

# Evaluation of Postoperative Pain in Patients Undergoing Unilateral Inguinal Hernioplasty by Lichtenstein: A Case Report

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doi: <https://doi.org/10.38179/ijcr.v3i1.101>

## Abstract

**Background:** Lichtenstein's surgery is the most recommended technique in the treatment of unilateral inguinal hernias in men, due to its simplicity, speed, pain-free, and almost unrestricted return to physical activities. The evidence indicates that work and leisure activities can be resumed, by most patients, in three to five days after laparoscopic or conventional hernioplasties, without the risk of recurrences or complications. Nevertheless, chronic pain is the most common postoperative complication affecting about 30% of patients regardless of the surgical technique used. Predictive factors for chronic pain are young age, female gender, preoperative pain level, and postoperative pain intensity.

**Aim:** To evaluate the perception of postoperative pain in patients who have undergone unilateral elective inguinal hernioplasty using the Lichtenstein technique in order to define predictors of the development of chronic pain and to identify the average time to return to work and to normal physical activity.

**Methods:** Analysis of electronic forms applied to patients that underwent elective unilateral inguinal hernia repair by Lichtenstein at a state hospital in a small town in the interior of Brazil. The statistical analyses were processed using the software Statistical Package for Social Sciences (SPSS) version 22.0.

**Results:** Data from 38 participants were analyzed with an average of 41.45 ( $\pm$  13.94) years. Most of them returned to work and to light physical activities 45 days after surgery. There was a positive correlation between the presence of pain 90 days after surgery and the development of chronic pain (Spearman correlation of 0,818 and  $p < 0.001$ ).

**Conclusion:** Despite the small sample of this study, it awakens us to the consequences that Lichtenstein surgery can trigger for patients with inguinal hernia and the importance of good management and evaluation of postoperative pain in order to improve the quality of life of these patients.

*Keywords: Hernioplasty, Lichtenstein, Chronic pain*

Received: 2021.05.24  
Accepted: 2022.04.22  
Published: 2023.01.15

**Financial support:** None  
**Conflict of interest:** None  
**Patient Consent:** Free and Informed Consent Form sent by electronic means have been signed by each participant in the research.

## Introduction

Inguinal hernia repair is one of the most performed surgeries worldwide [1], with an estimated 20 million hernioplasties per year [2]. Its importance is due to its high incidence representing 75% of all hernias in the abdominal region, affecting mainly men in the productive phase [3].

They are almost always symptomatic, and the only cure is surgical [4]. The Lichtenstein technique is recommended as the first choice for unilateral inguinal hernias in men due to its simplicity, speed, being almost painless, and allowing an almost unrestricted return to physical activities, in addition to being easily reproducible [2].

The technique is performed by inguinoscopy, with the insertion of a sutured polypropylene mesh over the transverse fascia, replacing the original structure with a strong mesh reinforcement [5]. It stimulates fibroblasts, leading to the formation of strong connective scar tissue that significantly improves the durability of the fasciomuscular layer formed during surgery [6].

Since the integrity of the hernia repair depends on good surgical technique, a complete return to activities does not increase the recurrence of the defect [2]. Work and leisure activities can be resumed by most patients in three to five days after laparoscopic or conventional hernioplasties, without the risk of recurrences or complications [4].

In a study by Lau, Lee, and Poon, 2000, a rate of less than 1% was reported in more than 2000 patients who resumed normal activities immediately after surgery. Even so, most patients return to work in three weeks due to fear of recurrence [7].

Despite the low rates of recurrence, pain and discomfort continue to be a problem for a large number of patients undergoing this technique [8]. About 10-12% of patients may experience disabilities due to chronic pain and approximately 1 to 3% of these patients may complain about severe chronic pain, with tremendously negative effects on health and care costs globally [4].

The international guideline of the Endohérnia Society summed up from the literature the following predictive factors for chronic pain: young age, female gender, level of preoperative pain, and intensity of postoperative pain [4].

## Methods

### Sample Selection

The sample consisted of all patients on the surgical team at the Ernestina Lopes Jaime State Hospital, located in the city of Pirenópolis, Goiás - Brazil, who underwent unilateral inguinal hernia repair from January 1 to December 31, 2019.

The inclusion criteria used in the research were: patients with age 18 years or older, submitted to elective unilateral inguinal hernia repair, under spinal anesthesia and sedation, ASA (American Society of Anaesthesiologists) classification below III, and BMI (Body Mass Index) below 30.

Of the 172 previously selected patients, 23 were excluded cases that did not meet the inclusion criteria. 17 of them were under 18 years old, 2 patients submitted to emergency procedures due to strangulated hernias, 3 underwent hernioplasty with sedation and local anesthesia, and 1 patient submitted to general anesthesia.

All 125 selected patients received telephone calls to clarify about the research, however, of these, 24 did not have an updated register in the medical record and 63 were not interested in participating. Thus, only 38 patients were willing to participate in the study and filled out the Free and Informed Consent Form sent by electronic means.

### Assessment Tool

The evaluation instrument used was a form (Annex 1), sent electronically (Google Forms), containing specifications about the research, the Free and Informed Consent Form, and 13 questions divided into 3 sections (Identification, impacts of the disease, and pain in the postoperative period).

In the first section, data such as the patient's

name, date of birth, and profession were asked. In the second, the patient was asked about the presence of pain before surgery and the average time to return to work and for normal physical activities. In the last section, the pain indexes were questioned, according to the Visual Analogue Scale (VAS), on days 1, 30, 90, and 180 of the postoperative period. It was also asked if, at the time of the research, there was still local pain and if there was a need for analgesics.

### Data Analysis

The distribution and homogeneity of the data were tested by the Shapiro-Wilk and Levene tests, respectively. Among the variables that generated continuous data, only age and time in the operating room had a normal (parametric) distribution. Categorical data were presented in absolute and percentage frequency and continuous data were presented using measures of central tendency (mean and median) and variability (standard deviation and interquartile range).

To analyze the distribution of categorical data between groups of participants with different levels of effort at work, with different times of return to work and usual activities, a chi-square test was used. Comparisons of age between groups of participants with different times of return to work and usual activities and between groups according to the use of analgesics were performed using the Anova one-way test.

Comparisons of the degree of pain between groups of participants with different times of return to work and usual activities and between groups of participants according to the use of analgesics 180 to 360 days after surgery were performed using the Kruskal test Wallis. Comparisons of the degree of pain between the groups according to the perception of pain at the hernia site before surgery were performed using the Mann-Whitney U test.

Correlation analysis between pain intensities from 1 to 360 days was performed using Spearman's correlation test. Very high correlation indexes were considered to be those equal to or above 0.9, high correlation

between 0.7 and 0.89, moderate correlation between 0.5 and 0.69, low correlation between 0.26 and 0.49, and absent correlation values equal to or less than 0.25 [9]. A significance level of 5% was considered. Statistical analyzes were processed using the software Statistical Package for Social Sciences (SPSS) version 22.0.

## Results

### Characteristics of the participants

Data from 38 participants were analyzed, with ages varying from 19 to 76 years, with an average of 41.45 ( $\pm$  13.94) years. The demographic and clinical characteristics of the participants are shown in Table 1.

### Post-surgical clinical data of the participants

After surgery, most participants returned to work and light physical activities after 45 days. However, for most participants, the return to usual physical activities occurred only after 60 days of surgery. The time to return to work and activities, as well as the intensity of pain perceived by the participants after the surgery are shown in Table 2.

There were no statistically significant differences in the distribution of pain reports at the hernia site before surgery ( $p = 0.745$ ) or in the distribution of time to return to work ( $p = 0.236$ ) between the different professions categorized by physical effort requirement.

There were no differences in mean age or pain intensity after surgery between the groups of participants categorized according to the time they returned to work, nor were they categorized by the time they returned to their usual physical activities after surgery.

There were no significant differences in mean age between participants according to the use of analgesics between 180 and 360 days after surgery ( $p = 0.586$ ). It was observed that the participants who denied the use of analgesics reported a perception of pain in 90 days, 180 days, and from 180 to 360 days with significantly less intensity than those who mentioned using analgesics

occasionally (“sometimes”). These analyzes are shown in Table 3.

There were no significant differences in the mean degree of pain after surgery between participants who perceived pain at the hernia site before surgery for any period studied (1 day, 30 days, 90 days, 180 days, or 180 to 360 days).

#### **Correlation analysis showed positive correlations**

Low and moderate intensity of pain was perceived on the first day after surgery with pain intensity on days 30, 90, and 180 post-surgery. These analyzes also showed a high positive correlation between the intensity of pain perceived by the participant at 30 and 90 days after surgery, and a moderate positive correlation between the intensity of pain perceived between 30 and 180 days and from 180 to 360 days after surgery. And finally, the analyzes showed a high positive correlation between the intensity of perceived pain on days 90, 180, and 180 to 360 days. The correlation coefficients of these analyzes are shown in Table 4.

#### **Discussion**

During the research, the COVID-19 pandemic was installed in the world, which altered the study schedule, preventing selected patients from being called to the clinic to be included in the research. Such limitations required it to be carried out online, which restricted the number of participants, both due to the difficulty of patients to access the internet, as well as the difficulty to convince them of the importance of participating in the research, which was also a problem observed by Abdala et al, 2014 [10].

The average age of the patients included in the study was 41.45 years, with 89.5% of them being male. Such epidemiology is consistent with data in the literature that indicate that inguinal hernia affects mainly men of working age [11].

The technique used in all patients was the hernioplasty by Lichtenstein, with polypropylene mesh implant, standardized

among all surgeons in the team. The average time of surgical procedure was 78.11 minutes, being below the average of 102 minutes reported in the literature [12], with no reports of complications in any of the selected cases.

The Brazilian Society of Hernia (BSH) recommends that patients undergoing inguinal hernioplasty return to their usual activities as soon as they are free of pain, which should occur between the second and the seventh day [13]. In the present study, however, none of the patients felt able to return to work activities before 45 days after surgery, which was consistent with a Chinese study that concluded that most patients felt able to return to activities labor only after 3 weeks of surgical recovery [7].

The international literature also recommends that return-to-work activities occur according to the work profile of each patient. Thus, jobs that do not require physical effort should be resumed in 1 to 2 weeks, jobs that require light effort (weight less than 10 kg) should be resumed in 2 to 4 weeks, and high-load jobs should be resumed in 6 to 8 weeks after surgery [14]. However, in the present study, the small sample did not allow the association between the effort profile at work and its resumption.

As for physical activity, the BHS also recommends that lifting more than 10 kg should be avoided for a period of four to six weeks [13]. On average, patients began to perform light physical effort activities, such as walking on flat ground, between 45 and 60 days after surgery and only resumed their usual physical activities (gym, running, swimming) after 60 days of the surgical procedure.

In the routine of the surgical team at the hospital, where the study took place, patients are usually medicated with 1g of dipyrone from 6/6h and 100 mg of tramadol on demand and tend to be discharged on the first postoperative day.

Despite the analgesia protocol used, the average pain on the first postoperative day was 4.79 at VAS, with 5 patients reporting

10/10 pain in the same period. This result corroborates with that indicated by Santos et al, 2015, that the use of analgesics, non-steroidal anti-inflammatory drugs, and opioids in the immediate postoperative period does not seem to be fully effective in preventing and treating pain the day after inguinal hernia surgery [15].

The average pain intensities, according to VAS, on the 30th, 90th, and 180th postoperative days were 2.66, 2.05, and 1.92, respectively. At the time they answered the questionnaire (180 to 360 days after the surgical procedure), the average pain was 1.87.

Chronic pain is the most common post-inguinal hernioplasty complication, affecting about 30% of patients, regardless of the surgical technique used [16]. A study of 419 patients by Callessen, Bech, and Kehlet concluded that chronic pain tends to persist in many of the patients who experience pain three months after surgery [17].

In the present study, 26.31% of the patients reported moderate to severe pain (average of 5.5 / 10 in the VAS) three months after the surgical procedure, which configures them as having chronic pain [18]. 80% of these patients maintained their pain complaint even six months after the procedure, with an average of 6.5 / 10 in the upper airway.

As pointed out by Callessen, Bech, and Kehlet in 1999, in the present study, it was possible to find a high positive correlation, with  $p < 0.05$ , between perceived pain intensity 90 days after surgery and pain maintenance six months after the procedure. It means that patients with complaints of moderate to severe pain after three months of surgery tend to develop chronic pain [17].

Likewise, there seems to be a correlation between the intensity of pain at the time of hospital discharge and the permanence of pain in 30 and 90 days after surgery. However, it is worth discussing here that, despite being widely used, VAS is a one-dimensional method that disregards aspects as important as the intensity of pain, such as location, sensory, and affective

characteristics and their impacts [19], which makes us think that an association of pain assessment methods would make this interpretation more reliable.

Regarding the indication of surgical treatment, according to the Guideline of the European Hernia Society, patients with asymptomatic or minimally symptomatic inguinal hernias can be managed with expectant conduct, presenting level 1B of evidence and grade A of recommendation [20], mainly when consider that these patients rarely develop incarceration in need of urgent surgery.

Considering that 75% (3) of asymptomatic patients in the present study evolved with persistent postoperative pain, we emphasize the importance of indicating hernia surgery only for symptomatic patients or with restrictive comorbidities that contraindicate conservative treatment.

## Conclusion

Despite the small sample of the present study, it awakens us to the consequences that Lichtenstein surgery can trigger for patients with inguinal hernia and the fact that, when properly evaluated, the patient's pain on the first postoperative day can be a predictor of the onset of chronic pain, especially when reassessed and compared with pain on the 30th and 90th days after the surgical procedure.

The prediction of chronic pain can be useful in therapeutic programming and in the most appropriate follow-up of patients with a predisposition to developing it, thus significantly reducing the negative impacts of the surgery on the client's quality of life.

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