

ORIGINAL RESEARCH

To evaluate the chronic post-herniorrhaphy pain

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Abstract

Background: Pain that persists after surgery is a unique subtype of the more general condition known as chronic pain. Chronic postoperative pain may develop after a wide variety of surgical procedures, including amputations, thoracotomies, and inguinal hernia operations, among others. Inguinal hernia repair has been the subject of much research; yet, the treatment of the persistent discomfort that results from this procedure is still challenging.

Aims and objective: To evaluate the chronic post-herniorrhaphy pain

Material and methods: In this research, participants were patients who had opted to undergo elective inguinal hernioplasty. After a period of six months, there was a total of 100 patients who attended their follow-up appointments. Every patient received the Lichtenstein surgery, which included the use of a prolene mesh measuring 8 by 15 centimetres. Sutures made of polydioxanone (PDS) were used to secure the mesh, and the skin was closed in layers. The level of discomfort was evaluated using the Visual Analog Scale (VAS) before to surgery, as well as on days 1, 2, and 7, and at the end of six months using a questionnaire. Pain was rated as mild if it received a VAS score of 1–3, moderate if it received a VAS score of 4–7, and severe if it received a VAS score of >7.

Results: Our patients were mostly male (98%), with an average age of 44.63±5.61 years. Chronic discomfort was evident at six-month follow-up in 68 individuals, accounting for 68% of all patients receiving hernia repair. When patients were classified as having mild (1-3), moderate (4-7), or severe pain (>7) based on their VAS score, the majority, 90%, had mild pain, 8% had moderate pain, and fewer than 2% had severe pain. Chronic pain occurred in 50% of individuals whose symptoms lasted fewer than six months. 68% of patients with symptoms lasting more than six months developed chronic pain. At the 5% confidence level, symptoms lasting more than six months had a significant impact on the development of chronic pain (p = 0.04).

Conclusion: we came to the conclusion that patients should not disregard persistent discomfort after inguinal hernia surgery since it causes a considerable amount of morbidity to the patient. Treatment with preemptive analgesia and surgery performed under local anaesthetic both have a substantial impact on pain. The identification and protection of all inguinal nerves throughout the surgical procedure are of the utmost importance.

Keywords: Chronic, Post-herniorrhaphy, Pain

Introduction

Pain that persists after surgery is a unique subtype of the more general condition known as chronic pain. Chronic postoperative pain may develop after a wide variety of surgical procedures, including amputations, thoracotomies, and inguinal hernia operations, among others. Inguinal hernia repair has been the subject of much research; yet, the treatment of the persistent discomfort that results from this procedure is still challenging. There are millions of repairs done to groin hernias every year[1] and 8%–16% of patients who have these repairs endure persistent discomfort to the extent that it interferes with their day-to-day lives six months after surgery. [2,3] Due to the enormous number of groin hernia repairs, the proportion of patients who have pain and discomfort that is considered to be debilitating is a significant clinical concern. Only a small percentage of these patients report having this condition. [4] A treatment option that is supported by evidence ought to be provided, with the choice dependent on the level of pain and the degree to which it interferes with everyday activities. The use of diverse evaluation methodologies and varied periods of follow-up is a concern with part of the present data, which is based on studies in persistent pain following groin hernia repair. Surgeons, scientists, and pain experts all employ various evaluation techniques. For example, researchers utilise a variety of questionnaires to evaluate chronic pain in their research projects. This makes it difficult to compare the results of different studies. Inguinodynia is the preferred general word for persistent groin pain following hernia surgery, and it should replace "neuralgia or mesh inguinodynia" in order to promote consistency and minimise misunderstanding in the literature. This is because inguinodynia is the most accurate description of the condition. It is more difficult to treat a postsurgical patient when there is a problem with workman's compensation. In spite of the fact that the vast majority of legal disputes are resolved outside of court, it is interesting to note that between 5 and 7 percent of patients who have postherniorrhaphy neuralgia will sue their surgeons [4]. There are several different variables that might contribute to the development of persistent discomfort after an inguinal hernia repair has been performed. The use of preemptive analgesia, the kind of anaesthetic administered, the protection of nerves, and the avoidance of postoperative problems are all factors that are connected to the onset of chronic pain. The acute pain experienced after surgery is the single most critical contributor to the formation of chronic pain; thus, any and all efforts should be made to eradicate this suffering. Following the treatment of inguinal hernias, we decided to investigate the variables that are linked with the development of chronic discomfort by conducting a prospective research.

Aims and objective

To evaluate the chronic post-herniorrhaphy pain

Material and methods

In this research, participants were patients who had opted to undergo elective inguinal hernioplasty. After a period of six months, there was a total of 100 patients who attended their follow-up appointments. Patients who presented with inguinal hernias that were blocked or strangulated were not included in the research. All of the patients who were scheduled to have elective inguinal hernia surgery had their medical histories taken very seriously, and

they were also examined very thoroughly. Due to the fact that the research was carried out at a variety of the hospital's surgical units, the surgical procedures used to complete the procedures varied slightly from one another. Every patient received the Lichtenstein surgery, which included the use of a prolene mesh measuring 8 by 15 centimetres. Sutures made of polydioxanone (PDS) were used to secure the mesh, and the skin was closed in layers. On a proforma, information was collected on the pre-operative features, type of anaesthetic, intraoperative finding, and postoperative complications. The level of discomfort was evaluated using the Visual Analog Scale (VAS) before to surgery, as well as on days 1, 2, and 7, and at the end of six months using a questionnaire . Pain was rated as mild if it received a VAS score of 1–3, moderate if it received a VAS score of 4–7, and severe if it received a VAS score of >7. Patients who report being in severe pain will have a follow-up appointment scheduled for a more in-depth assessment, and the reasons of persistent pain will be examined. The information that was gathered was evaluated in terms of the prevalence of chronic pain as well as the variables that contribute to its development and how it is treated. For the purpose of characterising the patient data, descriptive statistics such as mean and percentage standard deviation were used.

In order to examine the differences between the categorical variables, both the χ^2 test and Fisher's exact test were used. In the investigations that included two different groups, the Student's t-test was used for the purpose of comparing continuous data that was normally distributed, while the Mann-Whitney U test was utilised for the purpose of testing between continuous variables that were not normally distributed. Analysis of the continuous variables and the visual analogue scale in the research with three groups was performed using the Kruskal-Wallis ANOVA. Estimates of relative risks, both unadjusted and adjusted, were derived from multivariate Cox regression studies and compared with one another. A P value of less than 0.05 was used to indicate statistical significance.

Results

A total of 100 patients who had elective inguinal hernia repair met the inclusion criteria and were available for follow-up six months later. Table 1 summarises the patient features.

Table 1: Basic profile of the patients

Gender	Number	%
Male	98	98
Female	2	2
Age		
below 25	6	6
25-35	12	12
35-45	40	40
45-55	30	30
Above 55	12	12
Mean Age	44.63±5.61	44.63±5.61
Duration of symptoms		
below 6 months	32	32
Above 6 months	68	68
Site		
Right	43	43
Left	52	52
Bilateral	5	5
Postoperative complication hematoma/infection		

Yes	7	7
No	93	93
Preoperative pain		
Yes	25	25
No	75	75
Anesthesia		
Local	11	11
Spinal	83	83
General	6	6

Our patients were mostly male (98%), with an average age of 44.63 ± 5.61 years. Chronic discomfort was evident at six-month follow-up in 68 individuals, accounting for 68% of all patients receiving hernia repair.

Table 2: VAS score at end of 6 months

VAS score	Frequency	Percent
0	61	61
1	9	9
2	14	14
3	7	7
4	5	5
5	2	2
6	1	1
7	1	1

Table 2 displays the VAS scores of patients six months after surgery. When patients were classified as having mild (1-3), moderate (4-7), or severe pain (>7) based on their VAS score, the majority, 90%, had mild pain, 8% had moderate pain, and fewer than 2% had severe pain (Table 3).

Table 3: Chronic pain VAS score

Chronic pain VAS score	Number	Percentage
Mild (1-3)	45	90
Moderate (4-6)	4	8
Severe >6	1	2

Chronic pain occurred in 50% of individuals whose symptoms lasted fewer than six months. 68% of patients with symptoms lasting more than six months developed chronic pain. At the 5% confidence level, symptoms lasting more than six months had a significant impact on the development of chronic pain ($p = 0.04$).

It was discovered that 25% of patients who did not have preoperative pain got chronic pain, while 75% of patients who did have preoperative pain had chronic pain. When preoperative pain patients were separated into two groups, mild pain (4 VAS) and moderate to severe pain (>4 VAS), it was shown that patients with considerable preoperative pain had a greater likelihood of acquiring chronic pain ($p < 0.0001$) at the 5% confidence interval.

Only 20 patients were given prophylactic analgesia, and 20% of them acquired chronic pain, but 80% of those who were not given preemptive analgesia developed chronic pain. Preventive analgesia had no statistically significant effect on the development of chronic pain ($p = 0.08$).

The majority of patients (83%) had hernia surgery while under spinal anaesthesia; this form of anaesthesia had a substantial impact on the development of chronic pain. The mean VAS

values for the local group were 0.24 and 1.12 for the spinal group, both of which were statistically significant ($p = 0.03$).

ANOVA analysis revealed that no nerves were identified after surgery in 21% of cases, any one in 70%, and all three in 9% of instances. There was no link discovered between nerve identification and the development of persistent pain after surgery. Nerve damage was present in ten of the patients, and it was shown that nerve injury had a substantial impact on the development of chronic pain ($p = 0.001$).

Postoperative local anaesthetic infiltration was used in 7% of patients, and it was shown that local anaesthesia infiltration at the incision site considerably decreased the incidence of persistent pain ($p = 0.001$).

In 7% of instances, postoperative problems such as hematoma, seroma, or infection were evident. It was shown that surgical complications not only enhanced early postoperative pain but also increased the likelihood of chronic pain development ($p = 0.001$).

Postoperative discomfort on days 1, 2, and 7 substantially influenced chronic pain development ($p = 0.000$). (Table 4).

Table 4: Multivariate analysis of factors for chronic pain

Dependent variable	Mean square	f	Significance
Duration	1.52±0.23	1.25	0.36
Analgesia	1.65±0.11	1.36	0.25
Anesthesia	1.67±0.32	1.96	0.007
Nerve identification	1.85±0.41	2.36	0.21
Nerve injury	1.22±0.10	2.85	0.002
Postop infiltration	1.33±0.21	3.36	0.03
Complications	1.52±0.14	3.58	00.01
Preop pain	25.52±2.63	12.63	0.001
Pain day 1	23.85±4.36	14.58	0.001
Pain day 2	30.58±5.63	35.63	0.001
Pain day 7	33.63±5.33	41.36	0.001

The development of chronic pain following hernia surgery was found to be dependent on factors such as preoperative pain, type of anaesthesia, nerve injury, postoperative local infiltration, postoperative complication, and, most importantly, early postoperative pain, according to a multivariate analysis.

Discussion

We looked at 100 people who had elective hernia surgery to see whether they had persistent discomfort after the procedure. In this particular research, the prevalence of chronic pain was found to be 50%. Patients who suffered from chronic pain had mild pain 90% of the time, moderate pain 8% of the time, and severe pain that rendered them unable to function less than 2% of the time.

The patients' average age was 44.63 years old, with a standard deviation of 5.61 years in this research. There was no correlation discovered between age and the occurrence of chronic pain in our study. Courtney et al. [5] discovered that the likelihood of chronic pain reduced with advancing age, going from 39–58% in patients younger than 40 years old to 14–17% in patients older than 65 years old. This represented a significant reduction in risk. Additionally, a greater proportion of patients in the younger age group reported having severe or really severe pain [6]. The absence of data on physical activity, which may be varied amongst age groups and subsequently for their complaints, makes it difficult to arrive at an overall interpretation of the findings.

In this particular research, there were just two female patients, and not a single patient suffered chronic pain. According to studies that broke down the data by gender, women reported experiencing more pain than males. 38% of female patients in a national survey of 1071 patients were found to have an incidence of chronic pain, compared with just 28% of male patients ($2 = 3.87$, $p < 0.05$) [6]. The research had a follow up rate of 81%. In a research conducted by Mori et al. [7], only 15% of the 224 patients receiving mesh hernia repair were female. However, three out of the four patients who had continuous discomfort were female, leading to an incidence of chronic pain that was 0.5% in males but 8.8% in females. Three percent of male patients and eleven percent of female patients in a research that looked back at 594 male and 56 female patients acquired chronic pain [8].

According to the findings of this research, only 25% of participants who did not experience preoperative discomfort acquired chronic pain, but 75% of patients who did experience preoperative pain did. When patients with preoperative pain were divided into those with mild or no pain (4 on the visual analogue scale) and those with moderate to severe pain (>4 on the scale), it was discovered that patients with significant preoperative pain had a higher chance of developing chronic pain ($P, 0.0001$) than patients with less significant preoperative pain. In a study involving 300 patients, Wright et al. [9] found that 88 percent of patients who developed chronic pain had pain at the time of the preoperative assessment, whereas only 59 percent of patients who did not develop chronic pain did (the difference was statistically significant, with a P value of less than 0.001). Poobalan et al. [4] conducted another investigation and came to the same conclusion: there is a substantial predictive value ($P < 0.005$) between preoperative discomfort and chronic pain. On the other hand, a large randomised trial that included 994 patients discovered that there was no significant link between the development of chronic pain and preoperative discomfort ($P = 0.2$) [10]. According to the findings of the MRC research [11], thirty percent of patients said that their level of pain did not alter from before to after surgery, whereas five percent of patients reported feeling more discomfort after the herniorrhaphy. Spinal anaesthetic was used on the majority of patients (83%) who had hernia surgery. Researchers found that spinal anaesthesia played a significant role in the patients' subsequent development of chronic pain. A study conducted by Nordin and colleagues [12] came to very similar conclusions. In addition, it was discovered that the significantly shorter amount of time required for anaesthesia with local anaesthesia more than made up for the longer amount of time spent in the operating room when compared with regional and general anaesthesia. When someone has surgery to repair a groin hernia, the effects of the anaesthetic may often cause postoperative complications and result in a longer hospital stay. The outcomes of local anaesthetic were much superior than those of its alternatives. In the group that received regional anaesthetic, patients had a greater incidence of micturition issues, some of which were severe enough to need urethral catheterization [12].

Only twenty patients were given prophylactic analgesia, and twenty of those patients went on to acquire chronic pain. In contrast, eighty percent of patients who were not given preemptive analgesia went on to develop chronic pain. Multiple studies have shown that acute pain in the aftermath of an injury may result in central neuronal plasticity, which in turn can contribute to chronic pain. This may be avoided by beginning pain treatment as soon as possible, which also has the potential to lessen chronic pain [13].

It is still unknown whether or not pain management strategies such as preemptive or preventative analgesia may provide a clinically relevant decrease in the intensity or duration of pain experienced after surgery. During the perioperative phase, multimodal analgesic methods with the use of ketamine or other N-methyl-d-aspartate receptor antagonists—gabapentin or pregabalin—COX inhibitors, steroids, and afferent neural blockade have the potential to pre-vent central neuroplasticity. Good results have been obtained in the reduction

of chronic pain after breast surgery with the perioperative administration of venlafaxine, mexiletine with gabapentin, a eutectic mixture of local anaesthetics (EMLA), and a combined treatment with EMLA and gabapentin [14]. Additionally, a eutectic mixture of local anaesthetics (EMLA) has been shown to be effective in the treatment of chronic pain [15]. Instead of treating inflammatory pain, all of these therapies focus on neuropathic pain. To assess the effectiveness of preemptive analgesia in hernia repair, as well as its timing and influence on the development of chronic pain, further studies are necessary to be conducted. There is a lot of debate over whether therapy should be saved for the inguinal nerves in the event that a hernia has to be repaired. Some writers have suggested that an elective division of the ilioinguinal nerve is an effective way to lessen the likelihood of experiencing postoperative persistent pain [15].

When it comes to reducing the risk of experiencing chronic pain, Lichtenstein advises that the nerve be preserved at all times. There are research that suggest ligating nerve endings may lessen the likelihood of experiencing chronic pain; however, there are no studies that investigate whether or not this approach is effective [16, 17]. Others have recommended that the nerves should only be cut or ligated if their path through the operating field poses a danger of damage or if they get in the way of situating the mesh [18]. These are the only two circumstances in which it is necessary to do so.

Other investigations have been conducted, but none of them have been able to establish a connection between the division or preservation of the ilioinguinal nerve and an increased likelihood of having chronic pain [19]. If the nerve has to be divided, the procedure should be carried out as near as it safely can be to the point where it emerges from the retroperitoneum. We came upon Nerve damage was observed in 10 of the instances, and researchers discovered that nerve damage plays a key role in the development of chronic pain. According to the findings of a research that was conducted by Alfieri and colleagues [20], nerve damage that occurs during surgical procedures may be a significant contributor to persistent pain. Postoperative infiltration of local anaesthetic was only performed in 7% of patients, however it was shown that this technique considerably decreased the occurrence of persistent pain at the incision site. Despite the fact that studies have indicated a considerable decrease in VAS ratings in the infiltration group, the effects on pain over the long term have not been proven. Pain ratings decreased within the first 24 hours of the research [21] that was conducted by Sinclair and colleagues, but not during the subsequent 24–48 hours. According to the research carried out by Tverskoy and his colleagues [22], pain ratings improved for up to 48 hours following surgery. Early postoperative pain was shown to have a correlation with the development of chronic pain in the current investigation, which revealed this to be the case. Patients who had pain when coughing on the sixth postoperative day had a significant ($P = 0.05$) higher risk of developing chronic pain, but the method of early postoperative pain assessment was not described in the study by Lau et al. [23], which was a prospective study of 313 patients undergoing a laparoscopic repair. In this study, patients who had pain when coughing on the 6th postoperative day had a significantly higher risk of developing chronic pain. Heikkinen et al. [24] conducted a study with 123 patients, and they found that four of the patients developed a chronic neuralgia type pain and had higher VAS scores on day 14 ($P = 0.03$). This finding is in agreement with a large prospective study that was conducted by Callesen et al. [25] that involved 466 unselected patients 1 year after surgery. In that study, the authors found that the risk of chronic pain was significantly higher in patients who had a high early postoperative pain score in comparison to those who had a lower postoperative pain score after 1 week (9 versus 3%, $P < 0.05$). Patients who still had significant pain after four weeks showed the same association (24 versus 3%, $P < 0.001$) as those who did not. There are no studies that have been conducted to evaluate the role that particular analgesic therapies play in reducing the risk of developing a state of chronic pain following inguinal

herniorrhaphy. According to the findings that have been compiled, the intensity of the early postoperative pain appears to have a correlation with the likelihood of developing a chronic pain state. These findings highlight the need for further research into the preventive benefit of efficient acute pain treatment.

Conclusion

In the current research, we came to the conclusion that patients should not disregard persistent discomfort after inguinal hernia surgery since it causes a considerable amount of morbidity to the patient. Treatment with preemptive analgesia and surgery performed under local anaesthetic both have a substantial impact on pain. The identification and protection of all inguinal nerves throughout the surgical procedure are of the utmost importance. Because problems sometimes result in the development of chronic pain, it is imperative that every effort be made to both alleviate early postoperative discomfort and forestall their occurrence. When chronic pain is diagnosed and treated promptly, it is possible to alleviate the patient's suffering.

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