comparing various techniques could provide valuable insights into pain management strategies for inguinal hernia repair.

Our study also explored the use of analgesics to manage postoperative pain, with 10% of patients reporting the use of these medications.

Although this percentage is relatively low, it highlights the importance of adequate pain management strategies to improve patient comfort and recovery.

But literature data may be more alarming.

In a study on 1761 patients, at 2 years, 28.2% of patients took analgesics for chronic postoperative pain after hernia repair and 52.1% of patients experienced moderate and intense pain [16].

One patient in our study reported experiencing orchialgia and erectile dysfunction as a consequence of the surgery.

Such outcomes require careful consideration when evaluating the benefits and risks of surgical interventions for inguinal hernias, especially in cases of elective repair.

In conclusion, our study sheds light on the prevalence and characteristics of postoperative pain following the tension-free Lichtenstein procedure for inguinal hernia repair.

The findings emphasize the need for further research to explore individual factors that may influence the development of chronic pain, as well as the importance of adhering to international guidelines for groin hernia management to reduce the risk of chronic pain and its impact on patients' quality of life.

By understanding and addressing these aspects, healthcare providers can improve the outcomes and satisfaction of patients undergoing inguinal hernia surgery.

As we explored the prevalence of postoperative pain, it is essential to acknowledge the limitations of our study.

The relatively small sample size of 178 patients may have influenced the statistical power to detect significant associations between certain variables and pain outcomes.

Additionally, the study's single-center design and retrospective nature could have introduced selection and information bias.

Conclusions

In conclusion, this retrospective study provides valuable insights into the occurrence and characteristics of postoperative pain after inguinal hernia repair using the tension-free Lichtenstein procedure.

Preoperative pain and the surgical technique used are potential risk factors for developing postoperative pain, while meteorological factors may also influence pain intensity.

Further research with larger sample sizes and prospective designs is needed to confirm these findings and explore potential strategies for preventing and managing postoperative pain in inguinal hernia repair patients.

Contributions

All authors have read and agreed to the published version of the manuscript.

Dan Cartu and Tudor Bratiloveanu have the same contributions as the first author, Marian Racareanu.

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Conflict of interests

None to declare.

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