

Impact of inguinal pain on quality of life after unilateral inguinal hernioplasty

Impacto da dor inguinal na qualidade de vida após herniorrafia inguinal unilateral

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ABSTRACT: Abdominal wall hernia is caused by the protrusion of abdominal cavity contents into the subcutaneous space through an opening known as the hernial ring. Inguinal hernia is the most common type of hernia, accounting for 75% of all cases and affecting men more frequently. The recommended treatment is herniorrhaphy, with the Lichtenstein technique being the most commonly recommended approach. With the development of tension-free techniques, recurrence rates have decreased; however, inguinodynia has become the most frequent complication of inguinal hernioplasty. This study aimed to evaluate the occurrence of inguinodynia in patients undergoing inguinal herniorrhaphy at the Hospital Santa Casa de Misericórdia de Vitória and assess its impact on their quality of life. This is a prospective cohort study involving patients treated at the general surgery outpatient clinic of the Hospital Santa Casa de Misericórdia de Vitória, who underwent unilateral inguinal herniorrhaphy using the Lichtenstein technique between June 14, 2022, and April 30, 2023. The patients were given four questionnaires at different times, with subsequent statistical analysis and data tabulation. The incidence of inguinodynia observed during the study period was 17.6%. Among those with inguinodynia, more than half experienced a negative impact on their quality of life. In light of exposed, the development of comparative studies between multimodal treatments and the duration of pain relief is imperative for better management in future treatments of inguinodynia.

KEY WORDS: Inguinal Hernia; Chronic Pain; Quality of Life.

RESUMO: A hérnia da parede abdominal é ocasionada pela protrusão do conteúdo da cavidade abdominal até o espaço subcutâneo através de um orifício chamado de anel herniário. A hérnia inguinal representa o tipo mais comum de hérnia, correspondendo a 75% do total e acomete mais comumente os homens. O tratamento indicado é a herniorrafia e a técnica mais recomendada é a de Lichtenstein. Com o desenvolvimento das técnicas de livre tensão, os índices de recidivas diminuíram e, atualmente, a inguinodinia é a complicação mais frequente da hernioplastia inguinal. Dessa forma, o presente estudo objetivou avaliar a ocorrência de inguinodinia, em pacientes submetidos à herniorrafia inguinal no Hospital Santa Casa de Misericórdia de Vitória, e seus impactos na qualidade de vida. Trata-se de um estudo coorte concorrente prospectivo em que foram selecionados pacientes atendidos no ambulatório de cirurgia geral do Hospital Santa Casa De Misericórdia De Vitória, submetidos à cirurgia de herniorrafia inguinal unilateral pela técnica de Lichtenstein, entre os dias 14 de junho de 2022 e 30 de abril de 2023. Os pacientes selecionados foram submetidos a aplicação de 4 questionários em momentos distintos, com posterior análise estatística e tabelamento de dados. A incidência de inguinodinia observada no serviço durante o período desse estudo foi de 17,6%. Naqueles pacientes definidos com inguinodinia, observou-se impacto negativo na qualidade de vida em mais da metade desses. Diante desses dados, a elaboração de trabalhos comparativos entre tratamentos multimodais e a duração do alívio álgico é imperativa para melhor manejo em tratamentos futuros de inguinodinia.

PALAVRAS-CHAVE: Hérnia Inguinal; Dor Crônica; Qualidade de Vida.

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INTRODUCTION

A hernia of the abdominal wall is caused by the protrusion of the contents of the abdominal cavity into the subcutaneous space through a hernial ring¹. The displacement of these contents is due to points of weakness in the abdominal wall muscles. Inguinal hernia is the most common type of hernia, accounting for 75% of all hernias, and most commonly affects men, due to weakness of the abdominal wall because of testicular migration into the scrotum. The recommended treatment is herniorrhaphy, and the most widely used technique is the Lichtenstein technique, which consists of a conventional method performed through inguinotomy, with implantation of a polypropylene mesh in the floor of the inguinal canal, therefore considered a tension-free method. With the development of tension-free techniques, recurrence rates have decreased and, currently, inguinodynia is the most frequent late complication of inguinal hernioplasty, defined as chronic inguinal pain that persists three months after surgery^{1,2,3}.

The etiology is varied, but there are basically two mechanisms that can result in the perception of pain in the postoperative period. Acute pain, due to nociceptive and inflammatory stimulation, can be caused by the use of mesh. Chronic neuropathic pain, due to abnormal neural activity, can persist without continuous inflammation and be caused by damage to one or more nerves in the inguinal region, caused for example by stretching, crushing, entrapment or electrocautery injuries. In clinical practice, it is difficult to differentiate whether the pain has a somatic or neuropathic component^{3,4}.

The general incidence of moderate to severe chronic pain after hernia surgery found in the literature varies widely, with studies reporting figures ranging from 13% to 37% of patients, and has a major impact on patient satisfaction, daily activities, and use of health care and costs^{4,5}.

Therefore, the present study aimed to evaluate the occurrence of inguinodynia in patients undergoing inguinal hernia repair at the Hospital Santa Casa de Misericórdia de Vitória, and its impact on quality of life.

METHOD

This article is a prospective concurrent cohort study. Patients treated at the general surgery outpatient clinic of Hospital Santa Casa De Misericórdia De Vitória, who underwent unilateral inguinal herniorrhaphy surgery using the Lichtenstein technique, between June 14, 2022 and April 30, 2023, were selected. The selected patients were submitted to the application of 4 questionnaires at different times, with subsequent statistical analysis and data tabulation. The analysis of the patient's pain was measured by applying the visual analogue scale (VAS) at all different times, with a score of 0-10 points, the socioeconomic variables were applied in the initial questionnaire and the quality of life was measured by applying the WHOQOL-BREF questionnaire, which has a Likert score of 1-5 points, and subsequent analysis based on domains, applied immediately before surgery and 3 months postoperatively.

In the first moment, immediately before surgery, a questionnaire containing the VAS, WHOQOL-BREF, and the study variables was applied. In the second moment, one day after the procedure, the questionnaire contained the VAS again. In the third moment, in an outpatient follow-up appointment or by telephone contact after 14 days, the questionnaire contained the VAS. In the fourth and final moment, after 3 months, through telephone contact/digital means, a questionnaire containing the VAS and the WHOQOL-BREF was applied.

The variables analyzed in this study were age, sex, race, education, marital status, profession, alcohol consumption, smoking, pain, and quality of life, as a way of understanding the profile of patients treated at the service and establishing possible associations between these variables and the occurrence of inguinal hernia and inguinodynia.

This study was approved by the Human Research Ethics Committee (CEP) of the Santa Casa de Misericórdia de Vitória School of Sciences (EMESCAM), according to CAAE number 57706922.5.0000.5065.

RESULTS

A total of 59 patients who underwent inguinal herniorrhaphy were included in the study and statistical analysis of the variables and a comparison at different times of application of the VAS and the WHOQOL-BREF quality of life questionnaire were performed. During the different stages of the study, the patients were contacted and only 34 responded to the final questionnaire 3 months after the procedure.

Table 1 shows the epidemiological profile of the selected patients during the study period.

Table 2 shows the application of the VAS at different times, with a statistically significant decrease in pain in the comparison using the Pairwise method between the first application of the questionnaire and the last application. When comparing the other times with each other, no statistical significance was observed (Table 2).

By applying the WHOQOL-BREF questionnaire before the surgical procedure and 3 months or more after the intervention, we performed an analysis that allows us to say that HSCMV patients who underwent inguinal herniorrhaphy obtained statistically significant improvements in their quality of life in the general and physical domains, when comparing these two moments. The psychological, social and environmental domains did not show any statistically significant comparative difference (Table 3).

When studying the occurrence of inguinodynia in patients, which was the main objective of this research, we selected a value >3 points on the VAS to classify the patient as having inguinodynia, since it was considered that a pain value ≤ 3 points does not cause incapacitation of the patient, nor does it require the use of analgesics, and is more properly described as a mild case of local discomfort. Therefore, we obtained a total of 6 patients who presented the outcome of inguinodynia, presenting pain after more than 3 months of Evolution (Table 4).

TABLE 1 - Epidemiological variables

Variable	Categories	Frequency (number of patients)	Percentage (%)
Sex	Female	3	5,1
	Male	56	94,9
Race	White	23	39
	Brown	22	37,3
Education – Years of study	Black	14	23,7
	> 10 years	11	18,6
	8-10 years	12	20,3
	4-7 years	24	40,7
Marital status	Up to 3 years	12	20,3
	With a partner	33	55,9
Profession	Without a partner	26	44,1
	Professions that require physical effort	27	45,7
Smoking	Professions that do not require physical effort	32	54,24
	No	40	67,8
Drinking	Yes	19	32,2
	No	40	67,8
	Yes	19	32,2
Total		59	100

Source: by the authors

TABLE 2 - Analysis of the Visual Analogue Scale of pain (VAS) at different assessment times: 1 (preoperative), 2 (1st postoperative), 3 (1st surgical review consultation) and 4 (3 months after surgery)

Evaluation	Number of patients	EVA		
		Mean	Standard deviation	Median
1	59	3,6	2,8	3
2	41	3,1	2,9	2
3	23	2,5	2,7	2
4	34	1,5	2,4	0

Comparison by Wilcoxon method**Significance****1st assessment x 4th assessment**

0,02

Source: by the authors

TABLE 3 - Comparison of the results between the 4 domains of the WHOQOL-BREF questionnaire (physical, psychological, social relationships and environment) in the preoperative period and 3 months postoperatively

WHOQOL-BREF Questionnaire	Mean	Standard deviation	Median	p-value
Physical Domain: preoperative	3,69	0,72	3,71	
Physical Domain: 3 months postoperative	4,02	0,73	4,29	0,023
Psychological Domain: preoperative	4,14	0,55	4,17	
Psychological Domain: 3 months postoperative	4,26	0,46	4,33	0,15
Social Relations: preoperative	4,11	0,69	4,33	
Social Relations: 3 months postoperative	4,09	0,76	4,33	0,644
Environment: preoperative	3,63	0,59	3,63	
Environment: 3 months postoperative	3,82	0,51	3,81	0,149

Source: by the authors

TABLE 4 - Visual Analogue Scale (VAS) of pain 3 months postoperatively

Pain level 3 months postoperatively (VAS)	Number of patients	Valid percentage
≤ 3	28	82,35
> 3	6	17,65
Total	34	100

Source: by the authors

DISCUSSION

Through the analysis of the epidemiological variables with the sample studied, contrary to our initial expectations, it was not possible to establish risk or protective factors for the outcome of inguinodynia, a fact that is probably due to the small sample size.

It is noted that males were the most prevalent gender, accounting for 94.9% of patients undergoing inguinal herniorrhaphy, a finding corroborated by van den Dop et al., a French study that, in addition to obtaining a percentage of 90.3% of male patients, showed a statistical association between male gender and the occurrence of relevant chronic postoperative pain. In this same study, when evaluating the proportion of smokers among patients, a percentage similar to that found in the present study was found, with 67.8% of the interviewees being non-smokers. Since this is a well-known risk factor for the pathology studied here, it is possible to infer a similar influence of this variable in both studies⁶.

When correlating the outcome of chronic pain with the participants' level of education, we found that those with 7 or less years of education during their lifetime represented 61% of the sample. Kanematsu et al. describe a significant statistical association regarding this variable, in which the perception of pain is inversely proportional to the individuals' level of education^{7,8}.

Regarding the consumption of alcoholic beverages, we noted that 32.2% of the patients were alcoholics. This epidemiological characteristic was analyzed in different studies on chronic pain, and these conflicting results. While Sá et al. report the consumption of alcohol once a week as a protective factor for inguinodynia, Leveille et al. conclude in their case series that weekly alcohol consumption in an amount greater than 113 grams may be a factor that predisposes the development of chronic musculoskeletal pain, especially in males. The use of different methodologies in the studies may be responsible for this discrepancy. Therefore, more unified tools are needed to assess the impact of alcoholism and the perception of inguinodynia in patients undergoing inguinal hernioplasty^{7,9,10}.

Regarding the analysis of pre- and postoperative pain, when comparing the 4 different times of application of the VAS, we obtained a statistically significant difference in comparison between the pain presented by the patient before undergoing the surgical procedure and that presented more than 3 months after the procedure, as seen in Table 2. These data reveal that the intervention brought benefits to most patients, obtaining a reduction in the perception of pain previously reported.

The main hypothesis raised to explain this long-term

reduction in pain is directly due to the correction of the hernia, as it restores the patient's anatomy and decompresses the tissues pressed by the hernial content. However, chronic pain may result from other factors associated with the surgical event, such as trauma damage to local innervation, exacerbated foreign body reaction due to the placement of polypropylene mesh, periostitis associated with the fixation of the mesh to the pubis, among other factors⁴.

In the literature, the data collected confirm and illustrate the importance of the surgical procedure. Maliska et al. demonstrated that 95.52% of patients had some type of preoperative pain, with a reduction to 53.73% of patients presenting any level of pain after more than 3 months of the intervention. However, for van den Dop et al., of a total of 1,140 patients who presented moderate or severe preoperative pain, only 167 reported these levels of pain after 3 months^{7,10}.

Due to difficulties in obtaining contact and maintaining follow-up with patients, especially in the immediate postoperative period and at the outpatient follow-up after 14 days, the sample volume for the questionnaires applied at these times was compromised and made it difficult to adequately analyze the data obtained, not allowing us to clearly demonstrate a change in the patients' perception of pain at these times.

Regarding the occurrence of inguinodynia, the incidence was 17.65%, as illustrated in Table 4, and all of these were male. According to the study from Paraná by Castro et al., the results found were similar, where a total of 15% of patients reported pain greater than 3 points on the VAS applied after 3 months. However, there is no consensus in the literature on the values found in the incidence of inguinodynia, since the meta-analysis by Singh et al. describes the prevalence of moderate to severe pain after hernia surgery as approximately 10% to 12%⁴. Meanwhile, the literature review carried out by Poobalan et al. found a prevalence ranging from 0% to 63% after 1 year of the procedure. This plurality may be due to the different methods of assessing chronic pain, such as different values assigned to the VAS to define inguinodynia, the use of different questionnaires and the way they were applied, or the fact that they encompass different surgical techniques for hernioplasty^{11,12}.

The agents that lead to the emergence of this complication are multifactorial and have not yet been fully clarified. According to Minossi, Minossi and Silva, there are different types of classification of chronic postoperative pain. Neuropathic pain is the most important of these, as it is more prevalent and has a greater disabling potential, more commonly associated with nerve injuries resulting from surgical trauma, with the most affected nerves being: ilioinguinal, iliohypogastric and genitofemoral, given the local anatomy and the use of the

Lichtenstein technique selected here. Furthermore, somatic pain may be caused by the presence of sutures, clips or even the mesh used, leading to traction of the inguinal ligament during physical exertion^{13,14}.

Considering the above, some factors may be relevant to remedy the emergence of this pathology, such as a good critical view of the safety of anatomical structures during the operation and compliance with the recommendations for rest and postoperative care by patients. There are also reports of lower incidences of inguinodynia in laparoscopic techniques, although this type of surgical access is not widely available for inguinal hernia repairs due to operating costs; when accessible, it is an option that should be advocated¹⁵.

Regarding quality of life, when examining the results of the WHOQOL-BREF questionnaire in the preoperative and late postoperative periods, an increase in the physical domain score was observed after hernia repair surgery, which indicates improvement in this component of the patient's performance and, therefore, confirms results found in other studies. Maliska et al points to the effectiveness of this treatment in improving quality of life by reducing pain, increasing physical capacity to perform daily activities or returning to work activities¹⁰. However, in patients with chronic pain after 3 months, 66.7% had a worsening in the general domain and in the physical domain - an incidence higher than that found in other studies, which obtained results ranging from 18% to 25%. Thus, the significant impact of inguinodynia on quality of life and functional capacity is evident, demonstrating the importance of providing guidance to patients about the possibility of this adverse outcome, the need for adequate postoperative care, and reinforcing the demand for more robust studies and unified analysis tools to validate the data obtained in different studies^{2,10}.

The analysis of the psychological, social, and environmental domains did not demonstrate a significant

difference when comparing the pre- and post-surgical moments. However, it may mean that the improvement in the physical component of pain in this pathology does not necessarily affect all aspects of the individual's life in a global way, and that this somatic component, up until the period in which the patients were monitored, did not generate positive repercussions beyond physical improvement. This finding is understandable when we consider the definition of health according to the World Health Organization as "a state of complete physical, mental and social well-being and not merely the absence of diseases and infirmities", since a reconstructive surgery, such as inguinal hernioplasty, may not be decisive in offering health to the patient in its entirety, as it does not alter the social determinants of the health-disease process, such as economic, environmental, family and psychological factors in which that individual is inserted^{16,17}.

CONCLUSION

The incidence of inguinodynia observed in the service during the study period was 17.6%. Regarding the analysis of the impact of surgical intervention on the quality of life assessed in the general sample, a significant improvement was observed in the physical domain assessed, which includes activities of daily living, dependence on medication and work capacity. In those patients defined as having inguinodynia, a negative impact on quality of life was observed in more than half of them. Regarding the association between the variables and the outcome of inguinodynia, it was not possible to establish a statistical link.

It is important to consider the limitation of the study regarding the sample size, which, due to its small number, allows the results found to be considered only for the population in question. Furthermore, the importance of new studies and research on the subject in question is evident, given its relevance and prevalence.

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REFERENCES

1. Barbosa CA, Oliveira DC, DE-Melo-Delgado NM, Mafra JGD, Santos RSD, Moreira WC. Inguinodynia: review of predisposing factors and management. *Rev Col Bras Cir*. 2021;47:e20202607. Doi: 10.1590/0100-6991e-20202607
2. Miller HJ. Inguinal Hernia: Mastering the Anatomy. *Surg Clin North Am*. 2018;98(3):607-21. Doi: 10.1016/j.suc.2018.02.005
3. Dias BG, Santos MPD, Chaves ABDJ, Willis M, Gomes MC, Andrade FT, et al. Inguinodynia in patients submitted to conventional inguinal hernioplasty. *Rev Col Bras Cir* [Internet]. 2017;44(2):112-5. Doi: <https://doi.org/10.1590/0100-69912017002001>
4. Sekhon Inderjit Singh HK, Massey LH, Arulampalam T, Motson RW, Pawa N. Chronic groin pain following inguinal hernia repair in the laparoscopic era: Systematic review and meta-analysis. *Am J Surg*. 2022;224(4):1135-49. Doi: 10.1016/j.amjsurg.2022.05.005
5. van den Dop LM, den Hartog FPJ, Sneiders D, Kleinrensink G, Lange JF, Gillion JF, et al. Significant factors influencing chronic postoperative inguinal pain: A conditional time-dependent observational cohort study. *Int J Surg*. 2022;105:106837. Doi: 10.1016/j.ijsu.2022.106837.
6. Sá K, Baptista AF, Matos MA, Lessa I. Prevalência de dor crônica e fatores associados na população de Salvador, Bahia. *Rev Saúde Pública* [Internet]. 2009;43(4):622-30. Doi: <https://doi.org/10.1590/S0034-89102009005000032>.
7. Kanematsu JS, Atanazio B, Cunha BF, Caetano LP, Arada DMT. Impacto da dor na qualidade de vida do paciente com dor crônica. *Rev Med (São Paulo)*. 2022;101(3):e-192586. Doi: <http://dx.doi.org/10.11606/issn.1679-9836.v101i2e-192586>

8. Leveille SG, Zhang Y, McMullen W, Kelly-Hayes M, Felson DT. Sex differences in musculoskeletal pain in older adults. *Pain*. 2005;116(3):332-38. Doi: 10.1016/j.pain.2005.05.002
9. Maliska G, Mello ALP, Amaral RP, Bischoff C. Avaliação do impacto da dor crônica na qualidade de vida dos pacientes antes e após hernioplastia inguinal. *Rev Med (São Paulo)*. 2019;98(1):40-5. Doi: <http://dx.doi.org/10.11606/issn.1679-9836.v98i1p40-45>
10. Castro GRA, Zilles A, Gazzola LD, Barros RB, Sadowski JA, Guetter CR. Laparoscopic inguinal hernia repair: the long-term assessment of chronic pain and quality of life. *ABCD* [Internet]. 2022;35:e1695. Doi: <https://doi.org/10.1590/0102-672020220002e1695>.
11. Poobalan AS, Bruce J, Smith WC, King PM, Krukowski ZH, Chambers WA. A review of chronic pain after inguinal herniorrhaphy. *Clin J Pain*. 2003;19(1):48-54. Doi:10.1097/00002508-200301000-00006
12. Minossi JG, Minossi VV, Silva AL. Manejo da dor inguinal crônica pós-hernioplastia (inguinodinia). *Rev Col Bras Cir* [Internet]. 2011;38(1):59-65. Doi: <https://doi.org/10.1590/S0100-69912011000100011>
13. Bande D, Moltó L, Pereira JA, Montes A. Chronic pain after groin hernia repair: pain characteristics and impact on quality of life. *BMC Surg*. 2020;20(1):147. Doi: 10.1186/s12893-020-00805-9
14. Claus CMP, Oliveira FMM, Furtado ML, Azevedo MA, Roll S, Soares G, et al. Orientações da Sociedade Brasileira de Hérnia (SBH) para o manejo das hérnias inguinocrurais em adultos. *Rev Col Bras Cirur*. 2019;46(4):e20192226. Doi: <https://doi.org/10.1590/0100-6991e-20192226>
15. Aasvang EK, Gmaehle E, Hansen JB, Gmaehle B, Forman JL, Schwarz J, et al. Predictive risk factors for persistent postherniotomy pain. *Anesthesiology*. 2010;112(4):957-969. Doi: 10.1097/ALN.0b013e3181d31ff8.
16. Organização Mundial da Saúde; 1946; Nova Iorque, assinado em 1948. <https://www.scielo.br/j/abcd/a/NSCqtsZFKW9cr4k33sZmMw/#>

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