

Ovarian Torsion During Pregnancy

Gebelik Sürecinde Over Torsiyonu

 Sıtkı ÖZBİLGEÇ^a,  Fazıl AVCI^b,  Emine TÜREN DEMİR^a,  Bayram CAN^b,
 Çetin ÇELİK^b,  Ali ACAR^a

^aDepartment of Obstetrics and Gynecology, Necmettin Erbakan University Faculty of Medicine, Konya, Türkiye

^bDepartment of Obstetrics and Gynecology, Selçuk University Faculty of Medicine, Konya, Türkiye

ABSTRACT

Objective: Pregnancy creates a suitable basis for torsion of the adnexa. However, ovarian torsion in pregnancy is not a common condition. In this study, clinical and laboratory results of women who underwent surgery with the diagnosis of ovarian torsion during pregnancy were examined. **Materials and Methods:** Medical records of pregnant women who were operated for ovarian torsion in the obstetrics and gynecology clinics of two university hospitals between 2015-2021 were reviewed. A total of 29 pregnant patients with ovarian torsion, 19 in the first trimester and 10 in the second and third trimesters, were included in the study. **Results:** It was determined that eight of the pregnancies whose data were analyzed within the study were created using assisted reproductive techniques. The pregnant women were divided into two groups according to being in the first and second-third trimesters and they were compared in terms of clinical, laboratory, ultrasonographic findings and delivery methods. There was no statistically significant difference between the analyzed data of the two groups. Ovarian torsion in pregnancy is typically overlooked due to its unclear clinical and objective symptoms. Therefore, it is possible to experience a delay in diagnosing patients. This can be a life-threatening situation for the fetus and mother. **Conclusion:** Surgical treatment is very important for pregnant women diagnosed with ovarian torsion. There should be no delay in diagnosis and treatment. In surgical treatment, detorsioning of the torsioned ovary alone or surgical fixation of the torsioned adnexa to the surrounding tissues in addition to detorsion can be used.

Keywords: Ovarian torsion; pregnancy; doppler USG; surgery

ÖZET

Amaç: Gebelik durumu, adnexlerin torsiyone olması için uygun bir zemin oluşturur. Buna rağmen gebelikte over torsiyonu sık görülen bir durum değildir. Bu araştırmada, hamilelik döneminde over torsiyonu tanısıyla cerrahi geçiren kadınların klinik ve laboratuvar sonuçları incelendi. **Gereç ve Yöntemler:** 2015-2021 yılları arasında iki üniversite hastanesinin kadın hastalıkları ve doğum kliniklerinde, over torsiyonu nedeniyle opere edilen hamile kadınların tıbbi kayıtları incelendi. 19 tanesi birinci trimester, 10 tanesi ise ikinci ve üçüncü trimesterde olmak üzere toplam 29 over torsiyonu gelişmiş gebe hasta çalışmaya dahil edildi. **Bulgular:** Çalışma dahilinde verileri incelenen gebeliklerin sekizinin, yardımcı üreme teknikleri kullanılarak oluşturulduğu tespit edildi. Gebeler, birinci ve ikinci-üçüncü trimesterde olmalarına göre iki gruba ayrılarak klinik, laboratuvar, ultrasonografi bulguları ve doğum şekilleri açısından karşılaştırıldı. İki grubun incelenen verileri arasında istatistiki olarak anlamlı fark bulunmadı. Gebelikte over torsiyonu, belirsiz klinik ve nesnel semptomları nedeniyle tipik olarak göz ardı edilebilir. Bu yüzden hastalara tanı koymada gecikme yaşanması olasıdır. Bu, fetus ve anne için hayatı tehdit edici bir durum oluşturabilir. **Sonuç:** Over torsiyonu tanısı alan gebeler için cerrahi tedavi çok önemlidir. Tanı ve tedavide gecikme olmaması gerekir. Cerrahi tedavide tek başına torsiyone olan overin detorsiyone edilmesi ya da detorsiyona ek olarak torsiyone olan adnexin etraf dokulara cerrahi olarak sabitlenmesi yöntemleri kullanılabilir.

Anahtar Kelimeler: Over torsiyonu; gebelik; doppler USG; cerrahi

TO CITE THIS ARTICLE:

Özbilgeç S, Avcı F, Türen Demir E, Can B, Çelik Ç, Acar A. Ovarian Torsion During Pregnancy. Turkish Journal of Reproductive Medicine and Surgery. 2024;8(1):7-11.

Correspondence: Sıtkı ÖZBİLGEÇ

Department of Obstetrics and Gynecology, Necmettin Erbakan University Faculty of Medicine, Konya, Türkiye

E-mail: sozbilgec@yahoo.com



Peer review under responsibility of Turkish Journal of Reproductive Medicine and Surgery.

Received: 07 Jun 2023

Accepted: 19 Sep 2023

Available online: 23 Oct 2023

2587-0084 / Copyright © 2024 by Reproductive Medicine, Surgical Education, Research and Practice Foundation.
This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Ovarian torsion occurs when the ovary and ligaments that support it in the adnexal region twist inward. Typically, the fallopian tube undergoes torsion at the same time with the ovary, called adnexal torsion (Figure 1). Pregnancy is a risk factor for ovarian torsion on its own. In a retrospective analysis of individuals diagnosed with torsion, it was shown that between 8% and 15% of patients were pregnant.¹

Numerous studies on the prevalence of ovarian torsion during pregnancy have produced widely disparate findings.²⁻⁵ It was shown that torsion occurred at a rate of 15% in a group consisting of 174 pregnant women with an adnexal mass larger than 4 cm.⁶ Torsion occurred at a much lower rate in other groups of pregnant individuals with adnexal masses (1 to 6 percent).^{7,8} Ovarian torsion presents with various nonspecific symptoms and indications, including pelvic discomfort, fever, nausea, and vomiting.⁹ As a result, diagnosis is challenging. The results of physical examinations vary. Although one-third of patients do not exhibit soreness on examination, the majority do.^{2,4} Tenderness may be restricted to one side of the adnexal mass or may be diffuse. A palpable pelvic mass may be present. Peritoneal signs are uncommon but should raise concern for adnexal necrosis. A low-grade fever may be present.

Many individuals have no laboratory abnormalities. In rare cases, anemia may occur due to bleeding from a ruptured corpus luteum cyst. If the infection occurs because of adnexal necrosis, leukocytosis may ensue. If these laboratory results are present in a suspected torsion patient, significant adnexal damage should be evaluated.



FIGURE 1: Ovarian torsion in a patient who was 23 weeks and 4 days pregnant with twins through IVF.

The results of ultrasonography (USG) vary. Diagnosis is much more challenging in pregnant women, since the diagnostic efficiency of USG is diminished due to the larger uterus and ovaries.¹⁰ In comparison to the contralateral ovary, the torsion ovary may seem rounder, larger, and heterogeneous. This might be due to the development of edema, congestion, and/or hemorrhage in the torsion ovary. Doppler flow may be normal, reduced, or absent in a torsion ovary.¹¹ Normal Doppler flow cannot rule out torsion, as preservation of flow may result from partial blockage, intermittent curve or collateral circulation.¹² Doppler flow of the contralateral normal ovary should also be evaluated for comparison.¹¹

Because of the size of the pregnant uterus, surgical therapy of ovarian torsion in a pregnant woman may be technically more complex. Laparoscopic torsion treatment is safe and effective in pregnant individuals; oophoropexy may also be performed.¹³⁻¹⁶

MATERIALS AND METHODS

The clinical and laboratory data of 29 pregnant women who presented to two tertiary medical facilities between 2015 and 2021 with abdominal pain and were surgically diagnosed with ovarian torsion were evaluated in this research. Patients were separated into two groups based on the gestational trimester in which they received ovarian torsion surgery. Patients up to 14 weeks gestation were classified as part of the first group, whereas those with ovarian torsion beyond 14 weeks gestation were classified as part of the second group. Patients' age, presentation complaints, prior obstetric history, current single or multiple pregnancies, use of assisted reproductive techniques, prior history of ovarian hyperstimulation syndrome, torsioned ovarian side, the presence of adnexal mass, type of surgery, number of twists, and laboratory results were all evaluated. This information was obtained using the hospital's patient information management system.

All procedures performed in the current study were approved by the institutional review board (Reference number:3634/2022) in accordance with the 1964 Helsinki Declaration and its later amendments.

All statistical computations were performed using SPSS version 21 (IBM SPSS Statistics, IBM

Corporation, Armonk, NY, USA). The descriptive characteristics of the research (mean, standard deviation) were examined using Descriptive Statistical Tests. The Mann–Whitney U test was used to make comparisons across groups for parameters for which the normal distribution technique could not be used. The Spearman Chi-Square and Fisher’s Exact Test were used to evaluate categorical parameter comparisons. We adopted a 95% confidence CI and a significance level of $p < 0,05$.

RESULTS

In our research, 29 pregnant individuals who were verified to have ovarian torsion surgically were analyzed. Nineteen of these patients were in the first group (first trimester) and 10 were in the second group (second and third trimester). The mean age of the patients in the first group was 31.68, and the mean age of the patients in the second group was 30.7. While 13 of the patients evaluated were pregnant for the first time, 16 of them were multiparous, indicating that they had more than one pregnancy. Of these pregnancies, 8 conceptions were conceived via the use of assisted reproductive technologies. This figure equates to 27.6% of all pregnancies. The ovarian hyperstimulation syndrome (OHSS) was present in 5 of the pregnancies we evaluated in our research, accounting for 17% of the total number of cases. Nine of the individuals investigated (31% of the total number of cases) had prior laparotomy in their history.

The presence of an adnexal mass was found in 22 of the patients. Among the patients, 17 cases had right ovarian torsion and 11 cases had left ovarian torsion. One of the patients had both right and left ovary torsion. Even though 19 of the patients underwent laparotomy, 9 of them were operated with laparoscopic techniques. During one patient’s procedure, laparoscopic surgery was first performed and subsequently modified to laparotomy. The average number of twists, which is defined as the number of twists and turns of the adnexal torsion around itself, was 2.16 in the first group and 2.9 in the second group. None of the patients had a history of ovarian torsion before their treatment. Pelvic discomfort was the most common complaint among all the patients upon admission to the hospital.

While the mean white blood cell count of the patients in the first group was $11.84 \times 1000/\text{ml}$, the mean white blood cell count of the patients in the second group was $12.8 \times 1000/\text{ml}$. Patients in the first group who had CRP measurements had a mean value of 12.36, but the mean value of the second group with CRP measurement was 23.65. Although the mean neutrophil/lymphocyte ratio in the first group was 10.16, it was only 10.07 in the second group.

Comparative clinical and laboratory results of the patients in the first and second groups are shown in [Table 1](#) for the first group and the second group, respectively.

DISCUSSION

In a study on 20 pregnant women published by Chang et al. In 2011, ovarian torsion was seen in 50% of the women during the first trimester of pregnancy.¹⁷ Similarly, in comparable investigations, ovarian torsion during pregnancy was shown to be more common in the first trimester than in the second.^{18,19} In our research, ovarian torsion was seen in the first trimester at a rate of 65 percent, which was higher than the results of the previous studies. A greater prevalence of functional cysts in the first trimester, which raises the risk of ovarian torsion in these women, is the most likely reason for the tendency of most occurrences of maternal ovarian torsion to develop in the first half of pregnancy.²⁰ Lower abdomen discomfort was the most common symptom among all our patients upon admission to the hospital. This application complaint is consistent with other similar studies.^{17,21} Torsion of the left ovary was found in 38% of our patients, whereas the incidence of torsion of the right ovary was found in 62% of our patients. This is consistent with results from other studies of a similar type.^{17,21,22} Since the right utero-ovarian ligament is longer than the left one and/or the left pelvis has the sigmoid colon, which may aid to avoid torsion on that side, the right ovary looks to be more susceptible to torsion than the left one.²³ While 83.4 percent of the pregnant women we evaluated in our research were primigravid, 16.6 percent were multiparous, according to the results of our study. Our research found that although 23 (79 percent) of the

TABLE 1: Characteristics of adnexal torsion cases during pregnancy.

		First Trimester n=19	Second and third trimesters n=10	p value
Year (age)		31,68±4,67	30,7±7,06	0,573
Gravida		2,58±1,68	1,6±0,97	0,094
Parity		0,95±1,22	0,6±0,97	0,456
Adnexal mass	Present	14	7	0,581
	Absent	5	3	
Side	Right	12	6	0,589
	Left	7	4	
Pregnancy week, week		9,42± 2,74	21,70±4,06	0,001
Pregnancy status	Singleton	13	9	0,277
	Multiple	5	1	
Crp level, Measurement value		12,36±9,7	23,65±22,96	0,266
Wbc (*1000/ml)		11,84±2,54	12,8 ±2,29	0,247
Neutrophil/lymphocyte ratio		10,16±7,66	10,07±8,14	0,982
Twist count		2,16±0,96	2,9±1,19	0,094
Recurrence, number		0	0	
OHSS	Present	4	1	0,424
	Absent	15	9	
Laparotomy history	Present	5	4	0,364
	Absent	14	6	
Type of surgery	Laparotomy	13	7	0,636
	Laparoscopy	6	3	
ART	Present	6	2	0,419
	Absent	13	8	
Type of birth	Vb	12	6	0,589
	Cs	7	4	

Crp: C reactive peptide, OHSS: Ovarian hyperstimulation syndrome, ART: Assisted reproductive technic, Vb: Vaginal birth, Cs: Caesarean section.

pregnant women we evaluated were carrying singletons, 5 (17 percent) were carrying twins, and one (4 percent) was carrying triplets.

A key risk factor for ovarian torsion during pregnancy, according to some researches, is the use of assisted reproductive technologies (ARTs).^{18,24} When women undergo regulated ovarian stimulation, the frequency of ovarian torsion in pregnancy rises to 6 percent, and in situations of ovarian hyperstimulation syndrome, the risk rises to 16 percent.²⁵ In three retrospective case-control investigations, it was shown that ovarian hyperstimulation was a contributing factor in 48-73 percent of ovarian torsion in pregnancies produced by ovulation stimulation or in vitro fertilization.¹⁸⁻²⁰ According to our results, 27.5 percent of patients who had assisted reproductive procedures were pregnant, whereas

17% of patients developed ovarian hyperstimulation syndrome. When the neutrophil/lymphocyte ratio was calculated based on the laboratory results of the patients, we discovered that the ratio was 8.68 in the first group of patients. This rate was 6.43 percent in the second group. In a study on 20 non-pregnant ovarian torsion cases conducted by Eric and Balcı in 2018, they discovered a neutrophil/lymphocyte ratio of 7.27.²⁶ The participants in our study who were in their first trimester, as well as those who were in their second and third trimesters, had a greater incidence of miscarriage.

Laparoscopy was performed in 24 (66 percent) of 36 pregnant patients in the research conducted by Balcı et al. in 2018, while laparotomy was performed in 12 (32 percent) of 36 pregnant patients (34 percent).²⁷ In our study, 20 patients (68%) were operated

on by laparotomy, while 9 (32%) were operated on by laparoscopy.

CONCLUSION

In conclusion, ovarian torsion that developed during pregnancy occurred mostly during the first trimester of the woman's pregnancy. Ovarian torsion occurred easier by the introduction of assisted reproductive procedures and ovarian hyperstimulation syndrome. In our clinic, laparotomy was favoured over hysterectomy, which was contrary to the typical practice. The study's limitations include the retrospective nature of the data gathering and the small number of instances included. However, since ovarian torsion in pregnant women is an uncommon occurrence, it is difficult to gather enough data to undertake bigger, prospective research on the subject.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Sitki Özbilgeç; **Design:** Emine Türen Demir; **Control/Supervision:** Çetin Çelik, Ali Acar; **Data Collection and/or Processing:** Bayram Can; **Analysis and/or Interpretation:** Fazıl Avcı; **Literature Review:** Sitki Özbilgeç; **Writing the Article:** Sitki Özbilgeç; **Critical Review:** Ali Acar.

REFERENCES

- Mahonski S, Hu KM. Female Nonobstetric Genitourinary Emergencies. *Emerg Med Clin North Am.* 2019;37(4):771-84. [Crossref] [PubMed]
- Houry D, Abbott JT. Ovarian torsion: a fifteen-year review. *Ann Emerg Med.* 2001;38(2):156-9. [Crossref] [PubMed]
- White M, Stella J. Ovarian torsion: 10-year perspective. *Emerg Med Australas.* 2005;17(3):231-7. [Crossref] [PubMed]
- Tsafir Z, Hasson J, Levin I, Solomon E, Lessing JB, Azem F. Adnexal torsion: cystectomy and ovarian fixation are equally important in preventing recurrence. *Eur J Obstet Gynecol Reprod Biol.* 2012;162(2):203-5. [Crossref] [PubMed]
- Johnson TR Jr, Woodruff JD. Surgical emergencies of the uterine adnexae during pregnancy. *Int J Gynaecol Obstet.* 1986;24(5):331-5. [Crossref] [PubMed]
- Yen CF, Lin SL, Murk W, Wang CJ, Lee CL, Soong YK, Arici A. Risk analysis of torsion and malignancy for adnexal masses during pregnancy. *Fertil Steril.* 2009;91(5):1895-902. [Crossref] [PubMed]
- Bromley B, Benaceraf B. Adnexal masses during pregnancy: accuracy of sonographic diagnosis and outcome. *J Ultrasound Med.* 1997;16(7):447-52; quiz 453-4. [Crossref] [PubMed]
- Schmeler KM, Mayo-Smith WW, Peipert JF, Weitzen S, Manuel MD, Gordinier ME. Adnexal masses in pregnancy: surgery compared with observation. *Obstet Gynecol.* 2005;105(5 Pt 1):1098-103. [Crossref] [PubMed]
- Cohen A, Solomon N, Almog B, Cohen Y, Tsafir Z, Rimon E, Levin I. Adnexal Torsion in Postmenopausal Women: Clinical Presentation and Risk of Ovarian Malignancy. *J Minim Invasive Gynecol.* 2017;24(1):94-7. [Crossref] [PubMed]
- Oelsner G, Shashar D. Adnexal torsion. *Clin Obstet Gynecol.* 2006;49(3):459-63. [Crossref] [PubMed]
- Albayram F, Hamper UM. Ovarian and adnexal torsion: spectrum of sonographic findings with pathologic correlation. *J Ultrasound Med.* 2001;20(10):1083-9. [Crossref] [PubMed]
- Adnexal Torsion in Adolescents: ACOG Committee Opinion No. 783. *Obstet Gynecol.* 2019;134(2):e56-e63. [Crossref] [PubMed]
- Djavadian D, Braendel W, Jaenicke F. Laparoscopic oophorectomy for the treatment of recurrent torsion of the adnexa in pregnancy: case report and review. *Fertil Steril.* 2004;82(4):933-6. [Crossref] [PubMed]
- Mathevet P, Nessah K, Dargent D, Mellier G. Laparoscopic management of adnexal masses in pregnancy: a case series. *Eur J Obstet Gynecol Reprod Biol.* 2003;108(2):217-22. [Crossref] [PubMed]
- Bisharah M, Tulandi T. Laparoscopic surgery in pregnancy. *Clin Obstet Gynecol.* 2003;46(1):92-7. [Crossref] [PubMed]
- Upadhyay A, Stanten S, Kazantsev G, Horoupan R, Stanten A. Laparoscopic management of a nonobstetric emergency in the third trimester of pregnancy. *Surg Endosc.* 2007;21(8):1344-8. [Crossref] [PubMed]
- Chang SD, Yen CF, Lo LM, Lee CL, Liang CC. Surgical intervention for maternal ovarian torsion in pregnancy. *Taiwan J Obstet Gynecol.* 2011;50(4):458-62. [Crossref] [PubMed]
- Hasson J, Tsafir Z, Azem F, Bar-On S, Almog B, Mashiach R, et al. Comparison of adnexal torsion between pregnant and nonpregnant women. *Am J Obstet Gynecol.* 2010;202(6):536.e1-6. [Crossref] [PubMed]
- Smorgick N, Pansky M, Feingold M, Herman A, Halperin R, Maymon R. The clinical characteristics and sonographic findings of maternal ovarian torsion in pregnancy. *Fertil Steril.* 2009;92(6):1983-7. [Crossref] [PubMed]
- Bider D, Mashiach S, Dulitzky M, Kokia E, Lipitz S, Ben-Rafael Z. Clinical, surgical and pathologic findings of adnexal torsion in pregnant and nonpregnant women. *Surg Gynecol Obstet.* 1991;173(5):363-6.
- Wu WF, Wang ZH, Xiu YL, Xie X, Pan M. Characteristics and surgical intervention of ovarian torsion in pregnant compared with nonpregnant women. *Medicine (Baltimore).* 2020;99(24):e20627. [Crossref] [PubMed] [PMC]
- Kayabasoglu F, Aydogdu S, Yilmaz SE, Sarica E. Torsion of the previously normal uterine adnexa in the second trimester of pregnancy. *Arch Gynecol Obstet.* 2010;282(6):655-8. [Crossref] [PubMed]
- Beaunoyer M, Chapdelaine J, Bouchard S, Ouimet A. Asynchronous bilateral ovarian torsion. *J Pediatr Surg.* 2004;39(5):746-9. [Crossref] [PubMed]
- Rackow BW, Patrizio P. Successful pregnancy complicated by early and late adnexal torsion after in vitro fertilization. *Fertil Steril.* 2007;87(3):697.e9-12. [Crossref] [PubMed]
- Mashiach S, Bider D, Moran O, Goldenberg M, Ben-Rafael Z. Adnexal torsion of hyperstimulated ovaries in pregnancies after gonadotropin therapy. *Fertil Steril.* 1990;53(1):76-80. [Crossref] [PubMed]
- Eriç Horasanlı J, Balci O. Over Torsiyonlarında Nötrofil/Lenfosit Oraninin Tanısal Değeri. *Bozok Tıp Dergisi.* 2018;8(4):122-6. [Crossref]
- Balci O, Energin H, Gökemli H, Acar A. Management of Adnexal Torsion: A 13-Year Experience in Single Tertiary Center. *J Laparoendosc Adv Surg Tech A.* 2019;29(3):293-7. [Crossref] [PubMed]