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# Clinical experience in pregnancies complicated by adnexal torsion

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**Summary**

*Objective:* The purpose of this study was to present data on clinical and operational management and postoperative outcomes of pregnancies complicated by adnexal torsion (AT). *Materials and Methods:* Twenty-four pregnant women who presented to the present clinic between January 2007 to December 2013 and were intraoperatively diagnosed with AT were included in this study. Demographic data such as age and data on obstetric history, gestational week, current trimester, previous gynecologic and non-gynecologic operations, type of surgery that was performed, average size, location and number of adnexal masses, surgical techniques that were employed, postoperative complications, and pathology results were investigated and noted. *Results:* In this study, 132 patients were operated due to AT, and the rate of pregnant women with AT was 18.2% (24/132). The mean age of the patients was 29.25 ± 6.27 years, and the mean gestational week was 18.25 ± 7. Eight patients were in their first trimester (33.3%) whereas 13 were in their second trimester (54.2%), and three were in their third trimester (12.5%) when they presented to the hospital. The mean AT size was 95.3 ± 53.9 mm, as measured by ultrasonography. All the patients were operated by laparotomy. Regarding the types of abdominal incision, 13 patients (54.2%) had a Pfannenstiel incision, three patients (12.5%) had an infra-umbilical median incision, and eight patients (33.3%) had a pararectal incision. Duration of operation was significantly shorter in patients with pararectal incisions ($p < 0.01$) compared to those with Pfannenstiel and infra-umbilical median incisions. Regarding the types of treatment, ten patients (41.7%) underwent unilateral salpingo-oophorectomy (USO), eight patients (33.3%) underwent adnexal detorsion+cystectomy, and six patients (25%) underwent adnexal detorsion only. *Conclusion:* AT is a gynecologic emergency that requires early diagnosis and treatment, as it is capable of complicating the pregnancy. Determination of the current gestational week prior to the surgical intervention will assist and guide the surgeon in identifying the suitable type of surgery for a particular patient. Pararectal incision should be the incision of choice for a shorter duration of operation, which is crucial in pregnant women for reduced exposure to anesthesia.

*Key words:* Adnexal torsion; Detorsion; Pregnancy; Surgical technique.

## Introduction

Adnexal torsion (AT) refers to partial or complete rotation of the ovary and/or fallopian tube [1]. It is the fifth most frequent gynecologic emergency and occurs in 2.7% of all patients who require urgent gynecologic operation [2]. Adnexal torsion causes congestion and hemorrhagic infarction in the ovarian parenchyma, triggered by impaired venous and lymphatic drainage, and results in impaired arterial blood supply, followed by necrosis of the ovary [3]. It may occur in women of any age; however, women in the reproductive age display a higher frequency [4, 5]. Although the risk of having AT is increased five-fold in pregnant women, it occurs quite rarely in pregnancy. Its incidence is reported to be one to ten per 10,000 spontaneous pregnancies [6, 7]. Complication of the pregnancy by AT usually occurs between gestational weeks six to 17 [8]. It is quite rare in ovaries of normal size. However, polycystic ovary (PCO), mature cystic teratoma, functional corpus luteum (CL) which is seen in the early weeks of pregnancy, especially in the first trimester, and increased ovarian volume caused by the use of assisted reproductive technologies (ART) are the risk factors for AT [9]. Clinical symptoms and findings may vary in patients with AT. Sudden-onset, non-specific, constant or intermittent abdominal pain localizing in the supra-pubic region is the most frequent cause of admission to hospital. AT becomes particularly complicated later in pregnancy.

Early diagnosis and treatment is crucial for continuation of the pregnancy and preservation of the ovarian functions in patients with AT. In these patients, laparoscopy (L/S) can be performed safely until gestational week 16, and open L/S, left subcostal entry, and laparotomy (L/T) can be employed in later weeks of the pregnancy. [10]. Adnexectomy and other aggressive approaches that were frequently employed a few decades ago have now been replaced by adnexa-sparing surgery such as detorsion, cystectomy, and cyst aspiration and fenestration in patients with AT [11]. Surgical intervention assumes great importance in these patients as AT may lead to increased rates of abortion, preterm delivery, perinatal death, and low birth weight [12, 13].

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Table 1. — *Demographic data, preoperative number of leukocytes, adnexal torsion size as measured by ultrasonography (USG), and admission and operation time*

| | Mean ± SD | Min - max |
|---|---|---|
| Age (years) | 29.25 ± 6.27 | 18-43 |
| Gravida | 2.5 ± 2.0 | 1-7 |
| Parity | 1.3 ± 1.7 | 0-6 |
| Number of living children | 1.3 ± 1.6 | 0-5 |
| WBC (K/uL) | 12,834.2 ± 2,604.7 | 7,000-16,800 |
| Adnexal torsion size (mm) | 95.3 ± 53.9 | 60-300 |

SD: standard deviation.

Figure 1. — Adnexal torsion view from a pararectal incision in a pregnant woman.

The purpose of this study was to present data on clinical symptoms and findings, as well as surgical techniques, postoperative complications, and perinatal outcomes in pregnancies complicated by AT.

## Materials and Methods

Twenty-four pregnant women who presented to Dicle University Faculty of Medicine Outpatient Clinic of Obstetrics and Gynecology between January 2007 to December 2013 and were intraoperatively diagnosed with AT were retrospectively analyzed in this study. It was found that a total of 132 patients were operated in the given period of time due to AT. Pregnant women who were operated for other gynecologic or non-gynecologic reasons were excluded from the study. Patient data were obtained from the hospital archive and electronic database. Data on the patient's complaints upon admission, physical examination results, type of pregnancy (spontaneous or use of assisted reproductive technologies), and operation time were noted. Data on current gestational week and trimester of the pregnancy and presence of blood flow in the adnexae, as assessed by Doppler ultrasound, were noted along with operational data such as type of abdominal incision (L/S, L/T), size, location and number of adnexal masses and type of operation (unilateral salpingo-oophorectomy – USO, detorsion or cystectomy). Postoperative pathology results, whether the patient had a term delivery or not, mode of delivery, indications for C-section, and the newborn's data were also noted.

Descriptive and comparative analyses were conducted by SPSS (Statistical Package for Social Sciences) for Windows 15.0, Epi info, and Excel programs. Whether numeric data demonstrated a normal distribution or not was determined by Kolmogorov-Smirnov test. As the data did not demonstrate a normal distribution, Mann-Whitney U test was used for comparison of mean values in two independent groups whereas Kruskal Wallis H was used for comparison of mean values in more than two independent groups. Data were expressed as mean ± standard deviation. A $p$ value smaller than 0.05 and a 95% confidence interval were considered statistically significant. This study was approved by Dicle University Faculty of Medicine Board of Ethics.

## Results

A total of 132 patients were operated in the given period of time due to AT, and the rate of pregnant women with AT was 18.2% (24/132). Demographic data such as age, gravida, and parity, and findings such as number of living children, preoperative number of leukocytes, abdominal torsion size, as measured by ultrasonograpy (USG) are demonstrated in Table 1. Physical examinations showed that 18 patients (75%) presented with sudden-onset abdominal pain whereas six patients (25%) presented with chronic abdominal pain. Abdominal pain was accompanied by nausea and vomiting in 12 patients (50%).

Of 24 patients with AT, eight were in their first trimester (33.3%) whereas 13 were in their second trimester (54.2%), and three were in their third trimester (12.5%) when they presented to the hospital. As to the abdominal incision, all patients had L/T. Of 24 patients who had L/T, 13 (54.2%) had a Pfannenstiel incision, whereas 3 (12.5%) had an infra-umbilical median incision, and eight (33.3%) had a pararectal incision (Figure 1). Following the USG assessment, pararectal incision was made as a vertical line proportional to AT size. Incision was made from the closest site to the abdomen. Of 24 patients, six (25%) underwent detorsion, eight (33%) underwent detorsion + cystectomy. and ten (41.7%) underwent USO. USO was performed in patients with no blood flow in the adnexae and in patients with very fragile adnexae and continued necrosis in the adnexa in the post-detorsion period. No patient had recurrent torsion during their pregnancy. Decision on the type of incision to be used was based on the current gestational week. Patients who were in their first or second trimesters had a Pfannenstiel or umbilical median incision whereas patients who were having their third trimester had a pararectal incision. Duration of operation per type of incision is demonstrated in Table 2. In this respect, duration of operation was significantly shorter in patients with pararectal incisions compared to patients with Pfannenstiel and infra-umbilical median incisions ($p < 0.01$).

Types of operation employed in different trimesters are .demonstrated in Table 3. Of 24 patients with AT, 20 (83.3%) had a spontaneous pregnancy whereas four (16,7%) got pregnant with the help of ART. Regarding the

Table 2. — *Duration of operation as per the type of incision.*

| | N | Mean ± SD | Min - max | *p* |
|---|---|---|---|---|
| Operation time of Pfannenstiel incision (minutes) | 13 | 93.15 ± 9.66 | 80-117 | |
| Operation time of infra-umbilical incision (minutes) | 3 | 107.00 ± 2.3 | 92-117 | <0.01 |
| Operation time of pararectal incision (minutes) | 8 | 73.50 ± 6.55 | 66-84 | |

N: number of patients; SD: standard deviation.

Table 3. — *Operations performed as per trimester.*

| | | Types of treatment | | | |
|---|---|---|---|---|---|
| | | Detorsion | Detorsion + Cystectomy | USO | Total |
| Trimester | 1 | 3 | 3 | 2 | 8 |
| | 2 | 3 | 2 | 8 | 13 |
| | 3 | 0 | 3 | 0 | 3 |
| | | 6 | 8 | 10 | 24 |

USO: Unilateral salpingo-oophorectomy.

Table 4. — *Newborns' data including weight, height, and APGAR scores at minutes 1 and 5.*

| | N | mean±SD | min.-max |
|---|---|---|---|
| Weight (gr) | 24 | 2.758,9±525,7 | 1.800-3.450 |
| Height (cm) | 24 | 47,8±2,4 | 43-52 |
| APGAR at min 1 | 24 | 7,5±1,4 | 5-9 |
| APGAR at min 5 | 24 | 8,7±1,2 | 6-10 |

N: number of patients; SD: standard deviation.

pathology results of the specimens taken from the patients who underwent cystectomy and USO, seven patients (29.2%) had mature cystic teratoma, four patients (16.7%) had a functional CL, four patients (16.7%) had serous cystadenoma, two patients (8.4%) had follicular cyst, and one patient (4.2%) had mucinous cystadenoma. Furthermore, 17 patients (70.2%) had a term delivery whereas seven patients (29.2%) had a preterm delivery. No patient had an abortion. As to the mode of delivery, six patients (25%) had a normal vaginal delivery whereas 18 patients had a C-section. Newborns' data on weight, length, and APGAR scores at minutes 1 and 5 are demonstrated in Table 4.

## Discussion

AT is a clinical condition which may easily be overlooked in pregnant women due to its non-specific findings and symptoms which make the differentiation from other abdominal pathologies a challenge [14]. In their study, Shadinger *et al.* found that 100% of the patients with AT presented with abdominal pain and 85% had additional complaint of nausea [15]. In the present study, on the other hand, all of the patients had abdominal pain and 50% of the patients had additional complaints of nausea and vomiting. USG is the imaging method of choice in patients with suspected AT, as it gives the opportunity to evaluate adnexae and fetal well-being at the same time. Edematous appearance of the ovary, presence of masses, increased ovarian size, and absence of blood flow in Doppler are the ultrasonographic clues about AT [16]. The etiology of AT is not clearly known. In the literature, it was reported that adnexal masses smaller than six cm would cause no complications in pregnancy [17-20]. In their study on 36 pregnant women with AT, Lee *et al.* reported that ovarian size varied from six to ten cm in 26 patients (72%) [21]. In their study, Yu-Jın *et al.* reported that the risk of developing AT was two times higher in pregnant women with an ovarian size of six to ten cm compared to those with an ovarian size smaller than six cm [22]. In the present study, the mean ovarian size was 95.3 ± 53.9 mm, which was comparable to the data reported in the literature. Torsion of the right ovary is more common compared to torsion of the left ovary. A physiologically longer utero-ovarian ligament, more mobile distal ileum and cecum, and more frequent operation history due to acute appendicitis can be listed among the etiological causes of higher frequency in the right ovary [23-25]. In their study on ovarian torsion, Argenta *et al.* found that more than 90% of the specimens had functional cysts and benign neoplastic tumors whereas less than 1% had malignant tumors [26]. In the present study, on the other hand, patients' specimens had functional and benign cysts, and no specimen had malignancy. ART are accepted as a major risk factor for AT [27]. The risk is increased from 6% to 16% after IVF cycles in which the ovaries are stimulated [28]. In the present study, four patients (16.7%) developed AT after IVF, and this rate was comparable to the data reported in the literature. AT occurs more frequently in the first trimester [29], in which growing ovary plays a significant role. As of gestational week 12, corpus luteum hands its functions over to placenta and ovary stops growing in size.

Diagnosis of AT is difficult in pregnant women, and surgical intervention is required once the diagnosis is established. In recent years, adnexectomy has been replaced by ovary sparing surgery in treatment of AT. In the present study, ten patients (41.7%) underwent USO, eight patients (33.3%) underwent adnexal detorsion+cystectomy, and six patients (25%) underwent adnexal detorsion only. It has been shown by clinical and experimental studies that ovarian functions are preserved by early intervention, especially by ovary sparing surgery (detorsion ± cystectomy) [30-31]. Regarding surgical method, L/S can safely be performed until gestational week 16. However, use of L/S can be risky after gestational week 16 as it can cause damage to the uterus, particularly because of the growing size of the uterus. L/S causes less bleeding and postoperative pain, offers better patient comfort, and ensures a shorter length of stay compared to L/T in patients with AT [32]. In their study in which

103 patients with AT underwent L/S and 76 patients underwent L/T, Lo *et al.* reported fewer postoperative complications and shorter length of stay (2.9 ± 1.1 versus 6.0 ± 3.7 days) in patients who underwent L/S; however, they found no statistically significant difference between the two groups of patients in duration of operation (105.6 ± 42.7 and 101.5 ± 39.4 min.) [33]. There are many studies in the literature comparing L/S to L/T in patients with AT; however, to the best of the authors' knowledge, there is no study evaluating abdominal incision techniques performed in the later weeks of pregnancy. In the present study, all the patients underwent L/T. Regarding the incision techniques, 13 patients (54.2%) had a Pfannenstiel incision, three patients (12.5%) had an infra-umbilical median incision, and eight patients (33.3%) had a pararectal incision. Pfannenstiel incision was preferred in patients who were having their first trimester whereas infra-umbilical median and pararectal incisions were preferred in those who were beyond gestational week 20. Duration of operation was significantly shorter in patients with pararectal incisions ($p < 0.01$) compared to those with infra-umbilical median and Pfannenstiel incisions. Pararectal incision is not frequently preferred by obstetricians as an abdominal entry technique; however, it can be safely used in the later weeks of pregnancy, especially in the third trimester. It has several advantages as follows: it is made from the closest site to the abdomen, requires a smaller cut. and lesser contact with uterus compared to Pfannenstiel and infra-umbilical median incisions. It brings about disadvantages, either. As the incision is made in one side, it does not offer view of the whole abdomen and the contralateral adnexa.

In conclusion, AT is a gynecologic pathology in pregnancy which requires urgent surgical intervention. Considering the potential obstetric complications such as preterm delivery and abortion which can be triggered by anesthesia and a prolonged operation, pararectal incision should be the incision of choice especially in the later weeks of pregnancies complicated by AT, as it shortens the duration of operation, reducing exposure to anesthesia and operation itself. The frequency of AT is quite low among pregnant women, which makes the full understanding of the advantages and disadvantages of the techniques difficult. Therefore, there is a need for further multicenter studies with greater number of patients to provide better insight into the techniques than can be used in AT.

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