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MANAGEMENT OF GROIN HERNIORRHAPHY-RELATED CHRONIC POSTSURGICAL PAIN: GENERAL SURGEONS' UNDERSTANDING, ATTITUDES, AND EXPERIENCES

Selin Balta[1], Muharrem Oztas [2], Alpaslan Sahin[1]

1 *University of Health Sciences, Department of Pain Medicine, Konya, Türkiye*
2 *University of Health Sciences, Department of General Surgery, Gülhane Training and Research Hospital, Ankara, Türkiye*
3 *University of Health Sciences, Department of General Surgery, Konya, Türkiye*

Abstract

Aim: Groin herniorrhaphy is a common surgical procedure worldwide. Groin herniorrhaphy-related chronic postsurgical pain (GHCPSP) has a negative effect on quality of life. This survey evaluated general surgeons' knowledge, attitudes, and experiences with GHCPSP.

Methods: A survey on GHCPSP was designed by two experienced general surgeons and a pain physician and reviewed by an experienced hernia surgeon. The survey included four questions to assess demographic characteristics of the respondents; four questions related to understanding of pain characteristics of GHCPSP and the effectiveness of pain treatments for GHCPSP; five questions about attitudes towards management of early postoperative pain and GHCPSP; five questions related to experience of surgical techniques for groin herniorrhaphy, consultation rates to pain and psychiatry clinics for multidisciplinary management of GHCPSP, and working collaboration with a pain clinic. The survey was emailed to all members of the Turkish Surgical Society.

Results: The study included 259 respondents. The majority (248/95.8%) of respondents prescribed non-opioid medications for early postoperative pain control. 42% of the respondents favored paracetamol and/or NSAIDs for GHCPSP, and 42.9% favored multimodal agents for GHCPSP. 20% of the respondents stated that a validated scale or questionnaire is used to assess GHCPSP. 17.5% of the surgeons stated that neuropathic pain may be a component of GHCPSP. 90% of the respondents thought that referral to a pain physician may be useful in terms of pharmacological and interventional therapies in the management of patients suffering from refractory GHCPSP. The average consultation rates of respondents to pain and psychiatry clinics for GHCPSP was 30% and 1%, respectively.

Conclusions: General surgeons have adequate awareness of early postoperative pain and GHCPSP. On the other hand, the assessment of pain characteristics needs to be improved and the value of a multidisciplinary approach to pain management needs to be more recognized.

Keywords: *Herniorrhaphy, chronic postsurgical pain, neuropathic pain, multidisciplinary management, pain medicine*

Corresponding Author: Selin Balta, e-mail: selinaa01@yahoo.com

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Introduction

Groin herniorrhaphy is a common procedure worldwide, with approximately 2 million procedures performed each year[1]. After surgery, some patients may experience persistent pain. In 2008, Macrae defined chronic pain that develops in areas that are not the continuation of the preoperative process and may be associated with the surgical site 2 months after surgery as chronic postsurgical pain (CPSP)[2]. It has been concluded that pain must persist for at least 6 months to fulfill the definition of CPSP associated with hernia repair, as inflammation in the area surrounding the mesh used in hernia repair continues up to the third postoperative month[3]. The incidence of groin herniorrhaphy-related CPSP (GHCPSP) was reported to be 3.8-12.4% [4,5], regardless of the severity of pain, and GHCPSP was reported to have negative effects on quality of life, such as relations with others, work, and exercise[6].

Patients with GHCPSP may experience both nociceptive pain, which is described as aching, stabbing, throbbing, sharp and gnawing, and neuropathic pain, which is described as burning, and stinging. In the development of neuropathic pain, neuroma, sutures or postoperative adhesions, nerve entrapment or direct trauma that may occur in the ilioinguinal nerve, iliohypogastric nerve, the genitofemoral nerve and the lateral femoral cutaneous nerve in the perioperative process play a role. Pain may increase with hip joint hyperextension and decrease with flexion and radiate to the scrotal/labial area, upper leg, or lower back. GHCPSP can be triggered by contact with the wound site, coughing, abdominal breathing, bowel movements. There may also be loss of sensation in the leg and/or groin and painful ejaculation[7].

GHCPSP is one of the reasons patients sue surgeons, and litigation results sometimes cause economic losses for surgeons[8]. The European Hernia Society has outlined predictive factors and recommended management strategies for GHCPSP [9]. There have been no assessment of general surgeons, practicing hernia surgery, experience, knowledge, attitudes to the GHCPSP.

This study aimed to evaluate general surgeons' understanding of the pathophysiology of GHCPSP, the effectiveness of pain clinics for GHCPSP, management of early pain, experience of surgical techniques for groin herniorrhaphy, preference of mesh type, consultation rates to pain and psychiatry clinics for multidisciplinary management of GHCPSP and working collaboration with a pain clinic.

Materials and Methods

This cross-sectional survey was conducted in line with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was performed from January to February 2021 after obtaining ethics approval from the local ethics committee (No: 2020/3040, date: 22 December 2020).

Intervention

Two experienced general surgeons and one pain physician designed a survey to evaluate GHCPSP, focusing on general surgeons' knowledge, attitudes, and experiences. Clinicians designed this survey considering the topics and recommendations in The European Hernia Society Groin Hernia Surgery Guideline[8].

The survey was subsequently reviewed by an experienced hernia surgeon. The physician based the questions to address important topics related to GHCPSP. The survey included four questions to assess demographic characteristics (years of experience in general surgery, type of health facility were they're employed, availability of a pain clinic in the hospital and city where

they work) of the respondents; four questions related to understanding of neuropathic pain component in groin GHCPSP and the effectiveness of different types of pain treatments for CPSP after groin herniorrhaphy; five questions about attitudes towards management of early postoperative groin herniorrhaphy-related pain and GHCPSP with their prescription preferences; five questions related to experience of surgical techniques for groin herniorrhaphy, preference of mesh type, consultation rates to pain and psychiatry clinics for multidisciplinary management of GHCPSP, and working collaboration with a pain clinic (Appendix). The survey was designed using Google Survey and mailed to all members of the Turkish Surgical Society, also we sent personal reminders.

Participants

Only general surgeons with at least 2 years of experience in the field of general surgery were included. The general surgeons included in the study used either the classic open herniorrhaphy (Lichtenstein) technique or laparoscopic herniorrhaphy (laparoscopic totally extraperitoneal *or* transabdominal preperitoneal) method in groin herniorrhaphy.

Statistics

Statistical analyses were performed using SPSS, version 20.0 (IBM Corp., Armonk, NY). There were no missing data. The Shapiro–Wilk test was used to evaluate the distribution of the data. Variables with non-normal distributions were summarized as medians and interquartile ranges (25–75%), and confidence intervals of the median differences were calculated at 95%. Categorical data were summarized as numbers and percentages. The relationship between numerical variables was evaluated using Spearman's correlation analysis. Point-biserial correlations between nominal variables and continuous variables were determined. A value of $P < 0.05$ was considered statistically significant.

A post-hoc power analysis was performed after finalization of the study. The G-power software package, version 3.1.6 (Franz Faul, Kiel University, Kiel, Germany) was used for the power analysis. Two hundred fifty-nine general surgeons were included in the final analysis. The power of the study was calculated as 0.97, with an effect size of 0.3 and significance level of 0.05.

Results

Of 1600 number of general surgeons had been contacted, 264 physicians agreed to participate in the study, giving a response rate of 16.5%. After exclusion of those with less than 2 years of experience in general surgery ($n = 5$), the final study included 259 participants. The average number of years' experience in general surgery was 13 (8.0–20.0) (95% CI, 13.36–15.34) years. Table 1 provides information on type of health facilities where the respondents (N = 259) were employed. Eighty-six (33.2%) respondents reported that they worked in a clinic in collaboration with the pain clinic in their residency program, 182 (70.3%) had a pain physician in the hospital where they currently worked, and 244 (94.32%) had a pain physician in the city where they worked.

The average practicing laparoscopic technique rate of the respondents was 20% (2.0–60.0) (95%CI, 29.77–38.25). When asked about their preference regarding mesh type in herniorrhaphy.

Table 1. Type of health facilities where the general surgeons ($n = 259$) were employed.

Type of health facility	Percentage (number, *n*)
Public hospital	16.7 (43)
Private hospital	18.7 (49)
Training and research hospital	43.3 (112)
University hospital	21.3 (55)
Total	100% (259)

Table 2. Pain relief prescribing practices of the general surgeons (*n* = 259)

Pain relief medications	Percentage (number, n)
Paracetamol	11.6% (30)
NSAIDS*	74.5% (193)
Paracetamol plus NSAIDS*	12.7% (33)
Combinations with opioids	1.2% (3)
Total	100% (259)

** Nonsteroidal anti-inflammatory drugs*

The respondents stated that their average rate of using standart mesh was 99% (80.0–100.0, 29.77–38.25), bioabsorbable mesh 0% (0–1.0) (95%CI, 2.10–4.58), and light mesh at 0% (0–15) (95%CI, 12.15–19.10).

Most of the respondents (248/95.8%) stated that they prescribed postoperative pain control medication at the time of patient discharge after herniorrhaphy. Their choices of pain relief drugs for early postoperative pain are shown in Table 2.

The respondents were also asked about neuropathic pain. The level of agreement with the following statements was evaluated on a Likert 5-point scale: "Neuropathic pain may accompany chronic pain after hernia repair," and "I am competent in evaluating neuropathic pain, questioning patients about neuropathic pain, and assessing neuropathic pain symptoms." The responses of the respondents are shown in Table 3. Survey respondents used a validated scale or questionnaire to assess GHCPSP in 20% (0–70) (31.55–40.78).

The pain relief prescription practices of the respondents for GHCPSP are shown in Table 4.

Respondents stated their average consultation rate of 30% (1-70) (95% CI, 34.55-43.48) and 1% (0-10) (95% CI, 8.74-13.21) to pain and psychiatry clinics.

The attitudes of the respondents toward GHCPSP were assessed by presenting them with the following case. "Twelve months after undergoing hernia repair, a patient presents with persistent pain in the inguinal area.

Table 3. Respondents' understanding of neuropathic pain.

Scores on a 5-point Likert scale*	Percentage (number, *n*)	
	Questioning and examination **	Being a component of CPSP***
1	13.5% (35)	2.3% (6)
2	34.4% (89)	3.5% (9)
3	34.7% (90)	17.8% (46)
4	10.0% (26)	40.5% (105)
5	7.3% (19)	35.9% (93)
Total	100.0% (259)	100% (259)

**A score of 1 on the Likert scale denoted strongly disagree, whereas a score of 5 denoted strongly agree.*
***"I have knowledge and experience in evaluating, questioning, and examining neuropathic pain which be a component of groin herniorrhaphy related CPSP." Do you agree with this statement?*
****"Neuropathic pain may be a component of groin herniorrhaphy-related chronic postsurgical pain." Do you agree with this statement?*

Table 4. Respondents' (*n* = 259) preferences in terms of pain relief medications after herniorrhaphy

Pain relief medications	Percentage (number, *n*)
Paracetamol and/or NSAIDS*	42.9 (111)
Antidepressants	0.8 (2)
Gabapentinoids	6.6 (17)
NSAIDS plus antidepressants	7.7 (20)
NSAIDS plus gabapentinoids	27.4 (71)
NSAIDS plus antidepressants plus gabapentinoids	12.4 (32)
Combinations with opioids	2.3 (6)
Total	100 (259)

** Nonsteroidal anti-inflammatory drugs*

After excluding possible pain-related causes, such as mesh-related infection, fluid collection, mesh migration, and a recurrent hernia, I consider on the management of chronic pain." They were then asked whether they agreed with this statement. The level of agreement was evaluated on a Likert 5-point scale. Table 5 shows the responses of these questions.

The respondents were also questioned about groin GHCPSP, with their level of agreement with various statements assessed us-

ing a 5-point Likert scale. Table 6 provides a summary of the answers.

There was a moderate positive correlation between the rate of referring patients with GHCPSP to pain physicians and responders' collaboration with a pain clinic during responders' residency program (p = 0.04, r = 0.55). There was a weak positive correlation between the rate of referring patients with GHCPSP to pain physicians and the respondents' views on pharmacological options that pain physicians may have for GHCPSP (p = <0.001, r = 0.22).

There was a weak positive correlation between the rate of referring patients with GHCPSP to pain physicians and the respondents' views on interventional treatment options that pain physicians can utilize for CPSP (p = <0.001, r = 0.31).

There was no correlation between respondents' rate of referrals of patients with GHCPSP to a pain physician and the presence of a pain medicine clinic in the hospital where the respondent currently worked (p = 0. 084, r = 0.18).

There was no correlation between the number of years of experience in general surgery and the rate of referrals of patients with GHCPSP to a pain physician (p = 0.07, r = 0.26).

Table 5. Respondents' (n = 259) attitudes toward CPSP after herniorrhaphy.

Scores on a 5-point Likert scale*	Percentage (number, n)
1	2.3 (6)
2	15.8 (41)
3	8.9(41)
4	20.5(53)
5	52.5(136)
Total	100(259)

**A score of 1 on the Likert scale denoted strongly disagree, and a score of 5 denoted strongly agree.*

Table 6. Respondents' thoughts on the effectiveness of different types of pain treatments for CPSP after herniorrhaphy

Scores on a 5-point Likert scale*	Percentage (number, n)	
	Pharmacological treatments**	Interventional treatments***
1	1.2% (3)	1.5% (4)
2	1.5% (4)	4.2% (11)
3	7.7% (20)	7.7% (20)
4	27.8% (72)	23.9% (62)
5	61.8% (160)	62.5% (162)
Total	100.0% (259)	100.0% (259)

**A score of 1 on the Likert scale denoted strongly disagree, and a score of 5 denoted strongly agree.*

*** "General surgeons can prescribe appropriate and adequate pharmacological treatment, but pain physicians can recommend alternative pharmacological treatments." Do you agree with this statement?*

****"General surgeons can prescribe appropriate and adequate pharmacological treatment, but pain physicians can utilize interventional treatments." Do you agree with this statement?*

Discussion

Majority of the respondents stated that they preferred non-opioid drugs for early pain prescribing in inguinal hernia repair and agreed that patients with GHCPSP could be assisted with interventional or pharmacological methods in pain clinics. On the other hand, a small portion of the respondents stated that they agreed with the possibility that GHCPSP might have a neuropathic nature, that they used validated assessment tools when evaluating GHCPSP, and referred patients with GHCPSP to pain and psychiatry clinics. In this study, 95.8% of the respondents stated that they routinely prescribed pain relief medication to patients at the time of discharge after groin herniorrhaphy.

They stated that they generally prescribed pain relief medications, such as paracetamol and nonsteroidal anti-inflammatory drugs (NSAIDs), as early postoperative pain control and that they prescribed opioids only rarely. Poor control of pain in the early postoperative period was reported to be a predictive factor for the development of GHCPSP and GHCPSP-related limitations of activity [4,10]. Tan et al.[10] reported a high rate of opioid prescription at discharge after abdominal surgery [11]. Increased opioid prescriptions can result in opioid misuse and even death due to an overdose [12]. In the present study, the control of early postoperative pain by general surgeons seemed good.

In this study, 90% of the respondents thought that referral to a pain physician may be useful in terms of pharmacological and interventional therapies in the management of patients suffering from refractory GHCPSP. In addition, 30% of general surgeons stated that they referred patients with GHCPSP to pain clinics. Courtney et al.[6] reported that GHCPSP can be prevented by timely referral of patients to pain clinics. Other research found that pain relief was possible via the application of tender area local anesthetic injection [13], ilioinguinal and iliohypogastric nerve blocks, radiofrequency therapy [14], and Th12-L2 dorsal root ganglion pulsed radiofrequency treatment in pain clinics [15]. Lai et al.[15] determined that 50% of surgeons considered that acute postoperative pain should be managed using a multidisciplinary approach. In addition, they revealed that the majority of surgeons need training on pain and in a multidisciplinary pain management [16]. The positive opinion of the participants in our study about the possible benefits of pain specialists on patients with GHCPSP is promising in the management of these patients.

The European Hernia Society recommends a multidisciplinary approach to pain management [9]. To the best of our knowledge this is the first study on surgeons' understanding and experience of GHCPSP and their attitudes toward a multidisciplinary approach to GHCPSP management. In the present study, despite the positive opinions of general surgeons about the usefulness of pain clinics, the rate of referrals to pain clinics was low. The low rate of referrals may be explained by successful management of pain by the respondents themselves, patients changing their physicians, or patients refusing alternative treatment methods. Multicenter clinical studies and data from patient interviews could help to shed light on the factors underlying the low rate of patient referrals.

In our study, only 20% of the respondents stated that they used the laparoscopic technique. The open technique has been reported to be a risk factor for the development of GHCPSP. In addition, chronic activity-related pain was found to be more severe in patients who underwent open repair than laparoscopic surgery [10]. The risk of GHCPSP with the laparoscopic technique, which is strongly recommended by the European Hernia Society, was reported to be lower than with the open technique [9]. Encouraging the uptake of a laparoscopic approach to groin hernia repair among general surgeons could help to reduce incidence of GHCPSP.

In this study, the majority of the respondents (99%) stated that they used a standard mesh in groin herniorrhaphy. Previous research found that light meshes were advantageous in terms of reducing early postoperative pain but not GHCPSP [9]. Considering that most of the surgeons in this study used the Lichtenstein technique, they followed the recommendations of the European Hernia Society regarding the use of a standard mesh with Lichtenstein technique.

In our study, 17.5% of the surgeons stated that neuropathic pain may be a component of GHCPSP. Previous research reported that neuropathic pain may develop as a result of tension, compression, electrical damage, or contusion of genitofemoral or ilioinguinal nerves[17]. Studies also showed that 38.5–55% of patients with GHCPSP experienced neuropathic pain [7, 18]. The present study shows that neuropathic pain is a neglected area of GHCPSP.

In this study, just 20% of the respondents said that they used a validated scale or questionnaire to assess GHCPSP. The Inguinal Pain Questionnaire, which is a validated scale, can be used to assess GHCPSP[19]. Other pain assessment tools and validated scales for GHCPSP include the Short Form-36 and Carolinas Comfort Scale, both of which evaluate the effect of pain on functionality[20], and the Surgical Pain Scale, which assesses the intensity of pain at rest and during normal activities, physical activities, and work-related activities, as well as pain-related discomfort[21]. In this study, the rate of use of validated scales in assess-

ments of GHCPSP was low. As reported previously, inadequate assessments of pain represent a major barrier in pain management [22]. Using a validated pain scale to assess the severity of pain and its impact can improve the management of GHCPSP.

In this study, just 1% of the respondents declared that they referred patients with GHCPSP to psychiatric clinics. Previous research highlighted the relationship between GHCPSP and psychological problems, such as anxiety, depression, catastrophizing, and kinesiophobia [23]. Acceptance and commitment therapy have been found to be useful treatments for CPSP [24]. General surgeons should consider consulting more frequently with psychiatry clinics in pain management of patients with GHCPSP.

A limitation of our study was that the surgeons were not directly questioned about their views on the utility of multidisciplinary teams and training programs in pain management. Lai et al.[15] reported that the majority of surgeons considered that training on pain and pain management should take place via meetings with a pain team. In future studies, the effect of multidisciplinary meetings and educational programs on surgeons' clinical approaches to GHCPSP management can be evaluated. Participant bias may be another limitation of our study. Participants who felt confident about their knowledge and experience of GHCPSP may have been more likely to have participated in the study.

Conclusion

General surgeons have sufficient awareness of early postoperative pain and GHCPSP. However, understanding of GHCPSP in evaluations of pain-related characteristics, including pain severity, and the effect of pain on quality of life needs to be improved. Furthermore, greater acceptance of the value of a multidisciplinary approach to pain management is needed.

Author contributions

Conception or design of the work: 1, 2, 3
Data collection: 1, 2, 3
Data analysis and interpretation: 1
Drafting the article: 1, 2, 3
Critical revision of the article: 1, 2, 3
Final approval of the version to be published: 1, 2, 3
Guarantor: 1

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Conflict of interest
The authors declare that they have no conflict of interest.

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Ethical approval
This cross-sectional study was conducted in accordance with the Declaration of Helsinki and in line with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement. The study was performed in January 2020 after obtaining ethics approval from Necmettin Erbakan University Ethics Committee (No: 2020/3040, date: 22 December 2020).

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