# Anatomical Sites and Characteristics of EndometriosisLesions: Laparoscopic Investigation

**Behnaz Nouri[1] iD, Malihe Arab[2] iD, Nazli Najeddin Choukan[3]***

1. Preventative Gynecology Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
2. Department of Gynecology-Oncology, Imam Hossein Medical Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
3. Department of Obstetrics and Gynecology, Shahid Beheshti University of Medical Sciences, Tehran, Iran

## Article Info

**Corresponding Information:**
**Nazli Najeddin Choukan,**
Department of Obstetrics and Gynecology, Shahid Beheshti University of Medical Sciences, Tehran, Iran

**Email:** Nazli_chogan@yahoo.com

## ABSTRACT

**Background & Objective:** Endometriosis is a common and benign disease of the female genital system, which is often seen in reproductive age and leads to infertility, dysmenorrhea, and dyspareunia. The aim of this study is to investigate the anatomical location and characteristics of endometriosis lesions in laparoscopic surgery.

**Materials & Methods:** In this cross-sectional study, 557 endometriosis patients who referred to the gynecology department of Shohadaye-Tajrish Hospital and underwent laparoscopic surgery during 2016-2021 were evaluated. Statistical analysis of data was done using SPSS software version 24.P-value less than 0.05 was considered statistically significant level.

**Results:** The results of this study show that the highest anatomical distribution of endometriosis lesions was ovarian endometriosis, and the lowest was vagina. Also, the highest rate of surface lesions is uterus and bladder, and the lowest is superficial lesions of the cul-de-sac cyst.

**Conclusion:** Our results demonstrate that the distribution of endometriosis lesions is asymmetric.

**Keywords:** Endometriosis, Laparoscopy, Anatomical Site, Lesion Distribution Characteristics types of Endometriosis Lesions

## Introduction

Endometriosis refers to the presence and growth of uterine tissue outside the uterine cavity, which is a chronic and complex disease that affects women of reproductive age **(1-4)**. Endometriosis is related to infertility and chronic pelvic pain during the menstrual cycle and dyspareunia **(3-8)**. About 176 million women suffer from endometriosis **(3, 9, 10)**. The approximate prevalence of endometriosis in the Tehran province in 2013 was reported about 5-20% **(3)**. Endometriosis significantly affects the quality of life (Qol) of females and their families, and burden of disease is the same as other chronic diseases **(3, 11-14)**. One of the causes of infertility is endometriosis that affects about 25-50% of infertile women **(5, 6, 15)**.

The cause and pathophysiology of endometriosis are unknown, however genetic and environmental factors may be involved **(1, 16-18)**.In order to check the location, number, measurement and severity of endometriosis involvement, a detailed laparoscopy evaluation is needed to consider the appropriate treatment method depending on the severity and location of the disease **(3, 7)**.The purpose of this study was to investigate the sites and characteristics of endometriosis lesions in laparoscopic surgery in patients referred to Shohadaye- Tajrish Hospital.

## Methods

### Patients and study design

This cross-sectional study was performed on endometriosis patients that referred to the gynecology department at Shohadaye-Tajrish Hospital as a referral center in Tehran, Iran, between April2016 and April 2022. Patients with endometriosis that underwent laparoscopic surgery enrolled in this study. The sampling method was convenient and according to the

following statistical formula, the sample size calculated 557 patients.

$$N= [P (1-P)] \times (Z \ 1-\alpha/2)^2 \ d^2$$

Inclusion criteria in this study were: age at least 18 years, diagnosis of endometriosis and laparoscopic surgery. Information was collected based on a checklist. Also, for each surgery, laparoscopic videos of the patients were observed and evaluated, and the anatomical location of endometriosis was determined using the detailed examination of these videos. Demographic factors (age, weight, height), location of endometriosis lesion, type of lesion (superficial lesion, endometrioma, DIE), pelvic adhesion and laterality of endometriosis were investigated in these people.

The ethics was approved by the ethical committee of Shahid Beheshti University of medical sciences (approval number IR.SBMU.RETECH.REC.1401.685).

**Statistical analysis**

Statistical analysis of the data was done using (spss software, version 24, IBM, USA). Statistical analysis of data was done using T-test for quantitative variables and square test for qualitative variables. A P-value less than 0.05 was considered statistically significant.

## Results

Finally, 557 patients enrolled in this study and 66.7 % of women them were married. The average age of patients was 33.35 ±7.51 years (min:18 and max:49) and the average body mass index (BMI) was 25.48 ±4.35. Fifteen patients (3.7%) had family history of endometriosis. Table 1 shows descriptive characteristics of lesions.

**Table 1. Descriptive characteristics of lesions**

|  | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|
| **Superficial and deep lesions** | | | | |
| **Deep Peritoneal lesions** | 10 | 60 | 34.62 | 12.052 |
| **Superficial Peritoneal lesions** | 20 | 70 | 33.33 | 19.664 |
| **Deep right ovarian lesions** | 10 | 10 | 10.00 | - |
| **Deep left ovarian lesions** | 10 | 10 | 10.00 | - |
| **Superficial right ovarian lesions** | 10 | 30 | 20.00 | 8.165 |
| **Superficial left ovarian lesions** | 10 | 30 | 17.78 | 6.667 |
| **Ovarian adhesions** | | | | |
| **Left (Dense)** | 10 | 30 | 18.33 | 7.528 |
| **Left (Filmy)** | 10 | 20 | 16.67 | 5.774 |
| **Right (Dense)** | 10 | 30 | 17.86 | 6.986 |
| **Right (Filmy)** | 20 | 20 | 20.00 | 0.000 |
| **Endometrioma size** | | | | |
| **Left endometrioma size** | 10 | 150 | 60.19 | 33.107 |
| **Right endometrioma size** | 20 | 150 | 57.78 | 36.064 |

Out of 557 patients, 82 (14.7%) had pelvic adhesions. Table 2 shows the prevalence of lesions in patients. Among the patients who had pelvic adhesions, 46.3% (n = 38) they had no history of pelvic infection, while 53.6% (n = 44) had a history of pelvic infection, which according to chi-square test, there was no statistically significant difference (P-value=0.79). Table 3 shows surgeries history for the patients under study.

**Table 2. Prevalence of lesions in patients**

|  | Frequency | Percent |
|---|---|---|
| **Deep lesions** | | |
| **Endometrioma** | 408 | 73.2 |
| **Left uterosacral** | 294 | 52.8 |
| **Right uterosacral** | 245 | 44.0 |

| | Frequency | Percent |
|---|---|---|
| Rectum | 158 | 28.4 |
| Bladder | 93 | 16.7 |
| Left pelvic wall | 43 | 7.7 |
| Right pelvic wall | 43 | 7.7 |
| Right ureter | 38 | 6.8 |
| Left ureter | 16 | 2.9 |
| Sigmoid | 38 | 6.8 |
| Diaphragm | 27 | 4.8 |
| Parametrium | 27 | 4.8 |
| cul-de-sac | 21 | 3.8 |
| Vagina | 6 | 1.1 |
| **Superficial lesions** | | |
| Uterine | 49 | 8.8 |
| Bladder | 49 | 8.8 |
| Cul-de-sac | 6 | 1.1 |
| **8.8 Endometriosis adhesions** | | |
| No | 491 | 88.2 |
| Yes | 66 | 11.8 |
| **Müllerian duct anomalies** | | |
| No | 508 | 91.2 |
| Yes | 49 | 8.8 |
| **Myoma** | | |
| No | 86 | 84.3 |
| Subserous | 16 | 15.7 |
| **Non-endometrioma cysts** | | |
| No | 536 | 96.2 |
| Yes | 21 | 3.8 |
| **Stage of endometriosis** | | |
| Stage 1 | 26 | 4.7 |
| Stage 2 | 38 | 6.8 |
| Stage 3 | 67 | 12.0 |
| Stage 4 | 426 | 76.5 |

**Table 3.** Surgeries history for the patients under study

| Surgeries | Left side | Right side | Both side |
|---|---|---|---|
| Oophorectomy | 55 (9.9) | 33(5.9) | 71(12.7) |
| Cystectomy | 98 (17.6) | 120 (21.5) | 120 (21.5) |
| Reconstructed ovary | 13(2.3) | 6(1.1) | 22 (3.9) |
| Fallopian tube occlusion | 16 (2.9) | 32 (5.7) | 13(2.3) |
| Salpingectomy | 59 (10.6) | 22(3.9) | 55 (9.9) |

The relationship between the average age and BMI of the patients and the location of the lesion is shown in Table 4. Independent t test shows there was a statistically significant difference in left uterosacral site and left pelvic wall with age of patients. The independent t-test showed a significant difference between BMI and pelvic wall, ureter, uterosacral and endometrioma lesions.

**Table 4.** The relationship between the age and BMI of patients and location of lesions

| Location of lesions | Yes Mean + SD Age | No Mean + SD Age | P-value |
|---|---|---|---|
| Uterine wall | 37.67 + 7.81 | 32.94 + 7.4 | 0.071 |
| Ureter | 35.43 + 7.23 | 33.2 + 7.55 | 0.452 |
| Uterosacrals | 34.12 + 7.9 | 32.34 + 6.94 | 0.238 |
| Endometrioma | 32.75 + 6.69 | 35.04 + 9.4 | 0.176 |
| Left Uterosacral | 34.85+7.61 | 31.67+7.12 | 0.032 |
| Right Uterosacral | 33.44+7.67 | 33.28+7.46 | 0.914 |
| Rectum | 33.48 + 7.58 | 3.30 + 7.54 | 0.913 |
| Bladder | 32.76+8.98 | 33.47+7.25 | 0.726 |
| Left uterine wall | 38.5+7.91 | 32.91+7.36 | 0.043 |
| Right uterine wall | 37.13+8.17 | 33.03+7.42 | 0.140 |
| Left ureter | 32.67+6.66 | 33.37+7.57 | 0.873 |
| Right ureter | 35.43+7.23 | 33.2+7.55 | 0.452 |
| Sigmoid | 33.14+9.28 | 33.37+7.43 | 0.939 |
| Parametrium | 28.8+4.02 | 33.59+7.59 | 0.166 |
| Location of lesions | Mean + SD BMI | Mean + SD BMI | P-value |
| Uterine wall | 25.31 + 2.46 | 25.49 + 4.49 | 0.910 |
| Ureter | 24.69 + 3.63 | 25.54 + 4.42 | 0.620 |
| Uterosacrals | 25.48 + 4.96 | 25.48 + 3.44 | 0.998 |
| Endometrioma | 25.71 + 4.54 | 24.86 + 3.82 | 0.390 |
| Left Uterosacral | 25.81+4.91 | 25.1+3.64 | 0.421 |
| Right Uterosacral | 25.42+5.31 | 25.53+3.47 | 0.906 |
| Rectum | 26.70 + 5.71 | 25.01 + 3.65 | 0.082 |
| Bladder | 24.5+3.95 | 25.68+4.43 | 0.309 |
| Left uterine wall | 25.27+2.66 | 25.5+4.47 | 0.896 |
| Right uterine wall | 25.07+2.56 | 25.51+4.47 | 0.798 |
| Left ureter | 26.47+3.72 | 25.45+4.39 | 0.693 |

## Discussion

In a study by Audebert et al. it was shown that the highest prevalence of endometriosis was in the ovary, uterosacral ligament, ovarian cavity, posterior cul-de-sac, and bladder, respectively). Also, the most common site of endometriosis was on the left side of the pelvis. The results of this study showed that the most adhesion is in the adnexa of patients. In this survey, average age of the patients was 33.6 years and average BMI of the

patients was 21.5 kg/m$^2$. Also, the most common site of involvement of deep endometriosis was reported in the ureter in 159 patients (14.4%) **(19)**.

In another study shown by Ajani et al. (2019), the average age of the patients was 35 years, and the most common site of endometriosis lesions was the ovary (bilateral in 28.8% of cases) and fallopian tubes **(20)**. Also, in a study conducted by Yasui and et al., (2015), they examined 210 patients who underwent surgery. It was shown that the prevalence site of endometriosis was ovary, peritoneum, rectum and bladder, respectively **(21)**.

Also, in a study by Jenkins et al. (2008), it was shown that ovarian and posterior broad ligament lesions were more common and anterior cul-de-sac lesions were significantly more than posterior cul-de-sac lesions **(22)**.

In the study of Kadivar et al. in 2013, it was shown that the frequency of extrapelvic endometriosis was 48 cases (14.8%) and 40 cases of abdominal wall endometriosis. Also, abdominal wall endometriosis was observed in 12.3% of endometriosis cases **(23)**. In this study, the frequency of endometriosis was 11.7%cases in the cesarean scar. Also, the results showed that the history of cesarean delivery in patients with abdominal wall endometriosis was more than in other patients with endometriosis **(23)**. In a study conducted by Lee.), it was shown that the prevalence of endometriosis in the ovary was (96.4%) **(24)**.

## Conclusion

Based on our finding and some other studies, demonstrate that the distribution of endometriosis lesions is asymmetric. The results of this study show that the anatomical distribution of endometrioma lesions in this study has the highest percentage related to ovarian endometrioma and the lowest percentage related to vagina. Most of the anatomical distribution after ovarian endometrioma is related to the left uterosacral, right uterosacral, rectum, bladder, uterus and appendix. Also, the highest rate of surface lesions is related to the uterus and bladder, and the lowest is related to the superficial lesions of the cul-de-sac.

## Acknowledgments

## Authors' Contribution

All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Concept and design: BN, MA and NNC. Drafting of the manuscript: NNC, MA and BN. Critical revision of the manuscript for important intellectual content: All authors. Statistical analysis: NNC. Supervision: BN.

## Funding/Support

## Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in the manuscript.

## References

1. Zondervan KT, Becker CM, Koga K, Missmer SA, Taylor RN, Viganò P. Endometriosis. Nat Rev Dis Primers. 2018;4(1):9. [DOI:10.1038/s41572-018-0008-5] [PMID]

2. Dahaghin S, Hosseini Doust R, Mirnejad R. Molecular Detection of Ureaplasma urealyticum and Chlamydia trachomatis in Women with Endometriosis. Iran J Med Microbiol. 2019;13 (2):125-31. [DOI:10.30699/ijmm.13.2.125]

3. Naji Omidi F, Abolghasemi J, Chaichian S, Rimaz S, Najmi Z, Mehdizadehkashi A. Evaluation of the factors influencing endometriosis in reproductive age women. Med Sci J Islamic Azad Univ. 2016;26(3):188-94.

4. Hoorsan H, Mirmiran P, Chaichian S, Moradi Y, Akhlaghdoust M, Hoorsan R, et al. Diet and Risk of Endometriosis: A Systematic Review and Meta-Analysis Study. Iran Red Crescent Med J. 2017;19(9): e41248. [DOI:10.5812/ircmj.41248]

5. Moazzami B, Chaichian S, Samie S, Zolbin MM, Jesmi F, Akhlaghdoust M, et al. Does endometriosis increase susceptibility to COVID-19 infections? A case-control study in women of reproductive age. BMC Women's Health. 2021; 21(1):1-7. [PMID] [PMCID] [DOI:10.1186/s12905-021-01270-z]

6. Sarbazi F, Akbari E, Karimi A, Nouri B, Noori Ardebili SH. The Clinical Outcome of Laparoscopic Surgery for Endometriosis on Pain, Ovarian Reserve, and Cancer Antigen 125 (CA-125): A Cohort Study. Int J Fertil Steril. 2021; 15(4):275-9.

7. Hoorsan H, Alavi Majd H, Chaichian S, Mehdizadehkashi A, Hoorsan R, Akhlaqghdoust M, et al. Maternal Anthropometric Characteristics and Adverse Pregnancy Outcomes in Iranian Women: A Confirmation Analysis. Arch Iran Med. 2018;21(2):61-6.

8. Sarbazi F, Akbari E, Nouri B. Pain Management in Endometriosis. Interv Pain Med Neuromod. 2022;2(1):e128043. [DOI:10.5812/ipmn-128043]

9. Nouri B, Roshandel S. Is Artificial Intelligence a New Diagnostic Approach for Patients with Endometriosis? Interv Pain Med Neuromod. 2022;2(1):e128720. [DOI:10.5812/ipmn-128720]

10. Nouri B, Arab M, nasiri m. Endometriosis: Clinical, Magnetic Resonance Imaging and Pathologic Findings. J Obstet Gynecol Cancer Res. 2022(14):61.

11. Davoodi P, J. Ghadimi D, Rezaei M, Khazei Tabari MA, Shirani A, Nouri B, et al. Endometriosis and COVID-19: Clinical Presentation and Quality of Life, a Systematic Review. J Obstet Gynecol Cancer Res. 2023; 8(4):314-25.

12. Morgan-Ortiz F, López-de la Torre MA, López-Zepeda MA, Morgan-Ruiz FV, Ortiz-Bojórquez JC, Bolívar-Rodríguez MA. Clinical characteristics and location of lesions in patients with deep infiltrating endometriosis using the revised Enzian classification. J Turk Ger Gynecol Assoc. 2019;20(3):133-7. [PMID] [PMCID] [DOI:10.4274/jtgga.galenos.2018.2018.0120]

13. Angioni S, Nappi L, Sorrentino F, Peiretti M, Daniilidis A, Pontis A, et al. Laparoscopic treatment of deep endometriosis with a diode laser: our experience. Arch Gynecol Obstet. 2021;304(5):1221-31. [PMID] [PMCID] [DOI:10.1007/s00404-021-06154-z]

14. Agarwal SK, Chapron C, Giudice LC, Laufer MR, Leyland N, Missmer SA, et al. Clinical diagnosis of endometriosis: a call to action. Am J Obstet Gynecol. 2019;220(4):354-e1-12. [DOI:10.1016/j.ajog.2018.12.039] [PMID]

15. Gui B, Valentini AL, Ninivaggi V, Marino M, Iacobucci M, Bonomo L. Deep pelvic endometriosis: don't forget round ligaments. Review of anatomy, clinical characteristics, and MR imaging features. Abdom Imaging. 2014; 39(3):622-32. [PMID] [DOI:10.1007/s00261-014-0091-3]

16. Albee RB, Sinervo K, Fisher DT. Laparoscopic Excision of Lesions Suggestive of Endometriosis or Otherwise Atypical in Appearance: Relationship Between Visual Findings and Final Histologic Diagnosis. J Minim Invasive Gynecol. 2008;15(1):32-7. [DOI:10.1016/j.jmig.2007.08.619] [PMID]

17. Foti PV, Farina R, Palmucci S, Vizzini IAA, Libertini N, Coronella M, et al. Endometriosis: clinical features, MR imaging findings and pathologic correlation. Insights into Imaging. 2018;9(2):149-72. [PMID] [PMCID] [DOI:10.1007/s13244-017-0591-0]

18. Di Giovanni A, Casarella L, Coppola M, Falcone F, Iuzzolino D, Rasile M, et al. Ultrasound Evaluation of Retrocervical and Parametrial Deep Endometriosis on the Basis of Surgical Anatomic Landmarks. J Minim Invasive Gynecol. 2022;29(10):1140-8. [DOI:10.1016/j.jmig.2022.06.014] [PMID]

19. Audebert A, Petousis S, Margioula-Siarkou C, Ravanos K, Prapas N, Prapas Y. Anatomic distribution of endometriosis: A reappraisal based on series of 1101 patients. Eur J Obstet Gynecol Reprod Biol. 2018;230:36-40. [DOI:10.1016/j.ejogrb.2018.09.001] [PMID]

20. Ajani MA, Salami A, Nwanji ID, Olusanya AA, Fatunla OE. Distribution and Characteristics of Endometriotic Lesions in South-Western Nigeria: A Single Institutional Experience. Med J Zamb. 2019;46(1):28-32. [DOI:10.55320/mjz.46.1.227]

21. Yasui T, Hayashi K, Nagai K, Mizunuma H, Kubota T, Lee J-S, et al. Risk Profiles for Endometriosis in Japanese Women: Results From a Repeated Survey of Self-Reports. J Epidemiol. 2015;25(3):194-203. [PMID] [PMCID] [DOI:10.2188/jea.JE20140124]

22. Jenkins TR, Liu CY, White J. Does Response to Hormonal Therapy Predict Presence or Absence of Endometriosis? J Minim Invasive Gynecol. 2008;15(1):82-6. [DOI:10.1016/j.jmig.2007.09.002] [PMID]

23. Kadivar M, Vafa A, Farahzadi A, Khani S. 6 years evaluation of prevalence of abdominal wall endometriosis in patients with definite histopathological diagnosis of endometriosis admitted in Rasool-Akram, Shariati and Atieh Hospitals in Tehran. Razi J Med Sci. 2012; 18(93):20-6.

24. Lee SY, Koo YJ, Lee DH. Classification of endometriosis. Yeungnam Univ J Med. 2021; 38(1):10-8. [DOI:10.12701/yujm.2020.00444] [PMID]

**How to Cite This Article:**

Nouri, B., Arab, M., Najeddin Choukan, N. Anatomical Sites and Characteristics of EndometriosisLesions: Laparoscopic Investigation. J Obstet Gynecol Cancer Res. 2023; 8(5):494-500.

**Download citation:**        **RIS** | **EndNote** | **Mendeley** |**BibTeX** |