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Characteristics of the patients with adnexal torsion and outcomes of different surgical procedures

A retrospective study

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Abstract

There is no uniform standard to assess the viability of the ovary and choose conservative surgery or radical surgery for patients with adnexal torsion. This retrospective study aims to explore the characteristics of patients with adnexal torsion and the outcomes of different surgical procedures.

A retrospective analysis of 174 cases diagnosed with adnexal torsion at our hospital between January 2005 and October 2014 was performed. Patients' clinical characteristics, surgical procedures, and postoperative recovery were analyzed.

Of the cases, 31 (17.82%) did not have any emergent symptom; adnexal torsion were found during other surgeries. Among all 174 adnexal torsion patients, 14 cases received conservative treatment, including anti-inflammatory treatment, and 8 (58.1%) were pregnant. Of the cases, 160 underwent surgical treatment: 144 (90%) were confirmed to have ovary/ovarian cyst torsion, among whom 26 (18.1%) had their adnexa retained (group A) and 118 (81.9%) underwent adnexectomy (group B). Age, time of torsion, and rounds of torsion in group A were significantly less than in group B. None of the patients with adnexa preservation surgery had any complication, such as abdominal infection or thrombotic diseases.

Patients with ovary/ovarian cyst torsion can attempt to preserve the ovaries without serious clinical complications; there were no severe complications such as embolism after the conservative surgeries in this study.

Abbreviation: SPSS = statistical product and service solutions.

Keywords: adnexa preservation, adnexal torsion, adnexectomy

1. Introduction

Adnexal torsion, which refers to complete or partial rotation of the adnexa, resulting in obstruction of venous and lymphatic reflux in the ovary, is a common gynecological emergency. A torsed adnexa involves both the ovary and fallopian tube and rarely involves only one of them.[1]

What happens after adnexal torsion? First, the ovarian vessels are compressed because of torsion of the pedicle, including blood vessels. Venous and lymphatic outflow is obstructed. Then, obstruction of the venous and lymphatic reflux resulted in ovarian edema, observed as a blue or dark-purple appearance of the torsed ovary. Next, the arterial blood flow may be affected because the arteries in the pedicle have thicker walls, are more muscular, and could resist compression more than the veins. If no surgery is performed, the ovary will become ischemic and necrotic, and thrombophlebitis, hemorrhage, infection, and peritonitis also may occur.[2] Finally, calcifications and auto amputation of the ovary may occur in the long term.[3,4] Thus, early diagnosis and immediate surgery are essential. Traditionally, it was thought that untwisting the torsed adnexa could cause drop of vascular emboli and thromboembolic complications; thus, most of the torsion was managed by radical surgery such as adnexectomy (salpingo-oophorectomy), without untwisting.[5–10]

However, in recent years, with an increased awareness of ovarian function protection, more and more torsed adnexa have been retained during surgical treatment, and recent reports have indicated no further increase in thromboembolic complications, such as pulmonary embolism after untwisting of the torsed adnexa.[7,9,11–13] In fact, the incidence of pulmonary embolism in cases of adnexal torsion is very low (some reported 0.2%),[14,15] thromboembolic events are very rare after the conservative surgery. This fact is evidenced by a study on thromboembolic events after conservative surgery of torsed adnexa conducted about

Editor: Goran Augustin.

ZW and DZ are two authors contributed equally to this work.

This study was supported by the National Natural Science Foundation of China (grant no.: 81200473) and the Guangdong Provincial Key Laboratory of Reproductive Medicine (grant no.: 2012A061400003).

The authors report no conflict of interest.

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Medicine (2019) 98:5(e14321)

Received: 20 September 2018 / Received in final form: 6 December 2018 / Accepted: 9 January 2019

http://dx.doi.org/10.1097/MD.0000000000014321

20 years ago, which showed that 309 patients underwent conservative surgery without thromboembolism and only 2 of 672 patients with thromboembolisms underwent adnexectomy.[16]

A key point during the surgery is to assess the viability of the ovary, on the basis of which the doctors could choose conservative surgery or radical surgery. There is no effective clinical predictors or sonographic criteria for assessment of viability,[10] and the only way to determine the viability of the ovary is by gross visual inspection during the operation. There is no uniform standard to date.[1] Thus, to explore the characteristics of patients with adnexal torsion and the outcomes of different surgical procedures, the clinical characteristics of patients diagnosed with adnexal torsion between 2005 and 2014 at our hospital were analyzed.

2. Patients and methods

In this retrospective study, we included all patients admitted to our hospital between January 2005 and October 2014 with a discharge diagnosis of adnexal torsion through the database of the First Affiliated Hospital of Sun Yat-sen University.

The medical records of all cases were retrospectively reviewed, data on the following variables were collected and analyzed: age, menarche status, main complaining symptoms, physical exam findings (presence of abdominal tenderness, peritoneal signs, palpable mass), ultrasound or computed tomography imaging findings (simple or complex features and largest measured diameter), operative procedures, and postoperative diagnosis. The institutional ethical board of The First Affiliated Hospital of Sun Yat-sen University approved this retrospective study and waived the need for informed consent.

Patients were grouped into 2 groups according to the surgical procedures: adnexa preservation or adnexectomy. The clinical characteristics and postoperative recovery condition were compared between the 2 groups.

Statistical analysis was performed using SPSS (Statistical Product and Service Solutions) statistical software, version 21.1 (SPSS, Inc.). Patients' general clinical characteristics were analyzed using descriptive statistics, the means of independent samples were compared using a *t* test, and categorical variables were analyzed using the chi-square test or Fisher exact test.

3. Results

3.1. General characteristics

We included 174 patients diagnosed as having adnexal torsion in this retrospective study. All patients were diagnosed as having adnexal torsion by imaging examination without operation or with operation confirming the presence of a torsed adnexa. The general characteristics are listed in Table 1.

Table 1

The general characteristics of the patients diagnosed as adnexal torsion.

	Cases (n)	Percentage (%)
Patients with adnexal torsion	174	100%
Pregnancy or not		
Pregnancy	143/174	82.18
Not pregnancy	31/174	17.82
Type of admission		
Emergency	23/174	13.22
Not emergency	151/174	86.78
Treatment		
Nonoperative	14/174	8.05
Pregnancy	8/14	57.14
Not pregnancy	6/14	42.86
Surgical operation	160/174	91.95
Type of adnexal torsion		
Ovary/ovarian cyst torsion	144/160	90
Other adnexal torsions b	16/160	10
Misdiagnosis	19/174	10.92
Pediatric	8/19	42.11
Appendicitis	8/19	42.11
Urinary tract infection	1/19	5.26
Mesenteric cyst	1/19	5.26
Peritonitis	1/19	5.26

Fourteen patients showed favorable outcomes with nonoperative treatment, including anti-inflammation and supportive therapies; 8 (57.1%) of them were pregnant women. Of the patients, 160 underwent surgical treatment. Pathological examination confirmed that 144 patients (90%) had ovarian cyst torsion, whereas the remaining patients had paraovarian cyst torsion, fallopian tube cyst torsion, or fallopian tube torsion. Of the patients, 143 (82.18%) were emergently hospitalized, and their chief symptoms are shown in Table 2. Thirty-one cases were hospitalized under nonemergent conditions, and were confirmed as having adnexal torsion upon surgery for the conditions that they were admitted for.

Nineteen patients with acute abdominal pain were misdiagnosed as having other diseases initially: 8 cases aged between 2 months and 12 years were admitted to the Pediatric Department for other conditions (2 for appendicular abscess, 2 for appendicitis, 3 for teratoma, 1 for abdominal mass); 7 cases were misdiagnosed as appendicitis (4 cases of ovarian cyst torsion and 3 cases of fallopian tube torsion were diagnosed during operation); 1 case was misdiagnosed as a urinary tract infection during the first visit for surgical treatment and was later diagnosed as mesosalpinx cyst torsion; 1 case was misdiagnosed as a mesenteric cyst; 1 case was misdiagnosed as acute suppurative peritonitis; and 1 case was finally confirmed to be rupture of a torsed ovarian chocolate cyst during operation.

Table 2

Symptoms of the emergency condition in the patients with adnexal torsion.

	Ovarian/Ovarian cyst torsion (%)	Fallopian tube torsion (%)	Paraovarian cyst torsion (%)	*P* value
Abdominal pain	91/114 (79.82)	10/10 (100)	2/2 (100)	.820
Nausea	39/114 (34.21)	4/10 (40)	1/2 (50)	.586
Fever	7/114 (6.14)	2/10 (20)	1/2 (50)	.074
Rectal tenesmus	5/114 (4.39)	1/10 (10)	0/2 (0)	.089

3.2. Symptoms of the emergency condition

Of the patients, 143 were admitted emergently, among whom 129 underwent surgical treatment: 114 were confirmed as having ovarian/ovarian cyst torsion during operation; 10, as having fallopian tube torsion; and 2, as having paraovarian cyst torsion. The characteristics of the emergency symptoms of these patients with different types of adnexal torsion are listed in Table 2. Abdominal pain is the main symptom, 79.82% of the ovarian/ovarian cyst torsion patients and 100% of the fallopian tube torsion and paraovarian cyst torsion patients complained of abdominal pain. The other symptoms included nausea, fever, and rectal tenesmus. There was no significant difference of emergency symptoms among different types of adnexal torsion.

3.3. Characteristics of the two surgical procedures

Of the cases, 144 ovary/ovarian cyst torsion cases were confirmed by operation. Among the patients with ovarian cysts, 26 patients (18.1%) were included in group A (adnexa preservation) and 118 (81.9%) were included in group B (adnexectomy). In this study, 26 ovary/ovarian cyst torsion patients with adnexa preservation had no severe complications, such as infection or thrombotic disease. Table 3 shows a comparison of the torsion characteristics in the 2 groups. Age, time of torsion, and rounds of torsion in group A were significantly less than those in group B.

4. Discussion

Adnexal torsion occurs mostly in women of childbearing age, and adnexa removal on the affected side causes adverse effects. Adnexal torsion is a rare emergency, and there are few large-scale case reports on this condition. This study included 174 patients diagnosed as having adnexal torsion and provided valuable clinical data.

In this study, of all adnexal torsion patients, 31 (17.82%) did not have any emergent symptom, and adnexal torsion was found during other surgeries. This indicated that not all cases of adnexal torsion have emergency symptoms, and we should pay attention to those without classical symptoms. Among those with emergency symptoms, abdominal pain is the main symptom, 79.82% of the Ovarian/Ovarian cyst torsion patients and 100% of the fallopian tube torsion and paraovarian cyst torsion patients complained of abdominal pain. This indicated that, for women with abdominal pain, doctors should consider the possibility of adnexal torsion, conduct the necessary pelvic examination, and perform ultrasound scanning.

The incidence of pregnancy with an ovarian cyst is 0.05% to 6.2% and that of pregnancy with ovarian cyst torsion is 3% to 25%.[15,17,18] In the present study, 23 of 174 patients (13.2%) with ovarian cyst torsion were in the early stage of pregnancy, which is consistent with that reported in the literature; of these patients, 8 underwent conservative treatment and 15 underwent surgical treatment. Our findings indicate that adnexal torsion is an important complication of ovarian cysts in pregnancy, especially in the first trimester. Considering the safety of the fetus, many patients did not undergo operative treatment, as some ovarian cysts may untwist by themselves. The diagnosis of adnexal torsion was not confirmed by surgery in this study, so there may be some misdiagnosis.

In recent years, more attention has been paid to the conservative operation for untwisting the torsed adnexa in patients of childbearing age. When torsion occurs, the ovarian cysts become ischemic rapidly because of blockage of the venous reflux, and then necrosis and secondary infection occurs, resulting in a series of systemic symptoms. Thus, immediate surgical treatment is needed once a diagnosis is made. Traditional treatment methods are surgical removal of the affected adnexa, but with increasing awareness among people, preserving ovarian function is more of a concern. However, the decision on whether to retain the torsed adnexa is controversial.

In some patients, adnexal torsion resolved by itself without surgical treatment. In the present study, 14 patients showed resolution of the condition without surgery, among whom 8 (58.1%) were pregnant and thus preferred conservative treatment.

For patients with purple/black ovaries and intracystic hemorrhaging we recommend removing the adnexa to avoid thrombotic diseases. However, some researchers have argued that a purple/black ovary is insufficient to indicate complete necrosis of the ovarian tissue, and they have suggested preservation of the ovaries, as 91% to 100% of the ovarian tissues can restore their function.[15] Other scholars believe that the duration of torsion and tenseness are key factors for retaining the adnexa. It is generally thought that the time from torsion to surgery should be less than 36 hours. Whether the blood flow of the ovary is active or cannot be determined by the color of the fully or partially restored ovary during operation. Disappearance of the torsion cyst pedicle vein based on Doppler ultrasonographic findings indicates local circulation disorders, such as an ovarian cyst with strangulated torsion. Results of the present study showed that the proportion of patients with retained adnexa was significantly smaller than that with adnexa removal, and their age was significantly lower, which may be related to the surgeons' decision on whether to remove or retain the ovary.

There is controversy regarding the conservative operation, as some physicians are concerned that ovarian cyst torsion might block the ovarian vein reflux and very easily cause a vein thrombus to form; untwisting the torsed adnexa could cause thrombus break-off, resulting in severe complications, including pulmonary embolism. In the current study, none of the 26 patients with retained adnexa had any significant postoperative infection, fever, thrombosis or pulmonary embolism.

In conclusion, it is safe and feasible to retain the ovaries during adnexal torsion surgery, but the decision to retain the ovary should be determined on the basis of many factors, including patients' ages, the doctors' judgments, the ovaries' condition during the operations, and whether the tumor is benign or malignant. There are some limitations to this study. First, there are no data on the long-term follow-up of the patients who underwent conservative operation. Second, because this study was a retrospective study, there are no detailed standards on the type of patients who choose conservative surgery or radical surgery.

With the accumulation of surgical experience, conservative operation for adnexal torsion will become increasingly popular. In the future, more data from retrospective and prospective

Table 3

Comparison of the torsion characteristics of adnexal torsion in the 2 groups.

	Group A	Group B	*P* value
Age (years)	24.23 ± 7.72 (26)	31.67 ± 16.51 (118)	.00
Time of torsion (hours)	39.76 ± 62.06 (23)	69.30 ± 95.05 (80)	.165
Rounds of torsion	1.29 ± 0.78 (24)	1.85 ± 0.90 (103)	.006

studies may provide more detailed standards for choosing conservative surgery or radical surgery for patients with adnexal torsion.

Author contributions

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