**Chron Precis Med Res** 2022; 3(3): 164-167
**DOI:** 10.5281/zenodo.7195850

ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

# The Clinical Characteristics and Ultrasonographic Findings of Ovarian Torsion: One-Year Tertiary Center Experience

## Over Torsiyonunun Klinik Özellikleri ve Ultrasonografik Bulguları: Bir Yıllık Tersiyer Merkez Deneyimi

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## ABSTRACT

**Aim**: We aimed to determine the clinical characteristics, diagnostic features and ultrasonographic (USG) findings of ovarian torsion.

**Material and Method:** Overall 264 patients diagnosed with ovarian torsion between April 2020 and April 2021 were analyzed, retrospectively. Patients requiring surgical and medical treatment were compared with those requiring only medical treatment regarding demographic characteristics clinical and USG findings.

**Results**: Of all diagnosed ovarian torsion surgically, 82 (47.95%) was detected in the right-sided and 89 (52.04%) in the left-sided. The mean diameter of affected ovaries by torsion was significantly higher than that measured in normal ovaries (69.2±25.2 mm vs 11.1±7.9 mm) ($p<0.05$). Blood flow was not revealed in 8.5% of affected ovaries based on transvaginal and transabdominal USG findings. Patients who examined only transabdominal USG had 45.7% incorrect negative diagnoses. Transvaginal USG has higher accuracy in detecting ovarian torsion ($p<0.05$). Also, when patients have chronic diseases the probability of ovarian torsion can be higher ($p<0.05$). All the statistical tests were considered significant at $p<0.05$

**Conclusion**: We re-demonstrates the challenges of diagnosing ovarian torsion and the limitations of USG, specifically colour Doppler. Transvaginal USG is strongly recommended in case of clinical doubtfulness to torsion. It can be an excellent choice to perform sonography by a radiologist when possible.

**Keywords**: Ovarian torsion, USG, transvaginal ultrasonography

## ÖZ

**Amaç**: Over torsiyonunun klinik özelliklerini, tanısal özelliklerini ve ultrasonografik (USG) bulgularını belirlemeyi amaçladık.

**Gereç ve Yöntem:** Nisan 2020 ile Nisan 2021 arasında over torsiyonu tanısı konan toplam 264 hasta retrospektif olarak analiz edildi. Cerrahi ve medikal tedavi gerektiren hastalar ile sadece medikal tedavi gerektiren hastalar demografik özellikleri, klinik ve USG bulguları açısından karşılaştırıldı.

**Bulgular**: Cerrahi olarak doğrulanan tüm over torsiyonlarının 82'si (%47.95) sağda, 89'u (%52.04) sol tarafta tespit edildi. Torsiyone olan overlerin ortalama çapı, normal normal overlerden anlamlı derecede daha yüksekti (69.2±25.2 - 11.1±7.9 mm) ($p<0.05$). Transvajinal ve transabdominal USG bulgularına göre torsiyone overlerin sadece %8.5'inde kan akımı saptanmadı. Sadece transabdominal USG uygulanan hastalarda %45.7 yanlış negatiflik vardı. Transvajinal USG over torsiyonunu saptamada daha yüksek sensitiviteye sahipti ($p<0.05$). Ayrıca kronik hastalığı olan hastalarda over torsiyonu olasılığı daha yüksekti ($p<0.05$). Tüm istatistiksel testler $p<0.05$'te anlamlı kabul edildi

**Sonuç**: Transvajinal USG over torsiyonunu saptamada daha yüksek sensitiviteye sahiptir ve tanı iin öncelikle tercih edilmelidir.

**Anahtar Kelimeler:** Over torsiyonu, USG, transvajinal ultrasonografı

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**Başvuru Tarihi/Received:** 24.09.2022
**Kabul Tarihi/Accepted:** 04.10.2022

## INTRODUCTION

As the ovaries rotate around their own axis and vascular peduncle, they become torsioned, and as a result, disruptions in arterial, venous or lymphatic drainage occur in both arterial and venous system and lymphatic drainage. If this continues for a long time, infarct, massive congestion, and necrosis develop (1, 2).

Ovarian torsion is one of the most common gynecological emergencies in women (3). Patients often consult a doctor with complaints of abdominal pain, nausea and vomiting (3, 4). Diagnosing is not always easy. There is no specific laboratory finding for diagnosis, and imaging methods are frequently used (5, 6). The first imaging method used in diagnosis is ultrasonography (7). Both abdominal and transvaginal USG can be used. Especially Doppler USG is the most commonly used method, and its diagnostic success is quite high (7). On the other hand, magnetic resonance imaging (MRI) is also used in some cases because the patient may miss it (8, 9).

Our aim in this study is to analyze the clinical findings of women who are thought to have ovarian torsion and to determine the true diagnosis after the operation. To compare the abdominal and transvaginal USG findings of the patients and to evaluate the results.

## MATERIAL AND METHOD

Patients diagnosed with ovarian torsion were retrospectively between 01/04/2020 and 01/04/2021 in the tertiary gynecology center. Patients under the age of 18 and over the age of 45 and pregnant patients at the time of diagnosis of ovarian torsion were not accepted. Ethics committee approval was given by the local medical faculty scientific research ethics committee (Date: 2021, No: 2021-195). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

A gynecology specialist recommends patients under transabdominal sonography (Volusan GE) using 2-5 MHZ probes and 4-9 MHZ endocavity probes. In addition, transabdominal sonography was performed by a radiologist on the same day for all patients. Both transabdominal sonography results were compared with the definitive postoperative outcomes.

Data were analyzed using the SPSS 25.0 (IBM, Armonk, NY: IBM Corp.) program. Continuous variables were expressed as mean ± standard deviation, median (interquartile range, IQR), and categorical variables as numbers (n) and percentages (%). Student's t-test and Mann-Whitney U test were used to compare differences between independent groups.

## RESULTS

A total of 264 patients were analyzed and the mean age was 31,97±8,66 years (Table 1). Also, the mean age women who diagnosed and not diagnosed ovarian torsion were 32.1±8.7 and 31.8±8.7 years (Table 1). While the majority of patients (92.0%) presented with complaints of pain (abdominal/groin), 6.1% (n=16) also had vaginal discharge and 4.5% (n=12) had vaginal bleeding (Table 1). There was no statistical significance between the two groups (p=0.795). Sixteen of those were diagnosed with ovarian torsion, and 28 patients were diagnosed with other diseases via surgery. When we underwent surgical intervention to the patients we had diagnosis of study participants included: 171 torsion (64.8%), ovarian cyst/ruptured ovarian cysts/ hemorrhagic cyst 56 (21.2%), endometrioma/ruptured endometrioma 10 (3.8%), appendicitis 9 (3.4%), pelvic/ adnexial mass 7 (2,7%), pelvic inflammatory disease (PID) 5 (1.9%), omentum torsion 3 (1.1%), ectopic pregnancy 3 (1.1%) (**Table 1**).

**Table 1. Demographic characteristics of women with ovarian torsion.**

| | |
|---|---|
| Age (year) [mean (±SD)] | 31.97 (±8.66) |
| Ovarian torsion | 32.1 (±8.7) |
| Other | 31.8 (±8.7) |
| Complaints [n (%)] | |
| Pain (abdominal/groin) | 243 (92.0) |
| Vaginal discharge | 16 (6.1) |
| Vaginal bleeding | 12 (4.5) |
| Diagnosis [n (%)] | |
| Ovarian torsion | 171 (64.8) |
| Ovarian cyst | 56 (21.2) |
| Endometrioma | 10 (3.8) |
| Appendicitis | 9 (3.4) |
| Pelvic/adnexial mass | 7 (2.7) |
| PID | 5 (1.9) |
| Omentum torsion | 3 (1.1) |
| Ectopic pregnancy | 3 (1.1) |
| Comorbidity [n (%)] | |
| - | 128 (89.5) |
| + | 15 (10.5) |

PID: pelvic inflammatory disease, SD: standart deviation

According to our statistical analysis, there is no correlation between ovarian torsion and count of previous pregnancy (p=0.236) and count of final delivery (p=0.167). However, we found that when patients have chronic diseases (diabetes mellitus, hypertension, coroner artery syndrome), the probability of ovarian torsion can be higher (p<0.05).

The transvaginal ultrasound correctly diagnosed 74.3% of ovarian torsion cases and missed 25.7% of these cases (false negatives). However, patients who examined only transabdominal ultrasonography had 45.7% incorrect negative diagnoses. Transvaginal ultrasonography has

higher accuracy in detecting ovarian torsion ($p<0.05$). The ultrasonography performed by gynecologists (whether transvaginal or transabdominal) had 36.5% false negativity. But radiology specialists have 12.3% false negativity, and there was a statistically meaningful relationship between the two groups ($p<0.05$).

Of all diagnosed ovarian torsion surgically, 82 (47.9%) was detected in the right-sided and 89 (52.0%) in the left-sided. The mean diameter of affected ovaries by torsion was significantly higher than that measured in normal ovaries (69.23 ± 25.21 mm versus 11.15±7.85 mm) ($p<0.05$). Blood flow was not revealed in 8.5% of affected ovaries based on transvaginal and transabdominal sonography findings.

## DISCUSSION

This study sought to determine the value of gynecologists' and radiologists' transvaginal and transabdominal USG assessment for diagnosing ovarian torsion compared to surgical observation.

The frequency of ovarian torsion in gynecological emergencies in women is reported to be 2.7%. Although it is generally seen in all age groups, it occurs more frequently in women of reproductive age (13, 14). In our study, similar to the literature, the mean age of women with ovarian torsion was found to be 32.1±8.7 years and all of them were in the reproductive period.

Sometimes difficulties may be experienced during diagnosis. Since appendicitis, nephrolithiasis, acute gastroenteritis and diverticulitis in the differential diagnosis will create the same picture, there are delays in the diagnosis. After this delay, necrosis in the torsioned ovary may cause patients to lose their ovaries or decrease their follicle reserve (15, 16). Therefore, appropriate radiological imaging method should be used for timely and accurate diagnosis. Radiological imaging is necessary to facilitate early diagnosis and timely surgical intervention. In our study, endometrioma (3.8%), appendicitis (3.4%), PID (1.9%), omental torsion (1.1%) and ectopic pregnancy (1.1%) were seen in patients who were operated for ovarian torsion.

The first method used in diagnosis is USG. It is used as the first imaging tool in ovarian torsion because it can be used both abdominal and transvaginal, does not contain radiation, and can be applied immediately (17, 18). Especially Doppler USG is very valuable during diagnosis. However, cut-off values are not available due to ovarian blood flow variations, although they give very important findings during diagnosis. In the literature, it has been reported that Doppler USG can diagnose 87% of ovarian torsion (19). In addition, Doppler USG has been shown to have arterial flow loss in only 60-73% of patients with ovarian torsion (20, 21). The basic USG method in the evaluation of pelvic pain is transvagimal USG (22). The most important advantage is that it shows the anatomy of the ovaries and the findings of the disease with high resolutions (23). In our study, the detection rate of trosion by transvaginal USG was significantly higher than transabdominal USG. Transvaginal ultrasonography is a better option for diagnosing ovarian torsion when it's possible to perform.

Limitations of this study; (1) being a single-center study (2) There is no any information on the number of acute abdomen.

## CONCLUSION

Our study re-demonstrates the challenges of diagnosing ovarian torsion and the limitations of ultrasound, specifically colour doppler. The diagnosis of adnexal torsion remains a challenging mission. According to the study findings, transvaginal sonography is strongly recommended in case of clinical doubtfulness to torsion. It can be an excellent choice to perform sonography by a radiologist when possible.

## ETHICAL DECLARATIONS

**Ethics Committee Approval:** The study was initiated with the approval of the Demiroglu Bilim University, Ethics Committee (Date: 07-04-2021, No: 2021-129).

**Informed Consent:** Because the study was designed retrospectively, no written informed consent form was obtained from patients.

**Referee Evaluation Process:** Externally peer-reviewed.

**Conflict of Interest Statement:** The authors have no conflicts of interest to declare.

**Financial Disclosure:** The authors declared that this study has received no financial support.

**Author Contributions:** All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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