



Effect of deep infiltrative endometriosis surgery and surgical method on sexual function in females

Kadınlarda derin infiltratif endometriozis cerrahisi ve cerrahi yönteminin cinsel fonksiyon üzerine etkisi

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Abstract

Objective: Sexual function and quality of life are significantly reduced in endometriosis patients, particularly those with deep infiltrative endometriosis (DIE). The purpose of this study was to compare the effects of endometriosis excision and excision techniques on sexual function among individuals with DIE to those of healthy females in an objective manner.

Materials and Methods: Our study included 140 individuals who were diagnosed as having DIE and reported dyspareunia in our clinic between January 2018 and 2024, and 70 patients who presented to our family planning clinic. The preoperative and 6-month post-surgery scores of the female sexual function index (FSFI), quality of sexual experience scale (QSES), and visual analog scale (VAS) values of all patients who described preoperative dyspareunia were examined retrospectively from the patient files.

Results: In our study, the FSFI score of healthy groups was seen to be significantly greater than the pre-surgery and post-surgery groups ($p<0.001$ and $p<0.001$, respectively). The QSES scores of the healthy group were found to be significantly higher than the pre-surgery and post-surgery groups ($p<0.001$ and $p<0.001$, respectively). The VAS dyspareunia values of the healthy group were discovered to be significantly lower than the pre-surgery and post-surgery groups ($p<0.001$ and $p<0.001$, respectively). The FSFI and QSES scores of the post-surgery group were significantly higher than those of the pre-surgery group ($p<0.001$ and $p<0.001$, respectively). The VAS dyspareunia score of the post-surgery group was seen to be significantly lower than that of the pre-surgery group ($p<0.001$). The FSFI and QSES scores of patients who underwent laparotomy were discovered to be significantly greater than that of individuals who underwent laparoscopic surgery ($p<0.001$ and $p=0.01$, respectively).

Conclusion: The surgical approach may have a positive effect on both organ dysfunction and sexual function in women with DIE; this issue should be considered carefully.

Keywords: Deep infiltrative endometriosis, endometriosis, sexual function

PRECIS: The surgical approach may have a positive impact on both organ dysfunction and sexual function in women with deep infiltrative endometriosis, and we therefore support the inclusion of women's sexual health issues in standard gynecological care.

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Öz

Amaç: Endometriozis varlığında, özellikle de derin infiltratif endometriozis (DIE) varlığında cinsel işlev ve yaşam kalitesi önemli ölçüde azalır. Bu çalışmanın amacı, endometriozis eksizyonu ve eksizyon tekniklerinin DIE'li bireylerde cinsel fonksiyon üzerindeki etkilerini sağlıklı kadınlarla objektif karşılaştırmaktır.

Gereç ve Yöntemler: Çalışmamıza Ocak 2018-2024 tarihleri arasında kliniğimizde DIE tanısı almış ve disparoni bildiren 140 kişi ve aile planlaması kliniğimize başvuran 70 hasta dahil edildi. Ameliyat öncesi disparoni tanımlayan tüm hastaların ameliyat öncesi ve ameliyat sonrası 6. ayda female sexual function indeks (FSFI), cinsel deneyim kalitesi ölçeği (QSES) ve görsel analog ölçek (VAS) değerleri hasta dosyalarından retrospektif olarak incelendi.

Bulgular: Çalışmamızda sağlıklı grubun FSFI skorunun ameliyat öncesi ve sonrası gruplardan anlamlı olarak yüksek olduğu saptandı ($p<0,001$ ve $p<0,001$, sırasıyla). Sağlıklı grubun QSES skorlarının ameliyat öncesi ve sonrası gruplardan anlamlı olarak yüksek olduğu saptandı ($p<0,001$ ve $p<0,001$, sırasıyla). Sağlıklı grubun VAS disparoni değerlerinin ameliyat öncesi ve sonrası gruplardan anlamlı olarak düşük olduğu saptandı ($p<0,001$ ve $p<0,001$, sırasıyla). Ameliyat sonrası grubun FSFI ve QSES skorlarının ameliyat öncesi gruptan anlamlı olarak yüksek olduğu saptandı ($p<0,001$ ve $p<0,001$, sırasıyla). Ameliyat sonrası grubun VAS disparoni skorunun ameliyat öncesi gruba göre anlamlı olarak düşük olduğu saptandı ($p<0,001$). Laparotomi geçiren hastaların FSFI ve QSES skorlarının laparoskopik cerrahi geçiren bireylere göre anlamlı olarak yüksek olduğu saptandı ($p<0,001$ ve $p=0,01$, sırasıyla).

Sonuç: Cerrahi yaklaşımın DIE'li kadınlarda hem organ disfonksiyonu hem de cinsel fonksiyon üzerinde olumlu bir etkisi olabilir ve bu nedenle bu konu dikkatlice ele alınmalıdır.

Anahtar Kelimeler: Derin infiltratif endometriosis, endometriozis, cinsel fonksiyon

Introduction

The gynecologic condition endometriosis is characterized by the persistent inflammation and existence of tissue outside the uterus that resembles endometrial tissue⁽¹⁾. About 10% of women who are of reproductive age and exhibit pelvic discomfort and infertility are thought to have endometriosis^(2,3). A kind of endometriosis that extends more than 5 mm below the peritoneal surface is known as deep infiltrative endometriosis (DIE)⁽⁴⁾. It is well acknowledged that endometriosis and specifically DIE, significantly lowers quality of life and sexual function⁽⁵⁻⁷⁾. Changes in sexual function in females with DIE may be caused by a variety of causes, including as tissue fibrosis, discomfort, chronic inflammation, and the presence of neuroactive drugs^(8,9). Since endometriosis is a benign condition, pain management and symptom improvement should be the primary objectives of treatment. Conservative approaches, like medical care, may be risk-free and innocuous, but they frequently don't work, particularly in DIE^(10,11).

As long as endometriotic foci are completely eliminated, symptomatic endometriosis surgery is usually successful and has a low recurrence rate^(12,13). On the other hand, intestinal or urinary neurogenic dysfunction might make DIE laparoscopic treatment more difficult, particularly in cases where nerve-sparing surgery is not an option^(14,15). We aimed in this retrospective study to objectively evaluate the effect of endometriosis excision and excision methods on sexual function in individuals having DIE in comparison to healthy females.

Materials and Methods

The present study was conducted as a retrospective observational study pursuant to the guidelines of the Helsinki Declaration. Documents of informed consent were taken from all patients. The research was approved by the Ethics Committee of İzmir Democracy University Hospital (date: 26/06/2024, number: 2024/20-5). Our study included 140 patients who were

diagnosed as having DIE and reported dyspareunia in our clinic between January 2018 and 2022, and 70 patients who presented to our clinic for birth control. Before surgery, all patients with DIE underwent transvaginal and abdominal ultrasonography as well as gynecologic tests to determine whether they had pelvic endometriosis^(16,17). After retrospective screening of patients who underwent surgery due to DIE, 70 patients who underwent laparoscopic surgery (L/S) and 70 patients who underwent laparotomy (L/T) were included in the study.

The preoperative female sexual function index (FSFI)⁽¹⁸⁾, quality of sexual experience scale (QSES)⁽¹⁹⁾, and visual analog scale (VAS)⁽²⁰⁾ values of all patients who described preoperative dyspareunia were examined retrospectively from the patient files. Females with DIE had complete excision of macroscopic endometriotic lesions in accordance with relevant surgical procedures^(21,22). The same surgeon carried out the surgeries while the surgical team had consistently treated DIE patients with laparoscopic and laparotomic procedures in the past. Histologic analysis was performed on all patients after surgery, and only patients whose diagnosis was confirmed were included in the research. After 6 months, all participants had clinical examinations and transvaginal ultrasonography to evaluate the symptoms and/or anatomic recurrence of endometriotic nodules. Six months after surgery, the FSFI, QSES, and VAS scores of all patients were retrospectively examined from their patient files. On the VAS scale, 0 represents the lack of symptoms and 10 represents the worst conceivable illness. Dyspareunia was scored by participants on a range of 0 to 10. The FSFI assessed six distinct domains: pain/discomfort, satisfaction, orgasm, lubrication, arousal, and desire. The scale ranged from 0, indicating (no sexual activity in the previous four weeks or a score of) 1 (very unhappy) to 5 (very satisfied). A full-scale score ranging from 2.0 (severe dysfunction) to 36.0 (no dysfunction) was used in the study to assess sexual function, with higher FSFI scores thought to be linked to improved symptoms. According to Wiegel et al.⁽²³⁾, there is an

ideal cut-off score of 26, which is utilized to identify females who have sexual dysfunction from those who do not.

Greater QSES scores correspond to greater quality. The range of values is 7 to 49⁽²⁴⁾. This questionnaire also examines several facets of sexual life and the influence of pelvic issues on sexual functioning. When responding to the questions, participants were instructed to take into account the preceding four weeks. Exclusion criteria for the study were a history of gynecologic cancer, presence of depression, patients receiving postoperative medical treatment, inflammatory bowel disease, a record of pelvic radiotherapy or systemic chemotherapy, and gynecologic infection based on demographic and clinical characteristics [parity, body mass index (BMI), age].

Statistical Analysis

Statistical analysis was completed with the SPSS 26.0 software package (IBM Inc., Chicago, IL, USA). The distribution normality was evaluated using the Kolmogorov-Smirnov test. Non-normally-normally distributed parameters were analyzed with the Mann-Whitney U test. The Wilcoxon test was employed to determine changes before and after surgery. For the analysis of categorical data, the chi-square test and Fisher precision test were utilized. Regarding the statistical analysis, categorical variables are reported as percentages, and quantitative variables as median (minimum-maximum). Statistical significance was

considered as $p < 0.05$ and analyses were within 95% confidence intervals.

Results

The average age of the participants in our study was 30.1 ± 9.5 years and the BMI average was $24.1 \pm 5.9 \text{ kg/m}^2$. Fifty-one (24.3%) of the participants in our study had given birth. In this research, the average BMI of patients who underwent endometriosis surgery was $23.9 \pm 5.6 \text{ kg/m}^2$, which was significantly lower than that of healthy females ($p < 0.001$) (Table 1).

The FSFI score of the healthy group was significantly greater than the pre-surgery and post-surgery groups ($p < 0.001$ and $p < 0.001$, respectively). The QSES score of the healthy group was significantly greater than the pre-surgery and post-surgery groups ($p < 0.001$ and $p < 0.001$, respectively). The VAS dyspareunia score of the healthy group was seen to be significantly lower than the pre-surgery and post-surgery groups ($p < 0.001$ and $p < 0.001$, respectively). The FSFI score of the post-surgery group was significantly greater than the pre-surgery group ($p < 0.001$). The QSES score of the post-surgery group was significantly higher than the pre-surgery group ($p < 0.001$). The VAS dyspareunia score of the post-surgery group was significantly lower than that of the pre-surgery group ($p < 0.001$) (Table 2).

Table 1. Comparison of demographic characteristics of main groups

| Variables | All patients (n=210) (100%) | Healthy females (n=70) (33.3%) | Surgery (+) (n=140) (66.7%) | p* |
|---|--------------------------------|-----------------------------------|--------------------------------|--------|
| | Mean ± SD | | | |
| Age (years) | 30.1±9.5 | 30.2±9.4 | 30.1±9.6 | 0.5 |
| BMI (kg/m²) | 24.1±5.9 | 24.5±5.4 | 23.9±5.6 | <0.001 |
| Birth history | 51 (24.3%) | 22 (31.4%) | 29 (20.7%) | 0.08 |
| *p value: Mann-Whitney U test, BMI: Body mass index, SD: Standard deviation | | | | |

*p value: Mann-Whitney U test, BMI: Body mass index, SD: Standard deviation

Table 2. Comparison of scores of healthy females and females with a history of surgery

| Variables | Healthy females (n=70) (33.3%) | Pre-surgery (n=140) (66.7%) | Post-surgery (n=140) (66.7%) | p* | p** | p*** |
|-------------------|-----------------------------------|--------------------------------|---------------------------------|--------|--------|--------|
| FSFI | 29 (23-36) | 26 (21-32) | 28 (25-34) | <0.001 | <0.001 | <0.001 |
| QSES | 43 (36-46) | 40 (32-45) | 41 (33-46) | <0.001 | <0.001 | <0.001 |
| VAS (dyspareunia) | 2 (0-7) | 4 (2-10) | 3 (1-5) | <0.001 | <0.001 | <0.001 |
| Desire | 5 (4-6) | 4 (4-5) | 4 (4-6) | <0.001 | <0.001 | 0.08 |
| Arousal | 5 (4-6) | 4 (3-5) | 5 (4-6) | <0.001 | 0.2 | <0.001 |
| Lubrication | 5 (4-6) | 4 (3-5) | 4 (3-6) | <0.001 | 0.03 | <0.001 |
| Orgasm | 5 (3-6) | 4 (3-6) | 5 (4-6) | <0.001 | 0.3 | <0.001 |
| Satisfaction | 5 (4-6) | 4 (3-6) | 5 (4-6) | <0.001 | 0.06 | <0.001 |
| Pain | 5 (4-6) | 4 (3-6) | 5 (4-6) | <0.001 | 0.1 | <0.001 |

p*: Healthy vs. pre-surgery (Mann-Whitney U test), p**: Healthy vs. post-surgery (Mann-Whitney U test), p***: Pre-surgery vs. post-surgery (Wilcoxon test), FSFI: Female sexual function index, QSES: Quality of sexual experience scale, VAS: Visual analog scale

In the present research, the FSFI scores of individuals who had L/T were significantly higher than those of patients who underwent L/S ($p<0.001$). The QSES scores of patients who underwent L/T were significantly higher than those of patients who underwent L/S ($p<0.001$). Arousal scores of individuals who had L/T were significantly higher than those of patients who underwent L/S ($p=0.009$). The orgasm scores of patients who underwent L/T were significantly higher than those of patients who underwent L/S ($p=0.01$). Satisfaction scores of patients who underwent L/T were significantly higher than those of patients who underwent L/S ($p<0.001$). Pain scores of

individuals who had L/T were significantly higher than those of patients who underwent L/S ($p=0.01$) (Table 3).

Discussion

In this current research, we hypothesized that surgical treatment of females with DIE may have a positive effect on FSFI and QSES scores and dyspareunia, indicating improvement in overall sexual function. Our goal was to compare the sexual functioning of female individuals with DIE to that of healthy ones. Numerous local environmental, psychological, neurologic, and biological elements that impact one's bodily and mental well-being, as well as one's perception of femininity and interpersonal interactions, are all involved in sexual function^(25, 26). In addition, depression and infertility, that are very common in females having endometriosis, are also linked with sexual dysfunction^(27,28). Recently, there has been increased medical interest in the impact of the presence of endometriosis on sexual function in females. Numerous research in the literature has shown that patients having dyspareunia experience a marked reduction in severity and an improvement in their quality of sexual function following surgical excision of DIE lesions^(29,30). Combining L/S with postoperative hormonal treatment is beneficial for females with endometriosis, especially DIE, as it has been demonstrated to enhance sexual function and symptoms^(31,32). In line with these studies, our results revealed a notable enhancement in sexual function six months following treatment in patients treated for DIE. There are numerous questionnaire formats for examining sexual activity in females with endometriosis⁽³³⁻³⁵⁾. In our study, we used the FSFI survey. We preferred it because of its succinctness, proven validity, and trustworthy subscales (sexual desire, pain/discomfort, sexual arousal, satisfaction, orgasm, lubrication). Furthermore, we evaluated QSES survey data. In our study, in addition to a significant increase in FSFI, QSES, and VAS scores after surgery, found a significant improvement in FSFI subcategories. However, despite having no significant difference in FSFI subcategory values between patients in the post-surgery group and the healthy group, FSFI, QSES, and VAS values in the healthy group were still greater than the post-surgery group scores.

Sexual desire and satisfaction are deeply influenced by emotions and governed by a range of excitatory and inhibitory impacts. The most important of these obstacles is the presence of dyspareunia. For this reason, the VAS dyspareunia score among patients in our study were also evaluated using a questionnaire. Because pain is both a potent inhibitor of the sexual response cycle and a potent behavioral modulator, females with dyspareunia are more likely to develop hypoactive sexual desire disorder or arousal problems⁽³⁶⁾. Presumably because they were aware that endometriotic lesions had been eliminated and their post-operative pain sensations had decreased and they were more aware that endometriotic lesions had been eliminated, the women in the post-surgery group were able to unwind and feel

Table 3. Comparison of score changes in individuals who underwent laparoscopy and laparotomy

| Variables | Laparoscopy (n=70) (50%) | Laparotomy (n=70) (50%) | p* |
|------------------------|-----------------------------|----------------------------|---------------|
| Pre-FSFI | 25 (21-31) | 26 (21-31) | 0.4 <0.001 |
| Post-FSFI | 28 (25-32) | 29 (25-34) | |
| p** | <0.001 | <0.001 | |
| Pre-QSES | 40 (32-45) | 40 (33-45) | 0.3 0.01 |
| Post-QSES | 41 (33-45) | 41 (34-46) | |
| p** | <0.001 | <0.001 | |
| Pre-VAS (dyspareunia) | 4 (2-10) | 4.5 (2-10) | 0.8 0.2 |
| Post-VAS (dyspareunia) | 3 (2-5) | 3 (1-5) | |
| p** | <0.001 | <0.001 | |
| Pre-desire | 4 (4-5) | 4 (4-5) | 0.6 0.4 |
| Post-desire | 4 (4-6) | 5 (4-6) | |
| p** | 0.2 | 0.1 | |
| Pre-arousal | 4 (3-5) | 4 (3-5) | 0.2 0.009 |
| Post-arousal | 5 (4-5) | 5 (4-6) | |
| p** | 0.02 | <0.01 | |
| Pre-lubrication | 4 (3-5) | 4 (3-5) | 0.07 0.2 |
| Post-lubrication | 5 (4-6) | 5 (4-6) | |
| p** | <0.001 | <0.001 | |
| Pre-orgasm | 4 (3-5) | 4 (3-6) | 0.7 0.01 |
| Post-orgasm | 5 (4-5) | 5 (4-6) | |
| p** | <0.001 | <0.001 | |
| Pre-satisfaction | 4 (4-6) | 4 (3-6) | 0.5 <0.001 |
| Post-satisfaction | 4 (3-6) | 5 (4-6) | |
| p** | <0.001 | <0.001 | |
| Pre-pain | 4 (3-5) | 4 (3-6) | 0.02 0.01 |
| Post-pain | 5 (4-5) | 5 (4-6) | |
| p** | <0.001 | <0.001 | |

p*: Mann-Whitney U test, p**: Wilcoxon test, FSFI: Female sexual function index, QSES: Quality of sexual experience scale, VAS: Visual analog scale

more at ease during sexual activity. It has been demonstrated that the number of DIE nodules detected in certain regions is inversely correlated with the decrease in sexual desire⁽³⁷⁾.

At advanced stages, the illness can impact a variety of areas of a woman's life, including her mental health. According to reports, endometriosis-afflicted women have greater rates of psychological disorders such as anxiety and depression⁽³⁸⁾. Furthermore, there is a substantial correlation between DIE and persistent pelvic discomfort. Taking into account various studies, there is a substantial correlation between the cumulative size of posterior DIE (less than 1 cm) and both chronic pelvic discomfort and the least severe dyspareunia⁽³⁹⁾. The involvement of the anterior rectal wall, posterior vaginal fornix, pouch of Douglas, and uterosacral ligaments was observed in two separate investigations by Kor et al.⁽³⁹⁾ and Vercellini et al.⁽⁴⁰⁾. The degree of Douglas pouch stenosis and the endometriosis stage are associated with the severity of dyspareunia. Our study's results, which corroborate the findings of the other two studies, show a considerable improvement in VAS dyspareunia ratings following surgery. This finding might be explained by the fact that sexual dysfunction related to pelvic issues can be lessened by fully removing all endometriotic lesions and restoring normal pelvic structure. However, we assessed each of the FSFI score subgroups independently and did not restrict the assessment of sexual function to the existence or absence of pelvic discomfort. In particular, we found that the desire scale did not significantly improve following surgical therapy for DIE. Since sexual desire is a multifaceted process that depends on psychological, anatomical, and physiological components, it is challenging to explain this conclusion⁽⁴¹⁾. With respect to anatomical variables, it is well recognized that undergoing extensive surgery for endometriosis may result in injury to the autonomic nerves, which might subsequently affect orgasm⁽⁴²⁾. In this current research, the higher orgasm score in females with a history of L/T in the post-surgery group than in the L/S group suggests that nerve damage is more limited in the L/T group.

Study Limitations

We are aware that it is important to take into account the limitations of this research when evaluating the findings. The research was designed retrospectively; patient data were analyzed only from patient files and data in the database; and the limited number of patients can be cited as limitations of the study. Also, the majority of patients at our tertiary care center for endometriosis therapy were in a severe stage of illness; as a result, research participants may not be entirely typical of the endometriosis community as a whole. Patients with DIE are more prone than those with less severe illness to experience sexual dysfunction. Because the FSFI and QSES questionnaires inquire about areas of sexual function that many women view as extremely private, there is a considerable risk of response and recall bias, even though women complete them independently and without guidance. The psychological elements that characterize human

sexuality and the larger cultural background make studies of human sexuality vulnerable to prejudice and confounding variables. Nevertheless, our study has several strengths. Unlike other studies in the literature, our research assessed only the impact of DIE surgery on sexual function and individuals who had medical treatment in the postoperative period were not included in the study. In this way, the study made it possible to assess the impact of DIE surgery alone on sexual function, independent of medical treatment. Furthermore, unlike other studies in the literature, the type of surgical method was also evaluated as a factor in our study. Finally, all surgical patients were diagnosed with histologically confirmed DIE.

Conclusion

We found that females affected by DIE generally had significant improvement in their postoperative sexual function compared with the preoperative period. FSFI subparameters and QSES scores improved significantly following surgical treatment. For females affected by DIE, the surgical treatment may improve both organ failure and sexual function; therefore, this issue should be considered carefully.

Ethics

Ethics Committee Approval: The research was approved by the Ethics Committee of İzmir Democracy University Hospital (date: 26/06/2024, number: 2024/20-5).

Informed Consent: Documents of informed consent were taken from all patients.

Footnotes

Authorship Contributions

Surgical and Medical Practices: U.A., A.C.Ö., Concept: O.Y., C.A., F.A., Design: H.A.A., T.B.B., Data Collection or Processing: S.E., A.C.Ö., Analysis or Interpretation: H.A.A., T.B.B., Literature Search: F.A., Writing: U.A., B.E.

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