INTRAOPERATIVE FINDINGS OF ADNEXAL TORSION

Evsen Mehmet Siddik, Turgut Abdulkadir, Basaranoglu Serdar, Agacayak Elif, Tunc Senem Yaman, Icen Mehmet Sait, Ozler Ali, Gul Talip
Dicle University, School of Medicine, Department of Obstetrics and Gynecology, Diyarbakir, Turkey

Abstract

Objective: Adnexal torsion (AT) is a gynecologic emergency. Early intervention is important because it may give opportunity for preserving adnexa for future fertility and the function of the ovary. The aim of the study is to present intraoperative findings of the adnexal torsion.

Methods: Demographic data, clinical characteristics and presence of pregnancy were noted. In patients with an intraoperatively detected AT, side (right or left adnexa), direction (clockwise or counterclockwise), number of torsions and the size of torsioned adnexa were evaluated.

Results: Seventy two patients in the reproductive age with an intraoperatively detected AT were evaluated in the study. In 64 (89%) patients, the adnexa were preserved. In 50 (69.4%) patients, an AT was detected at the right adnexa but there was no statistically significant difference between two sides (p=0.543). Directions of the torsion were found to be higher in both adnexa as clockwise but the difference was not found to be statistically significant. The number of torsions were found to be higher (especially more than ≥ 5 times) in patients who had undergone unilateral salpingoophorectomy when compared with detorsioned cases. A linear correlation was observed between increases in the number of adnexal torsions and dimensions of the adnexal mass (r:0.454).

Conclusion: Increased size of an adnexal torsion enhances the probability of adnexal necrosis and indication of salpingoophorectomy. With the priority of intraoperative exploration and inspection, the fact that clockwise rotation is a more often seen abnormality in AT, can be an important consideration in the prevention of further adnexal damage during detorsioning maneuvers.

Key words: Adnexa Uteri, Torsion, Intraoperative Procedures, Surgery.

Received February 18, 2014; Accepted May 19, 2014

Introduction

Adnexal torsion (AT) is a gynecologic emergency in which ovary and/or tuba rotates partially or completely around its axis(1). Following AT, priority congestion of ovarian parenchyma and hemorrhagic infarct occur because of impairment of venous/lymphatic drainage, and then tissue necrosis related to strangulated arterial blood flow develops(2). Adnexal torsion frequently encountered during the reproductive period, but it can also happen during prepubertal or postmenopausal periods(3,4). Clinical findings of the patients may vary. Nonspecific, intermittent or sustained abdominal pain with a sudden onset especially felt at the suprapubic region is the most frequent complaint at presentation(5).

Nausea and/or vomiting and also a palpable mass during examination have been reported in 78% and 87% of the patients, respectively(6). Radical approaches like a unilateral salpingo-oopherectomy (USO) which had been performed until a few decades ago have been currently replaced to conservative surgery (detorsion) for preserving the ovarian and tubal functions(7). Development of adnexal torsions have been found more often at the right side relative to left side but such a report concerning the direction of adnexal torsion (clockwise or counterclockwise rotation) are not available in the literature. Since studies evaluating adnexal torsion are usually of retrospective design, the direction of torsion and number of adnexal torsions have not been indicated.
Still, sufficient literature data, which indicates an increased risk of adnexal necrosis, in parallel with the number of torsions experienced, might also dictate the choice of surgical intervention.

The aim of the study is to present surgical findings (such as; side, direction, number of torsions) of adnexal torsion and management options in patients in whom this is diagnosed intraoperatively.

Materials and methods

In this study, we evaluated patients treated for an adnexal torsion between January 2010 and April 2013, in the Clinics of Gynecology and Obstetrics of Dicle University Faculty of Medicine. We excluded patients who presented with acute abdominal pain that was managed conservatively, or patients without any evidence of an intraoperative torsion (ectopic pregnancy, complicated ovarian cyst, pelvic inflammatory disease and endometriosis). Demographic data, age, gravida, parity, number of living children, last menstrual period (LMP), complaints and concomitant symptoms of the patients, duration and type of the abdominal pain were recorded. The time between the onsets of pain until admission to hospital was noted. The time interval between admission to the hospital and surgical intervention was also evaluated.

All the cases were evaluated preoperatively by physical examination and ultrasonography (US) (Voluson 730 PRO). All patients had complaints of abdominal pain and on physical examination abdominal tenderness and guarding was present. During the study period, 72 patients in the reproductive age with intraoperatively detected AT were included in our investigation. Patient who presented with spontaneously detorsioned adnexa, found intraoperatively, were not included in the study. The mean dimensions of the torsioned adnexal mass was measured by preoperative ultrasound. White blood cell counts were also recorded. Laparotomy procedures were applied for 13 pregnant cases with an adnexal torsion. Gestational age was estimated in consideration of LMP and obstetrical US findings. In pregnant patients, the surgical field of the adnexal torsion was accessed through an abdominal incision, chosen preoperatively by US and physical examination (paramedian vertical incision), which provided the closest approach to the torsioned mass. Postoperatively pregnant patients received progesterone and/or tocolytic therapy.

During the follow-up period, miscarriages or premature births were not observed in pregnant patients. In 16 (27.1%) of 59 non-pregnant patients intraabdominal access was accomplished via laparoscopic intervention, while for 43 (72.9%) patients laparotomy procedures were used. Types of surgical modalities used in the study patients and the postoperative histopathological findings were analyzed. Since patients underwent surgery in the context of an emergency, each specimen could not be sent for frozen examination. However, in patients with an intraoperatively detected AT, side (right or left adnexa), direction (clockwise or counterclockwise) and number of torsions, size of the torsioned adnexa and concomitant abnormalities were evaluated and noted. Postoperative histopathological findings of the cases who had undergone cystectomy or USO were evaluated. Approval for the study was obtained from the local Ethics Committee of Dicle University.

Statistical analysis: Statistical analyses of the obtained data were conducted by using Statistical Package for Social Sciences (SPSS) version 15.0 (Chicago, IL). Data were presented as mean ± standard deviation. Normality of variance was tested with Kolmogorov-Smirnov test. Comparisons of continuous variables between two groups were performed using Student’s t-test. Variables showing non-parametric distribution were compared between groups by using Mann-Whitney U test. P < 0.05 was accepted as statistically significant.

Results

Mean age of the patient was 26.4 ± 7.7 years. All patients participating in this study had complaints of acute (84.7% of the cases) or chronic (16.3%) abdominal pain whereas 53 (74%) patients had the complaint of nausea and/or vomiting. Pregnancy was detected in 13 (18.1%) of 72 AT patients. Demographic data and clinical findings of the patients are presented in Table 1. The surgical procedure included detorsion of adnexa in 30 (41.7%) patients, detorsion+cystectomy in 34 (47.3%) patients and USO in eight (11.1%) patients.

In 50 (69.4%) patients AT were detected at the right adnexa whereas it was left sided in 22 patients (30.6%). Although AT was observed more often at the right adnexa, there was no statistically significant difference between the two sides (p=0.543). In right adnexal torsions, either clockwise (n=35
cases; 70 %), or counterclockwise (n=15; 30%) rotations were observed. In the left sided cases, clockwise and counterclockwise torsions were encountered in 68.2% (n=15) and 31.8% (n=7) of the cases, respectively.

An adnexal detorsion treatment modality was applied to 64 (89%) patients. Eight patients, in whom ovarian necrosis was assumed to have occurred, underwent USO. An ovarian mass was detected in 52 (72.2%) patients. Benign or malignant neoplasms were observed in 98.1 and 1.9% of the cases, respectively. The histopathological report of a patient who had undergone USO indicated the presence of a malignant ovarian neoplasm. This finding necessitated a second complementary oncologic surgery. Postoperative histopathologic findings are presented in Table 2.

The numbers of torsions were found to be higher (≥ 5 times), in patients who had undergone USO when compared with detorsioned cases. A linear correlation was observed between increases in the number of adnexal torsions and dimensions of the adnexal mass (r: 0.454) (Figure 1).

**Table 1**: Characteristics and clinics of the patients. *: In patients who are married (n:46)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>mean±SD (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>26.4±7.7 (13-48)</td>
</tr>
<tr>
<td>Gravidity*</td>
<td>3.09±2.94 (0-13)</td>
</tr>
<tr>
<td>Parity*</td>
<td>2.6±3.0 (0-13)</td>
</tr>
<tr>
<td>Number of living children*</td>
<td>2.4±2.6 (0-10)</td>
</tr>
<tr>
<td>White blood cell count</td>
<td>12843±3544 (6020-22100)</td>
</tr>
<tr>
<td>Ultrasonographic size of adnexa</td>
<td>72.3 ±26.6 (31-172)</td>
</tr>
<tr>
<td>Time to presentation to clinic (days)</td>
<td>1.5±1.1 (1-7)</td>
</tr>
<tr>
<td>Time to surgery (hours)</td>
<td>9.9±6.3 (1-24)</td>
</tr>
</tbody>
</table>

Table 2: Postoperative pathological results of the patients.

<table>
<thead>
<tr>
<th></th>
<th>n, (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follicular cyst</td>
<td>5, (9.6)</td>
</tr>
<tr>
<td>Corpus hemorrhagicum</td>
<td>6 (11.6)</td>
</tr>
<tr>
<td>Corpus luteum</td>
<td>5 (9.6)</td>
</tr>
<tr>
<td>Dermoid cyst</td>
<td>20 (38.5)</td>
</tr>
<tr>
<td>Serous cystadenoma</td>
<td>9 (17.3)</td>
</tr>
<tr>
<td>Mucinous cystadenoma</td>
<td>1 (1.9)</td>
</tr>
<tr>
<td>Endometrioma</td>
<td>3 (5.8)</td>
</tr>
<tr>
<td>Tuboovarian abscess</td>
<td>1 (1.9)</td>
</tr>
<tr>
<td>Fibroma</td>
<td>1 (1.9)</td>
</tr>
<tr>
<td>Ovarian tumour</td>
<td>1 (1.9)</td>
</tr>
<tr>
<td>Total</td>
<td>52</td>
</tr>
</tbody>
</table>

**Discussion**

In recent years, in the management of AT, ovarian preservation surgery replaced adnexectomy. In this study, ovarian preservation surgery (detorsion ± cystectomy) was performed in 89% of cases. Experimental and/or clinical studies have reported that ovarian functions are preserved when ovary preserving conservative surgery is conducted shortly after onset of symptoms.(8-10) Occasionally, diagnosis of AT can be overlooked and/or made incidentally in cases in which patients are operated on for non-gynecologic etiologies(11). Especially in patients with the initial diagnosis of acute appendicitis, a probability of preoperative misdiagnosis exists(12). Abdominal pain, nausea and vomiting are the most frequently encountered complaints at presentation. Abdominal pain can be of sudden onset or it can manifest as chronic, stable or intermittent pain distressing the patient for days, weeks or even months(13,14).

Especially in chronic cases, adnexectomy can be considered in conditions of non-vital detorsioned adnexa, established necrosis and/or fragile adnexa. The presenting clinical condition of the patient, examination findings, results of imaging studies and the experience of the physician are important determinants in diagnosis and proper management.

The etiology of AT is not well established. Rarely torsion of normal-sized ovary and tuba is observed. However, it has been reported that in pathological conditions which increase the dimen-
sions of adnexa, also increase the risk of torsion\textsuperscript{(15,16)}. Chang et al. suggested that in cases where the size of the ovary is greater than 4 cm in diameter, the risk of adnexal torsion increases\textsuperscript{(17)}.

In the present study, the mean diameter of the torsioned adnexa was 72.3 ± 26.6 mm and an ovarian mass was detected in 72\% of the cases. Mass lesions accompanying AT are rarely found to be of malignant nature during the reproductive age, while increased probability of malignancy have been reported for ovarian masses detected during the postmenopausal period\textsuperscript{(18-20)}. Argenta et al. investigated torsioned ovarian masses and detected functional cysts and benign neoplasms in more than 90\% and malignant tumors in less than 1\% of histopathologic specimens\textsuperscript{(21)}. Balcı et al. indicated the frequency of malignancy to be 2.6\% in histopathologic specimens of patients who underwent a surgical intervention with the indication of AT\textsuperscript{(22)}. In the present study, 98.1\% of ovarian masses observed during the reproductive age were histopathologically benign which is in compliance with the literature findings.

In the literature, the incidence of AT at the right side has been reported as 67-71 percent\textsuperscript{(23,24)}. The authors have attributed a higher frequency of right adnexal torsion to the probably physiologically longer right ligamentum ovarii proprium, restriction of adnexal mobility by the left mesosigmoid or increased mobility of the right adnexa. In the present study, a right adnexal torsion was observed in 69.4\% of the cases.

In the literature, it has been reported that 18-28\% of the cases operated for AT are associated with pregnancy\textsuperscript{(25,26)}. In the present study, pregnancy was found in 18.1\% of cases. It is possible that the adnexa is displaced to a larger anatomic region, as compared to the pelvis, as pregnancy progresses. Further, the adnexa becomes closer to the gastrointestinal system, thus increasing the probability of torsion in pregnant cases. One additional possible concomitant or causative condition, which may contribute to adnexal torsions, is the presence of an adnexal mass and the resultant elongation of the adnexal ligament.

Inside the pelvis and/or abdominal cavity, the adnexa is close to the intestines (small and/or large bowels), and even contacts the intestines. In addition to previous theories, we think that peristaltic movements of the intestines and/or bowels may cause the affected adnexa to move, causing a predisposition to torsion, and consequently the adnexa rotate around their axes. We also theorize, that the number and the intensity of bowel movements, facilitate torsion, while the direction of bowel movements, likely affects the side of rotation. In our review of the literature, we could not find any study investigating the direction of torsion. In this study, clockwise rotation was observed in the right and left adnexa in 84\% and 77.3\% of the cases, respectively. One aspect for future studies, could be to evaluate the higher rates of clockwise torsion, in both adnexa.

We have observed that torsioned adnexal mass dimension increases and ovaries became more fragile/ necrotic with an increase in the number of torsions (especially more than 5). We think that an increase in the number of adnexal torsions and adnexal size favors salpingo-ophorectomy as a treatment modality because of suspected arterial occlusion.

In conclusion, we think that increases in the size of torsionated adnexa enhance the probability of adnexal necrosis and provide indication of salpingo-ophorectomy. Utilizing intraoperative exploration and inspection when appropriate, and the fact that clockwise rotation is the more often seen abnormality in AT, can be an important consideration in the prevention of further adnexal damage during detorsioning maneuvers.

References


Corresponding Author
BASARANOGLU SERDAR
Dicle University, School of Medicine, Department of Obstetrics and Gynecology
Diyarbakir (Turkey)