

Bibliographic Analysis of Ovarian Torsion

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Abstract: Background: Ovarian torsion is a critical gynecological emergency that demands rapid diagnosis and immediate surgical management to prevent tissue necrosis and preserve ovarian function. Over recent decades, clinical management has undergone a significant evolution from radical surgery to fertility-preserving, conservative approaches. **Objective:** This bibliographic analysis aimed to evaluate the scientific literature on ovarian torsion published between 1990 and 2025, tracking historical developments, current clinical trends, and identifying prominent gaps in existing research. **Methods:** A comprehensive literature search was conducted across major electronic databases (PubMed, Scopus, Web of Science, and Google Scholar) using targeted keywords related to ovarian torsion, diagnostics, and surgical interventions. Peer-reviewed clinical studies, reviews, and case reports published in English were selected based on strict inclusion and exclusion criteria, followed by a qualitative synthesis of the data. **Results:** The bibliographic analysis revealed a substantial increase in publications over the past thirty years, alongside a clear paradigm shift from radical oophorectomy to conservative laparoscopic detorsion. While Doppler ultrasonography remains the primary diagnostic modality, the literature underscores that normal blood flow cannot entirely exclude torsion, highlighting an ongoing diagnostic challenge. Laparoscopic detorsion was consistently associated with shorter hospital stays, quicker recovery, and successful preservation of ovarian viability, even in cases presenting with initial ischemic appearance. Furthermore, research focusing on pediatric and adolescent populations has steadily grown due to the vital importance of protecting future reproductive potential. **Conclusion:** The management of ovarian torsion has successfully transitioned toward minimally invasive, fertility-conserving approaches. However, the current body of literature remains limited by a lack of standardized diagnostic criteria, a scarcity of randomized controlled trials, and insufficient long-term follow-up data regarding future fertility outcomes. Continued research in these areas is crucial to optimize clinical decision-making and patient care.

Keywords: Ovarian torsion; Adnexal torsion; Gynecological emergency; Laparoscopic detorsion; Doppler ultrasonography; Fertility preservation; Conservative surgery; Ovarian viability. Introduction.

INTRODUCTION

Ovarian torsion is a serious gynecological emergency caused by the ovary twisting around the ligaments that support it, leading to reduced or completely blocked blood flow. This condition can also affect the fallopian tube and is generally referred to as adnexal torsion [Sasaki, K. J., & Miller, C. E. 2014; Adnexal Torsion in Adolescents, 2019]. Ovarian torsion primarily affects women of reproductive age, though it can also occur in children and postmenopausal women. Early diagnosis and emergency surgical intervention are critical for preserving ovarian function and preventing complications such as tissue necrosis, infertility, and infection [Oelsner, G. *et al.*, 2003; Damigos, E. *et al.*, 2012]. The clinical presentation of ovarian torsion is often nonspecific, which makes diagnosis challenging for healthcare professionals. Patients frequently present with sudden lower abdominal pain, nausea, vomiting, and tenderness; these symptoms can mimic other abdominal or gynecological conditions such as appendicitis or ectopic pregnancy [Houry, D., & Abbott, J. T. 2001; Huchon, C. *et al.*, 2010; Spinelli, C. *et al.*, 2013; Dasgupta, R. *et al.*, 2018]. Advances in imaging techniques, particularly Doppler ultrasound, have improved diagnostic accuracy; however, a

definitive diagnosis is still frequently confirmed during surgery. Over the years, treatment strategies for ovarian torsion have evolved significantly [Mandelbaum, R. S. *et al.*, 2020; Chang, H. C. *et al.*, 2008; Vijayaraghavan, S. B. 2004; Cohen, S. B. *et al.*, 1999]. While earlier approaches favored removal of the affected ovary due to concerns about thromboembolic complications, current evidence supports conservative laparoscopic detorsion and ovarian preservation whenever possible. Growing research interest focuses on preserving fertility and minimally invasive s

METHOD

This bibliographic analysis was conducted to critically evaluate the current scientific literature on ovarian torsion. The study placed particular emphasis on diagnosis, treatment approaches, surgical outcomes, preservation of fertility, and recent developments in clinical management. The study aimed to identify the main trends in published research, evaluate developments in management strategies, and highlight gaps that require future research. The relevant literature was collected from internationally recognized electronic databases such as PubMed, Scopus, Web of Science, and Google Scholar. These

databases were selected because they provide access to peer-reviewed medical and scientific publications that comprehensively cover research in gynecology and emergency medicine. The literature review included articles published between 1990 and 2025 to examine both historical developments and recent advancements in the management of ovarian torsion. The search strategy included the use of specific keywords such as “ovarian torsion,” “adnexal torsion,” “gynecological emergency,” “laparoscopic detorsion,” “Doppler ultrasound,” “ovarian preservation,” and “fertility outcomes.” Boolean operators such as AND and OR were used to combine search terms and enhance the accuracy of the results. To ensure a comprehensive literature review, additional references were identified by reviewing the references of the selected articles. Inclusion criteria comprised peer-reviewed journal articles, review articles, retrospective and prospective clinical studies, case-control studies, and case reports addressing ovarian torsion in pediatric, adolescent, and adult populations. Only studies published in English and containing sufficient clinical or research data were included. Articles with missing relevant information, duplicate publications, conference abstracts without full text, and non-English publications were excluded from the analysis. Following the selection process, the articles were carefully reviewed and categorized based on publication year, study design, diagnostic methods, treatment approaches, patient demographics, and clinical outcomes. Special emphasis was placed on studies focusing on minimally invasive surgical techniques, fertility-preserving treatments, and advancements in diagnostic imaging. The data were then analyzed to identify recurring concepts and emerging. The findings from the selected studies were synthesized qualitatively to provide a comprehensive overview of the development of ovarian torsion research over time. This bibliographic methodology enabled the identification of major improvements in diagnostic accuracy and treatment strategies while also highlighting limitations in current literature, including the lack of standardized diagnostic criteria and long-term fertility outcome studies.

RESULTS

A bibliographic analysis revealed a significant increase in the number of studies published on ovarian torsion between 1990 and 2025. A total of relevant peer-reviewed articles, review articles, clinical studies, and case reports from major

scientific databases were examined. The findings showed that significant progress has been made in the understanding, diagnosis, and treatment of ovarian torsion over the past thirty years. The literature review revealed that most studies focused on women of reproductive age; however, the number of publications addressing pediatric and adolescent cases is steadily increasing. Studies published prior to the early 2000s emphasized radical surgical treatment, particularly oophorectomy, primarily due to concerns regarding tissue necrosis and thromboembolic complications following detorsion. However, more recent studies strongly support conservative surgical treatment aimed at preserving ovarian function and fertility. The review also demonstrated that ultrasonography, particularly Doppler ultrasonography, remains the most commonly used diagnostic imaging technique. Numerous studies have reported that findings such as ovarian enlargement, peripheral displacement of follicles, and reduced or absent blood flow are common indicators of ovarian torsion. However, several publications have emphasized that normal Doppler blood flow does not completely rule out torsion, highlighting the ongoing diagnostic challenge associated with this condition. Minimally invasive laparoscopic surgery was identified as the preferred treatment approach in the majority of recent studies. Compared with open surgical procedures, laparoscopy was consistently associated with shorter hospital stays, faster recovery, reduced postoperative pain, and improved fertility preservation. Conservative detorsion procedures were shown to restore ovarian function successfully in many patients, even in cases where the ovary initially appeared ischemic or necrotic during surgery.

The literature further indicated growing research interest in fertility preservation and long-term reproductive outcomes. Several studies demonstrated successful recovery of ovarian activity following conservative treatment. Pediatric and adolescent ovarian torsion also emerged as an important research area due to difficulties in diagnosis and the importance of preserving future fertility in younger patients. Geographical analysis of publications showed that North America and Europe contributed the largest proportion of ovarian torsion research, although studies from Asia, the Middle East, and developing countries increased significantly in recent years. Despite advancements, the analysis identified persistent gaps in literature, including limited randomized

controlled trials, absence of standardized diagnostic criteria, and insufficient long-term

follow-up studies evaluating fertility outcomes after conservative management.

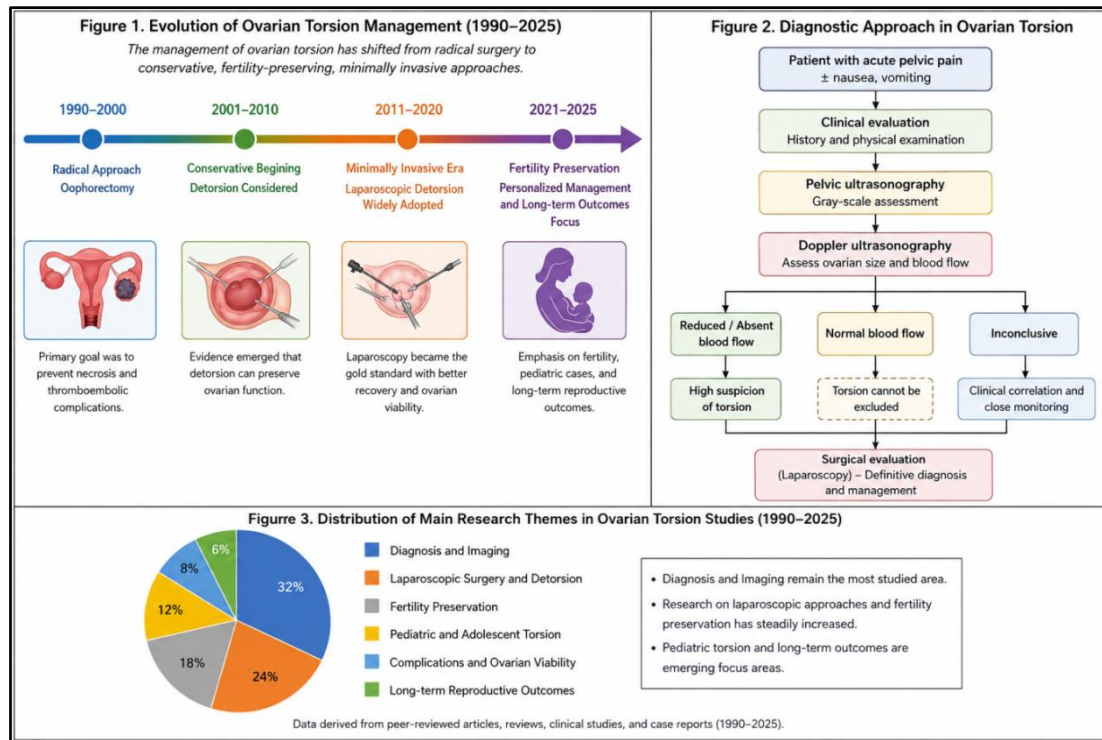


Table 1: Evolution of Diagnostic and Therapeutic Strategies for Ovarian Torsion (1990–2025)

Period	Main Diagnostic Method	Preferred Treatment	Main Research Focus
1990–2000	Clinical examination and ultrasound	Oophorectomy	Prevention of necrosis and complications
2001–2010	Doppler ultrasonography	Conservative surgery	Early diagnosis and ovarian preservation
2011–2020	Advanced imaging techniques	Laparoscopic detorsion	Fertility preservation and minimally invasive surgery
2021–2025	Combined imaging and clinical evaluation	Conservative laparoscopic management	Long-term reproductive outcomes and pediatric cases

Table 2: Most Frequently Reported Clinical and Ultrasonographic Findings in Ovarian Torsion

Clinical Finding	Frequency Reported in Literature
Sudden lower abdominal pain	Very common
Nausea and vomiting	Common
Pelvic tenderness	Common
Adnexal mass	Moderate
Fever	Less common
Reduced or absent Doppler flow	Frequently reported
Ovarian enlargement	Frequently reported

Table 3: Comparison of Clinical Outcomes Between Laparoscopic and Open Surgical Management of Ovarian Torsion

Parameter	Laparoscopic Surgery	Open Surgery
Hospital stay	Shorter	Longer
Recovery time	Faster	Slower
Postoperative pain	Reduced	Increased
Cosmetic outcome	Better	Moderate
Fertility preservation	Higher	Lower
Surgical complications	Lower	Higher

DISCUSSION

The findings of this literature review indicate that there has been significant progress in the understanding and treatment of ovarian torsion over the past few decades [Shalev, J. *et al.*, 1989]. Earlier literature focused primarily on emergency surgical intervention and removal of the affected ovary due to concerns about irreversible tissue damage and potential thromboembolic complications following detorsion. However, recent studies strongly support conservative surgical approaches aimed at preserving ovarian tissue and maintaining reproductive function, particularly in young women and adolescents [Oelsner, G. *et al.*, 1993; Ashwal, E. *et al.*, 2015; Fuchs, N. *et al.*, 201]. One of the key themes identified in the reviewed literature is that early and accurate diagnosis remains challenging. Ovarian torsion often presents with nonspecific symptoms that overlap with other gynecological and gastrointestinal conditions, such as acute abdominal pain, nausea, and vomiting [Yasa, C. *et al.*, 2017; Guthrie, B. D. *et al.*, 2010]. Although Doppler ultrasound has become the preferred diagnostic imaging technique, the literature consistently notes that normal ovarian blood flow does not completely rule out torsion. This finding underscores the importance of integrating imaging results with clinical judgment and maintaining a high degree of suspicion in questionable cases [Tobiume, T. *et al.*, 2011; Chapron, C. *et al.*, 1996].

The increased use of minimally invasive laparoscopic surgery represents one of the most important advancements in ovarian torsion management [Balasubramaniam, D. *et al.*, 2020]. Compared with traditional open surgery, laparoscopic procedures provide several advantages, including reduced postoperative pain, shorter hospitalization, quicker recovery, and improved cosmetic outcomes. More importantly, conservative laparoscopic detorsion has been shown to preserve ovarian viability even when the ovary appears necrotic during surgery [White, M., & Stella, J. 2005; Descargues, G. *et al.*, 2001; Bertozzi, M. *et al.*, 2017; Santos, X. M. *et al.*, 2015]. This shift toward ovarian conservation reflects the growing emphasis on fertility preservation in gynecologic practice. The analysis also revealed increasing research attention toward pediatric and adolescent ovarian torsion [Shadinger, L. L. *et al.*, 2008; Huchon, C. *et al.*, 2012; Huang, C. *et al.*, 2017; Gupta, A. *et al.*, 2020]. Early diagnosis in younger patients remains

challenging because symptoms may be vague or atypical. Delayed treatment in this population can significantly affect future reproductive potential, making prompt recognition essential. Consequently, recent studies recommend greater awareness among emergency physicians and pediatric specialists [Tsafirir, Z. *et al.*, 2012; Chen, M. *et al.*, 2001; Akdam, A. *et al.*, 2022].

Despite considerable progress, several limitations remain within the current body of literature. Most available studies are retrospective and involve relatively small sample sizes, limiting the strength of evidence. In addition, there is still no universally accepted diagnostic guideline for ovarian torsion, and long-term studies evaluating reproductive outcomes after conservative treatment remain limited [Gorkemli, H. *et al.*, 2002; Nair, S. *et al.*, 2014]. Overall, the literature demonstrates a clear transition from radical surgical management to fertility-preserving conservative approaches. Continued research focusing on standardized diagnostic criteria, advanced imaging techniques, and long-term fertility outcomes will be essential for improving patient care and clinical decision-making in ovarian torsion management [Nichols, D. H., & Julian, P. J. 1985].

This bibliographic analysis of Ovarian Torsion has several limitations that should be considered. First, the review included only articles published in English, which may have excluded relevant studies published in other languages. Second, many of the studies available in the literature were retrospective in design and involved relatively small patient populations, limiting the overall strength and generalizability of the findings. Differences in study methodologies, diagnostic criteria, and treatment protocols also made direct comparison between studies difficult. In addition, some older studies lacked advanced imaging techniques and long-term follow-up data, which may affect the accuracy of historical comparisons. The analysis primarily focused on published peer-reviewed literature, and unpublished data or conference abstracts were not included. Finally, limited randomized controlled trials and insufficient long-term fertility outcome studies continue to restrict comprehensive evaluation of conservative management approaches in ovarian torsion.

CONCLUSION

Ovarian Torsion remains an important gynecological emergency that requires rapid

diagnosis and immediate management to prevent serious complications and preserve ovarian function. The bibliographic analysis demonstrated significant progress in the understanding and treatment of ovarian torsion over recent decades. Earlier literature favored radical surgical approaches, whereas current evidence strongly supports conservative and fertility-preserving management, particularly through minimally invasive laparoscopic techniques. Advances in diagnostic imaging, especially Doppler ultrasonography, have improved early detection; however, diagnosis remains challenging because clinical symptoms are often nonspecific. The reviewed studies emphasized the importance of combining imaging findings with clinical evaluation to achieve timely intervention. Research also highlighted increasing attention toward pediatric and adolescent ovarian torsion due to the importance of protecting future reproductive potential.

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