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Comparison of Pain Severity with VAS Score in Preoperative and Postoperative Periods After Laparoscopic Cystectomy in Isolated Endometriomas

İzole Endometriomalarda Laparoskopik Kistektomi Sonrası Preoperatif ve Postoperatif Dönemde Ağrı Şiddetinin VAS Skoru ile Karşılaştırılması

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ABSTRACT

Background: In this study, it was investigated whether laparoscopic surgery reduces dysmenorrhea, pelvic pain, dyspareunia and abdominal distension evaluated with visual analog scale (VAS) in the postoperative period compared to the preoperative period in patients diagnosed with isolated endometrioma.

Materials and Methods: The preoperative and postoperative VAS scores of 36 cases with isolated endometrioma were compared among 197 patients who applied with pelvic pain and underwent laparoscopic surgery with an endometrioma diagnosis between 2017 and 2020. Patients were asked to complete a questionnaire containing a 100 mm VAS scale that included the four components of pre- and post-operative endometriosis-related pain (dysmenorrhea, pelvic pain, dyspareunia, and abdominal distension). Patients with deep infiltrative endometriosis, peritoneal endometriosis, related severe intraoperative adhesions, those who had previously undergone endometriosis surgery, and those who had received hormonal therapy for endometriosis or endometrioma before the surgery were found to be excluded from the study.

Results: The VAS scores of the patients for cyclic-non-cyclic pelvic pain, dysmenorrhea, dyspareunia, and abdominal distension decreased significantly in the postoperative period compared to the preoperative period ($p<0.05$).

Conclusion: This study determined that the symptoms of cyclic-non-cyclic pelvic pain, dysmenorrhea, dyspareunia, and abdominal distension after laparoscopic surgery in patients with isolated endometrioma were significantly reduced compared to the period before surgery. In addition, CA-125 biomarker results were significantly reduced after laparoscopic surgery in patients with isolated endometrioma.

Keywords: Endometrioma, VAS score, pelvic pain, Ca125

ÖZ

Amaç: Bu çalışmada izole endometrioma tanısı konan hastalarda laparoskopik cerrahinin postoperatif dönemde görsel analog skala (VAS) ile değerlendirilerek dismenore, pelvik ağrı, disparoni ve abdominal distansiyonun preoperatif döneme göre azaltıp azaltmadığı araştırıldı.

Gereç ve Yöntemler: 2017 ve 2020 yılları arasında pelvik ağrı şikayetiyle başvuran ve endometrioma tanısı ile laparoskopik cerrahi uygulanan 197 hastanın arasından izole endometrioma tespit edilen 36 olgunun preoperatif ve postoperatif VAS skorları karşılaştırıldı. Hastalardan ameliyat öncesi ve sonrası endometriozis ile ilişkili ağrının (dismenore, pelvik ağrı, disparoni ve abdominal distansiyon) dört bileşenini içeren 100 mm'lik bir VAS ölçeğini içeren bir anketi doldurmaları istendi. Derin infiltratif endometriozis, peritoneal endometriozis ve buna bağlı ciddi intraoperatif adezyonları bulunan, daha önce endometriozis cerrahisi geçirenler, operasyondan önce endometriozis veya endometrioma nedeniyle hormonal tedavi alan hastalar çalışma dışında tutuldu.

Bulgular: Hastaların siklik-non-siklik pelvik ağrı, dismenore, disparoni ve abdominal distansiyon VAS skorlarında preoperatif döneme kıyasla postoperatif dönemde anlamlı düzeyde azalma olduğu izlendi ($p<0,05$).

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ÖZ

Sonuç: Bu araştırmada izole endometrioması olan hastalarda laparoskopik cerrahi sonrası siklik-non-siklik pelvik ağrı, dismenore, disparoni ve abdominal distansiyon semptomlarının cerrahi öncesine göre belirgin azaldığı saptanmıştır. Ayrıca izole endometriomalı hastalarda laparoskopik cerrahi sonrası CA-125 biyobelirteç sonuçlarının anlamlı derecede azaldığı bulundu.

Anahtar Kelimeler: Endometrioma, VAS skoru, pelvik ağrı, Ca125

Introduction

Endometriosis is a disease characterized by the presence of the endometrial gland and stroma outside the endometrium. Its most common implantation site is the pelvic organs and peritoneum, but it can also be seen in extrapelvic areas such as the bowel, bladder, or lung. It can induce problems from minimal lesions to large adhesions that can completely distort the anatomy (1).

Endometriosis is a hormone-dependent disease and is, therefore, most common in women of reproductive age. The prevalence of surgically diagnosed endometriosis has been reported to be 10% between the ages of 15 and 49 years (2). Its prevalence in asymptomatic women ranges from 2% to 22%, while it is reported to be 21-47% in infertile women (3) and 71-87% in those with pelvic pain (2,3,4). On the other hand, the prevalence of isolated endometrioma is approximately 10-15% (4,5). It has been proven that endometrioma causes pain in these patients as well (5). Although several studies have been on endometriosis, the disease's prevalence, pathophysiology, natural history, and optimal treatment are still being investigated, and treatment methods are still being developed (1,2).

The type of endometriosis that only affects the ovaries is isolated endometriomas, which are benign, estrogen-dependent ovarian cysts. It is significant since it is a prevalent disease that also produces issues that have a detrimental impact on social life, and it has been the topic of numerous studies. The most common symptoms are dysmenorrhea, dyspareunia, non-cyclic pelvic pain, and sub-infertility.

In this study, surgical laparoscopy was performed on patients with isolated endometrioma, and it was aimed to discuss the severity of dysmenorrhea, pelvic pain, dyspareunia and abdominal distension in the preoperative and postoperative period by comparing them with the VAS method, in the light of the literature.

Material and Methods

In this prospective clinical study, 36 cases with isolated endometrioma were included among 197 patients operated on for endometrioma in University of Health Sciences Türkiye, Antalya Training and Research Hospital, Gynaecology and Obstetrics Clinic between October 2017 and October 2020. Informed consent was obtained from all patients. Before starting the study, the approval of the Local Ethics Committee of our hospital was obtained (decision number: 21/09/2017-13/7). Endometrioma was diagnosed by ultrasonography (USG), and Philips ClearVue 650 Brand USG and C9-4v Active Array transvaginal probe were used for measurements. Patients with deep infiltrative and peritoneal endometriosis, related severe intraoperative adhesions, those who had previously undergone endometriosis surgery, and those who had received hormonal therapy for endometriosis or endometrioma before the operation were excluded from the study. All operations were performed with the laparoscopic method, and the visual analogue scale (VAS) method was used to compare the severity of dysmenorrhea, pelvic pain, dyspareunia, and abdominal distension. The VAS is not a detailed assessment, and the patient is asked to rate the intensity of pain at rest or during an activity at a scale with a length of 10 cm, usually between 1-10 cm or 1-100 mm. This scale consists of a horizontal or vertical straight line. The line has a value of 0 at the beginning and a value of 10 at the end. A value of 0 means no pain, a value of 10 means unbearable pain. VAS is a widely used scale for the assessment of pain severity. The patient was asked to mark the pain she felt on this line, and the point he marked was measured in cm (6).

0 (No Pain)_____(Unbearable Pain)_10

Operation Technique

An umbilical 10 mm trocar was entered under general anaesthesia using the direct trocar insertion technique. After the pneumoperitoneum was created, three 5 mm trocars were inserted by laparoscopic observation, approximately 3 cm above the bilateral symphysis pubis, lateral to the rectus muscles, and 2 cm above the symphysis pubis, in the midline. Patients with deep infiltrative endometriosis or peritoneal endometriosis were excluded from the study. The contents of isolated endometriomas were aspirated, and the capsules were excised.

One day before the operation, the patients filled out a questionnaire evaluating pain using a 100 mm VAS including four components of endometriosis-related pain (dysmenorrhea, pelvic pain, dyspareunia, and abdominal distension). A scale (0 -100 mm) was used, where 0 represents no pain and 100 represents the worst pain imaginable (Annex-1). In addition, demographic characteristics [age, parity, body mass index (BMI)], operative characteristics,

and length of hospital stay of the patients were noted. The same symptoms were re-evaluated with 100 mm VAS in the postoperative 3rd-month follow-up of the patients and compared with their preoperative values.

Statistical Analysis

The Statistical Package for the Social Sciences (SPSS) V.25 software was used in the analysis of the data. The normality of the data was checked by considering the Kolmogorov-Smirnov test and Shapiro-Wilk test. Wilcoxon Signed Ranks test and Paired samples t-test were used for repeated measurements. Normally distributed data are shown as mean ± standard deviation, and non-normally distributed data are expressed as median (minimum-maximum). The categorical data were expressed with n (number) and percentages (%). The data were analysed at a confidence interval of 95%, and a p-value of <0.05 was considered to be statistically significant.

Results

The study included 36 patients with isolated endometrioma among 197 patients who had endometriosis operation. Demographic characteristics of the patients included in this study were summarized in Table 1. The mean age of the patients included in the study is 30.8±7.1 (minimum 18, maximum 42), mean weight 64.8±13.12 kg (minimum 43 kg, maximum 100 kg), mean BMI 24.38±5.06 kg/m^2, and median gravida was 0.5 (0-5), parity was 0 (0-3). When the operation histories were examined, 3 (8.3%) patients had a laparotomic myomectomy, 7 (19.4%) patients had a caesarean section, 2 (5.6%) patients had laparoscopic cystectomy, and 1 (2.8%) had laparotomic cystectomy operations. Moreover, it was observed that 34 (94.4%) patients did not have any additional disease, 1 (2.8%) patient had mitral valve prolapse (MVP), and 1 (2.8%) patient had a familial Mediterranean fever (FMF). The clinical, laboratory, and surgical data of the patients are given in Table 2. Bilateral endometrioma was detected in 13 (36.1%) of the patients. The mean operation time was 66.75±28.14 minutes, and the mean amount of bleeding was 133.6±149.8 cc. The comparison of VAS scores, CA-125, and hemoglobin values calculated in the preoperative and postoperative period are presented in Table 3. While the pelvic pain VAS score was 65±16.47 in the preoperative period, it was 40.83±16.27 in the postoperative period (p=0.001), the dysmenorrhea VAS score was 63.61±16.58 preoperatively and 37.77±16.92 postoperatively (p=0.001), the dyspareunia VAS score was 63.88±17.93 preoperatively and 45±19.63 postoperatively (p=0.001), and the abdominal distension VAS score was 54.44±14.02 preoperatively and 36.11±18.55 postoperatively (p=0.001). Preoperative CA-125 was 76.7±85.6, postoperative 22.78±17.01, and a significant difference was found between them (p<0.05). While the hemoglobine value was 12.55±1.06 preoperatively, it was 11.01±1.06 postoperatively. Preoperative-postoperative hemoglobin difference was 1.54±0.8 (g/dL). The difference between preoperative and postoperative hemoglobin values was statistically significant (p=0.001).

Table 1. Demographic characteristics of the patients

Age (mean ± SD)		**30.8±7.1**
Height (m) (mean ± SD)		1.63±0.04
Weight (kg) (mean ± SD)		64.8±13.12
BMI (kg/m^2) (mean ± SD)		24.38±5.06
Gravida (median)		0 (0-5)
Parity (median)		0 (0-3)
Abortus (median)		0 (0-3)
D/C (median)		0 (0-2)
Ectopic pregnancy (median)		0 (0-0)
Comorbidity	No	34 (94.4%)
	MVP	1 (2.8%)
	FMF	1 (2.8%)
Operation history	No	23 (63.9%)
	Laparotomic myomectomy	3 (8.3%)
	Cesarean section	7 (19.4%)
	Laparoscopic cystectomy	2 (5.6%)
	Laparotomic cystectomy	1 (2.8%)

BMI: Body mass index, MVP: Mitral valve prolapse, FMF: Familial mediterranean fever, D/C: Dilatation and curettage, SD: Standard deviation

Discussion

Endometriosis constitutes an important part of all patients with pelvic pain syndrome. There are no definitive criteria to determine whether endometriosis lesions cause pain symptoms.

Table 2. Clinical, laboratory and surgical data of patients

Cyst location (n,%)	**Unilateral**	**23 (63. 9)**
	Bilateral	**13 (36.1)**
1st cyst	Size 1 (mm) (mean ± SD)	52.94±19.80
	Size 2 (mm) (mean ± SD)	50.27±20.16
2nd cyst	Size 1 (mm) (mean ± SD)	45.30±17.20
	Size 2 (mm) (mean ± SD)	43.69±19.19
Operation time (min.) (mean ± SD)		66.75±28.14
Amount of bleeding (cc) (median)		60 (0-600)
Preoperative-postoperative hemoglobin difference (g/dL) (mean ± SD)		1.54±0.8

SD: Standard deviation

Table 3. Comparison of patients' preoperative and postoperative VAS scores, CA125 and HB values

VAS scores	Preoperative	Postoperative	p
*Pelvic pain (mm) (median)	70 (30-90)	40 (10-70)	**<0.001**[1]
*Dysmenorrhea (mm) (median)	60 (30-90)	40 (10-70)	**<0.001**[1]
*Dyspareunia (mm) (median)	70 (30-90)	50 (10-80)	**<0.001**[1]
*Abdominal distention (mm) (median)	50 (30-80)	40 (10-60)	**<0.001**[1]
*CA 125 (U/mL) (median)	54.05 (3.2-419)	20.15 (0-62)	**0.001**[1]
*Hemoglobin (g/dL) (mean ± SD)	12.55±1.06	11.01±1.05	**<0.001**[2]

[1]Wilcoxon Signed Ranks test, [2]Paired samples t-test, SD: Standard deviation, VAS: Visual analog scale

In this study, it was observed that CA-125 biomarker results and pain symptoms decreased by 20-25% after laparoscopic surgery in patients with isolated endometrioma, and significantly improved. Although there is some evidence that isolated ovarian endometriomas also cause pain, it is important to resolve the association of endometriosis and pain, detect a condition that reports the interdependence between serum CA-125 measurement, history, physical examination data, imaging methods and symptoms, and plan their treatment accordingly (7,8).

Based on the findings of this study, the VAS scores of 36 patients with isolated endometrioma who underwent laparoscopic cystectomy and confirmed by the pathology results decreased significantly in the postoperative period compared to the preoperative period.

A systematic review reported that the VAS is the most commonly used scale and is helpful for clinicians to evaluate treatment response in endometriosis-related pain (9). The VAS rating method is favoured because it is simple, quick, and economical. The relationship between pelvic pain symptoms and endometrioma has not been clearly defined (10). Ballard et al. (11) investigated whether different dimensions of chronic pelvic pain before laparoscopy are beneficial in the diagnosis of endometriosis. They conducted a questionnaire to assess the definitions, areas, and intensity of pain and observed differences in pain dimensions between women with and without endometriosis and those with deep and superficial endometriosis (11).

According to the ASRM's recommendation in 2014, laparoscopic treatment of endometriosis provides relief in pain and therefore treats endometriotic lesions seen during a diagnostic laparoscopy (12).

According to a recent Cochrane meta-analysis and the results of 5 randomized controlled studies, it was determined that the pain complaints of endometriosis patients treated with laparoscopic surgery were significantly reduced compared to patients who underwent diagnostic laparoscopy but were not treated (13). Improvement in pain score may be a response to surgery-induced regression of neurogenic inflammation of the pelvic organs, hyperalgesia, and dysreflexia (14).

In another study, the efficacy of laparoscopic excision in reducing pain in patients with visually diagnosed peritoneal endometriosis (without any signs of deep endometriosis) in the treatment of chronic pelvic pain was investigated (confirmed by pathology result that the excised tissues are endometriosis), and it was observed that the pain decreased in the postoperative period with a mean follow-up of 13 months (15). Similar to these results, in our study it was determined that the pain findings of the patients who presented with pain and were diagnosed with isolated endometrioma improved by 20-25% as a result of the treatment. The number of patients with only ovarian endometrioma seems to be very low. This demonstrates that our research is unique and that no other study of its kind has ever been conducted. There is a common opinion in the literature that pain related to endometriosis is mainly caused by deep and peritoneal endometriosis (12). However, nerve fibres in ovarian endometriomas were generally seen in the endometriotic stroma and around the endometriotic glands, as in peritoneal endometriosis and deep infiltrative endometriosis (16,17).

Tokushige et al. (17) also presented data to support this study and confirmed the presence of nerve fibres in ovarian endometriomas by detecting neuronal markers such as substance P, neuropeptide Y, and vasoactive intestinal peptide. In another study, Odagiri et al. (18) showed that ovarian endometriomas have more intense staining than peritoneal endometriosis by using neuron cell adhesion molecule staining to prove neuronal fibres. As a result of our study, we found similar findings with these two studies.

CA-125 is the most studied and identified marker, whose increase has been reported in endometriosis patients (14,19,20). In the study of Hirsch et al. (21), it was mentioned that CA-125 could describe pelvic pain and be a predictor for the presence of endometriosis in symptomatic patients. We also examined CA-125 in our study and found that its postoperative values decreased significantly. Although a

Cochrane meta-analysis by Nisenblat et al. (22) showed that serum CA-125 is not helpful as a diagnostic tool for endometriosis, it has been noted that it may have a potential use if post-surgical monitoring is required. When we evaluate the decrease in CA-125 values along with the decrease in VAS scores after laparoscopic cystectomy, we think that the patient benefited from the treatment and that CA-125 can be used in the follow-up of treatment, although it is not very helpful in diagnosis.

In general, the inhomogeneity of the methods employed to associate VAS ratings and endometriosis pictures in the literature made comparing our results challenging. These may include the methodology of the studies, the surgical method performed, or the post-surgical period in which VAS scores were collected, and the shape, location, or even definition of pain.

As a result, it can be concluded that there is a statistically significant improvement in short or long-term follow-ups in the majority of studies that evaluate pain using VAS scoring (11,14). In fact, the pain was also reduced significantly in VAS score evaluation studies in which 2 or 5 years of follow-up were published (14,23).

Study Limitations

Our research has some limitations. Despite the improvement in symptoms in VAS scores and CA-125 biomarker according to our results, we believe that studies with longer-term follow-up with more patients are necessary due to the subjective nature of the scale we used in our study and the limitations of our patient number and follow-up period. Furthermore, it is necessary to conduct long-term controlled studies in which pain detection, classification, and operational benefit can be evaluated with more detailed questionnaires such as severity, location, and type of pain developed for VAS scoring based only on patient selection.

Conclusion

It was observed that CA-125 biomarker results and pain symptoms decreased by 20-25% after laparoscopic surgery in patients with isolated endometrioma. We can conclude that pelvic pain was also reduced in these cases after laparoscopic surgery.

Ethics

Ethics Committee Approval: We adhered to the Declaration of Helsinki principles. Ethical approval was attained from the University of Health Sciences Türkiye, Antalya Training and Research Hospital, Local Clinical Research Ethics Committee (date and decision number: 21/09/2017:13/07).

Informed Consent: Written informed consent to participate and publish was obtained from all individual participants included in the study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: S.A., B.K., Concept: S.A., E.T., B.M., Design: S.A., E.T., B.K., Data Collection or Processing: S.A., B.K., B.M., Analysis or Interpretation: S.A., E.T., B.M., Literature Search: S.A., E.T., B.K., B.M., Writing: S.A., E.T.

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