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Recent conservative management trends in dealing with uterine adnexal torsion will preserve fertility in childbearing women: a review of literature and case series

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Recent conservative management trends in dealing with uterine adnexal torsion will preserve fertility in childbearing women: a review of literature and case series

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Abstract

Introduction

Uterine adnexal torsion is a rare gynecologic emergency, representing 2.5–7% of all the acute gynecologic surgical conditions. It could lead to adnexal ischemia and necrosis, putting a woman at the risk of a radical surgery, which leads her to lose a uterine adnexa, plummeting her future fertility, and possibility inducing a negative effect of her future marital and family life. Adnexal detorsion associated with cystectomy is a simple maneuver that could spare the woman of losing her ovary; this technique could successfully work even with an apparently necrosed ovary.

Aim

A review of literature, in addition to a retrospective observational study was done, the aim of this study was to assess the potential of saving a torsed, devitalized adnexa, through the less radical detorsion technique and simple cystectomy.

Results

Several studies have favored ovarian detorsion, cystectomy, and ovariopexy, as combined techniques, if done altogether could spare an ovary being removed for being necrosed. The present retrospective study of 12 cases with ovarian torsion revealed complying findings, where two of five patients with suspected adnexal necrosis were treated conservatively by combined detorsion and cystectomy, with the ovaries resuming normal activity soon within a few weeks.

Conclusion

Many apparently necrosed ovaries could be spared unnecessary excision, through implying a more conservative techniques, such as ovarian detorsion and cystectomy, with no marked detrimental consequences.

Keywords: Cystectomy, Doppler flow, necrosed adnexa, ovarian torsion

INTRODUCTION

Uterine adnexal torsion is an uncommon emergency, mostly encountered in women within the childbearing age. Such a condition could be encountered in premenarcheal girls as well as postmenopausal women. In younger women, it poses detrimental consequences on future fertility mandating prompt commencing of diagnostic efforts and subsequently appropriate intervention [1].

Ovarian torsion, uterine tube torsion, or both represent 2.7–7.4% of all gynecological emergencies that present to the emergency room

with acute surgical abdomen [2,3]. Some authors even reported adnexal torsion to be coincidentally found in 14.8% of patients operated for adnexal mass [4]. Adnexal torsion always presented primarily with lower quadrant pain, mostly on the right side, owing to liability of the right adnexa for torsion more than the left side, with colicky nature of pain in almost half of the cases [1,5].

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Overall, 70–85% of patients may show a picture suggestive of gastrointestinal tract insult, such as persistent nausea and vomiting [6,7], with considerable number of patients presenting with low-grade fever and sinus tachycardia [1,6]. Hematological studies may show leukocytosis uncorrelated to adnexal tissue necrosis [7–9]. Approximately half of the patients with such conditions are dipstick positive for leucocyte esterase, and more than half are positive for hemoglobin and nitrites, yet probably none of them would show any bacterial growth on urine culture [5].

Differential diagnosis

Many causes of acute or chronic pelvic pain will be included in the differential diagnosis of adnexal torsion [1]. Pelvic inflammatory disease, ruptured functional ovarian cyst, ectopic pregnancy, renal colic, subserous pedunculated fibroid torsion, red degeneration or ruptured superficial fibroid vein, diverticulitis, or ovarian hyperstimulation syndrome, all may present with a clinical picture similar to adnexal torsion causing acute lower abdominal pain [10]. Accordingly all the predisposing factors favoring adnexal torsion should be sorted out and identified before embarking on any surgical plan, approximating the investigator toward the correct diagnosis, especially that the physician in charge will not only have to choose the correct interventional procedure but in addition will have to explain it, justify it, and recommend it to the patient and her family. A detailed past and present history should be thoroughly taken. Torsion is more suspected if there is a history of polycystic ovary syndrome or a large ovarian cyst more than 5 cm, particularly a dermoid cyst [3,7,11]. On the contrary, ovarian malignancies and endometriomas are not in favor of adnexal torsion owing to marked adhesions hindering the free movement of the adnexa [11]. Prepubertal girls have a higher incidence of torsion of normal adnexa compared with women within the reproductive age [12].

Pelvic inflammatory disease is another common condition of non-migratory bilateral pelvic pain, with bilateral tenderness. Appendicitis is also an acute condition characterized by colicky and central pelvic pain, which becomes localized in the right iliac fossa later as peritonitis starts to develop. It is also usually associated with anorexia, nausea, vomiting, fever, and leukocytosis [1]. Ectopic pregnancy can be ruled out by simply testing the patient's serum for β -human chorionic gonadotropins [13]. A negative pregnancy test result will exclude any extrauterine pregnancy. Functional ovarian cyst will cause sudden severe abdominopelvic pain; usually these patients do not receive any contraceptive or ovarian suppressive medications, which permits the functional cysts to grow causing ovarian rotation. Usually, such pain resolves spontaneously within few days [14]. Ovarian hyperstimulation syndrome is another condition associated uncommonly with ovarian torsion. It develops usually with ovarian induction of ovulation using strong ovarian stimulators, such as gonadotropins, even occasionally with clomiphene citrate [15].

Appendicitis is a real dilemma, especially in pregnancy where the appendix is displaced by the enlarging and ascending uterus, giving a picture different from the classical one known with the traditional paraumbilical pain and pain at the McBurney point [16].

Patient with urinary tract infection usually present with urgency, frequency, and dysuria; even 40% of patients may develop hematuria, fever, and rigors, and pain is usually suprapubic. In case of renal colic, there will be loin pain radiating to the groin in a wavy fashion [1,17].

Degenerating fibroids, as well as torsion of subserous fibroid are considered causes of acute abdomen, and also ruptured surface vessel traversing the surface of a fibroid is a rare but reported cause of acute abdomen [18,19].

Predisposing factors

Approximately two-thirds of adnexal torsion is found to be on the right side, which could be attributed to the existing sigmoid colon on the left side, and the normally longer utero-ovarian ligament on the right side [20]. Various factors have been suggested to be encouraging factors that might facilitate torsion in some women more than others; increase in weight and size of the adnexa such as in cases with functional and pathological ovarian cyst could explain many of these cases, with dermoid cyst accused to be mostly associated with such cases, with an incidence of 3.5% [11].

All such factors will increase the tubal weight, consequentially weighing down the whole adnexa and contributing to the isolated tubal or the whole adnexal torsion. This is particularly more obvious with tubal pregnancy, paratubal cyst, hematosalpinx, and hydrosalpinx [21,22]. Tubal ligation has been thought to increase the risk of tubal torsion, which could be explained by the captured tubal secretions, and the damage imposed to the mesosalpinx, rendering the whole tube hypermobile and liable to torsion [23].

Corpus luteum of pregnancy is considered an inducing factor for ovarian torsion in the first trimester of pregnancy, with adnexal torsion recognized to be a common complication with an incidence of 25% [24].

Diagnosis of adnexal torsion

Clinical history and physical examination

Sudden severe continuous or intermittent colicky lower abdominal pain may be the first presenting symptom, yet a large number of patients might not present with such typical picture, with pain escalating over a period of time. It may radiate to the ipsilateral lumbar region making the diagnosis more confusing and raising the possibility of urological cause [11]. In addition, fever may be found in case of necrosis, accompanied with nausea and vomiting, which occur in most cases directing toward the suspicion of appendicitis or intestinal obstruction [6]. Adnexal torsion leads to vascular obstruction and congestion of adnexa, with progressive enlargement, and consequently a palpable mass may be felt on one side in up to 70% of cases [25].

Laboratory investigation

Blood test and urine test can help in ruling out a condition that might be confusing with adnexal torsion. Quantitative β -human chorionic gonadotropins will exclude ectopic pregnancy. Moreover, decrease in hemoglobin level might be found in cases of adnexal torsion. Leukocytosis is reported to be a finding associated with adnexal necrosis [26], although other reports show conflicting results about it [7]. Concerning urine tests, many cases with torsion will show positive results for leukocyte esterase, hemoglobin, and nitrites, despite negative urine culture finding for any bacterial growth [5].

Ultrasonography and Doppler study

There are variable images for adnexal torsion on ultrasound scans. Any scan should be correlated with the clinical picture [1]. The condition is frequently described as unilateral enlarged, edematous hypoechoic ovary, with peripherally arranged follicles. In addition, the ovarian borders become ill defined from the surrounding structures as the edema and venous congestion progress further [15,27]. In addition, comparing the scanned images of the involved ovary, with contralateral one, may also assist in the diagnosis. Any associated cyst within the involved ovary will show more echogenic intra-cystic shadows with hemorrhage. The uterine tube as well may be filled with hemorrhagic fluid [1]. Doppler study could reveal whirlpool appearance both on colored and gray-scaled Doppler [28]. Every case with an ovarian torsion is supposed to show abnormal Doppler study finding [29], ranging from coiling of the ovarian vessels seen early at the beginning of the torsion event and later in the subacute cases [30], up to complete absence of perfusion which is an ultimate late finding, proving it to be a sign that cannot be counted upon to exclude torsion [15]. Echoic fluid and anechoic fluid are common findings with ovarian torsion, yet are not consistent with every case, and are not definite findings in diagnosing the condition.

Computed tomography

The computed tomography (CT) finding of a torsed adnexa is quite variable, and it is possible to count upon if the scan is done in the stage of torsion evolution, whether contrast enhanced or noncontrast enhanced. Increased ovarian volume owing to edema and congestion is the most common finding, although it is the least specific; such specificity can be enhanced as the edema and congestion of the ovarian stroma squeeze the follicles toward the periphery underneath the ovarian capsule, which is well demonstrated on contrast-enhanced CT and MRI T2-weighted sequences with fat saturation [31]. The contrast-enhanced phase may further indicate vascular congestion of the adjacent structures, through detection of dilated and enlarged blood vessels, leading to helical figures around the adnexa [31]. On the contrary, the noncontrast-enhanced CT may show a characteristic high-density area of the hematomas and infarcted areas with densities between 30 and 50 UH [25]. In addition to characteristic adnexal findings such as macroscopic fat

components in case of teratomas, the uterus may be seen separated from the adnexal mass [32]. Other frequent findings with the condition include ascites, displacement of the ovary away from its usual location, and obliteration of the adjacent fat planes [13].

MRI findings

MRI is a more safe modality compared with CT, especially during pregnancy [33], with the advantage of higher contrast resolution, leading to better detection of fat content, through either high signal intensity on T1-weighted sequence or low signal intensity on sequences retrieved using fat saturation [25]. On T2-weighted images without fat saturation, an edematous stroma will yield a high signal intensity in addition to the peripherally distributed follicles. However, in case of hemorrhagic infarct, T1-weighted sequence with fat saturation will show high signal intensity, which should foster the suspicion about hemorrhagic infarcts [13].

Methods of treatment

Surgical approach is the only possible way to deal with adnexal torsion, with two different ports to access the adnexa, either via laparoscopy or through laparotomy, with laparoscopy considered to be the preferred method to manage the condition [34]. Laparoscopy provides both the definite diagnosis of the condition, in addition to allowing curative interventional procedure to deal with and treat the adnexal torsion, and it can be safely used in both children and pregnant women [11]. Traditional management of adnexal torsion includes either conservative methods, implying untwisting of the adnexa, to be followed by an ovarian fixation maneuver, to avoid recurrence of twisting, such as evacuation or removal of a cyst and stitching the adnexa to a less mobile pelvic structure if possible [35,36]. The radical surgical measure includes adnexectomy of the revolved adnexa, with a reported rate ranging between 7 and 93% in different articles [35,37]. Usually adnexectomy is not the final resort except after precise check for tissue viability with evidence of adnexal tissue necrosis becoming quite apparent [11]. The main concerns following detorsion of twisted adnexa with apparent dark blue or black mottled coloration will be the potentially possible thromboembolic consequences from untwisting of a necrosed dead adnexa, yet there always has been a very low rate of pulmonary embolism reported with adnexal torsion [7]; fortunately, that rate is similar to the reported rate with untwisting of the torsed adnexa [38].

Exceptionally long lax utero-ovarian ligament is considered a predisposing factor for adnexal torsion. Ovariopexy has been proposed as a solution to guard against revolving of the adnexa around its own axis with such malformed ligament, and also the ovariopexy procedure has been suggested as a protective measure for solitary adnexa, which could be achieved either by suturing the ovarian end of the utero-ovarian ligament either to the back of the broad ligament or the back of the uterus [39]. Isolated fallopian tube torsion (IFTT) is a rare form of adnexal torsion and has been mentioned several times in literature and

reported as published case reports and case series. It is dealt with in the same fashion as ovarian torsion, yet it poses more difficulty to diagnose as the ovary is with normal blood supply and the whirlpool ultrasound sign exists only with ovarian torsion; thus, diagnosing and dealing with IFTT promptly needs much diligence and high suspicion threshold by the investigator [10].

An increasing number of studies were in favor of conservative management with adnexal preservation, whether the torsed structure was an ovary, a tube, or both; such studies showed on postdetorsion follow-up, the ovaries and tubes regaining their function once again, maintaining the same fertility as before, with minimal detrimental implications [10,11].

The present study

After getting the necessary Medical Ethical Committee approval for the currently presented retrospective descriptive case series study, involving 12 patients presenting with severe lower abdominal pain, the following data were retrieved and gathered. Each patient was proved at a point during investigation by ultrasonography and Doppler studies, in addition to CT or MRI if needed, to be associated with right or left adnexal torsion with or without adnexal cyst. The study was conducted in the duration between July 2012 and April 2016 in tertiary hospitals, and all patients had surgical intervention either via laparoscopy or through laparotomy incision. According to the suspected condition of the ovary, either radical surgery including adnexal excision or a more conservative cystectomy with ovarian detorsion was done to preserve the ovary. There were no specific exclusion or inclusion criteria for choosing the cases, yet none of those patients had any history suggestive of systemic medical disease, or previous abdominal surgical intervention, except for two cases with previous appendectomy and five cases with previous cesarean deliveries. One patient had ovarian cystectomy done before through laparotomy, and one case had previous laparoscopic ovarian cystectomy.

RESULTS

The patients had an age range between 14 and 52 years, with a mean of 32.0833 ± 11.0186 years. Demographic criteria and relevant history are presented in Table 1. Nine patients had a cystic mass ranging in size between 4 and 18 cm, with a mean of 10.2 ± 4.422 cm. Following histopathological examination, two patients had no detectable cystic mass and one patient had a cystic left mass, proved later to be a hydrosalpinx causing IFTT. Five patients were diagnosed with functional cyst, three diagnosed with dermoid cyst, and exceptionally, one patient had torsion with endometrioid cyst. All patients had lower abdominal pain as the main presenting symptom. Four patients had fever of 38°C and above. Eight patients had nausea and/or vomiting. Six patients had mild to minimal vaginal bleeding. Seven patients had right-sided adnexal torsion, whereas five cases had left-sided torsion. Table 2 shows a comparison of

the outcome of the clinical and surgical findings of the current study with other similar studies, whereas Fig. 1 demonstrates a simplified graph of the symptoms and signs associated with adnexal torsion. Fig. 2 represents the pathological diagnosis of the excised adnexal cysts. On surgical intervention, of five patients with apparently necrosed adnexa having dark blue to black ovarian tissue coloration with mottling, three patients had oophorectomy done, with two of them having had a lag/delay duration owing to variable reasons, of more than 72 h between the onset of pain and the operative procedure, whereas two patients with apparently necrosed adnexa were spared excision and just treated with detorsion and simple cystectomy. In general, the mean duration between onset of pain and operative intervention for all patients was 36.166 ± 23.205 .

Regarding the mode of operative intervention, eight patients had laparoscopy done for exploration, whereas four patients had laparotomy done to explore the cause of pain. All the patients who had adnexal detorsion were followed up for ~ 4 months postoperatively using ultrasound (US) for signs of peritonitis, pain, and return of follicular activity. They were also followed for signs and symptoms of thromboembolism with not even one showing any. In addition, all of them resumed ovarian activity with apparently growing follicles.

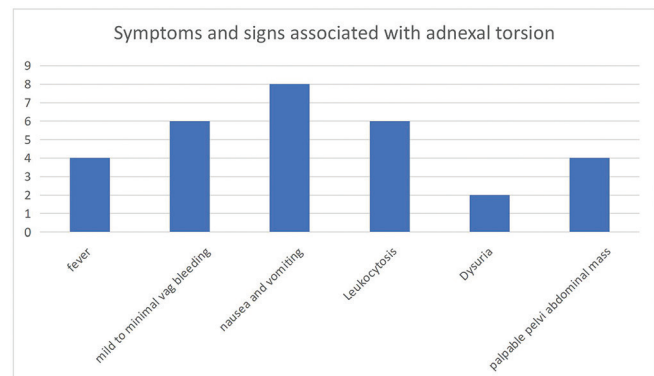


Figure 1: Symptoms and signs associated with adnexal torsion.

Table 1: Demographic criteria of the patients and relevant history

Parameters	Number or range within the parameter	Mean \pm SD
Age	14-52	32.0833 ± 11.018
Parity	0-5	3.1 ± 1.197
Previous abdominal or pelvic surgeries	0-4	2.25 ± 1.299
Months of use of oral contraceptives	0-75	38.714 ± 26.637
Number of times of previous abdominopelvic diagnostic scans in the past 2 years	0-3	1.777 ± 0.8333
Previous cycles of induction of ovulation in the past 10 years	0-12	9 ± 2.449

Table 2: Comparison of the clinical and operative data of different similar studies with the current study

	This study [n (%)]	Vijayalekshmi <i>et al.</i> [40] (%)	Spinelli <i>et al.</i> [41] (%)	Vijayaraghavan [28] (%)	Nair[34] (%)	Poonai <i>et al.</i> [5] [n (%)]
Nausea and vomiting	8 (66.66)	27.8	56.7		65.7	7 (58.33)
Fever	4 (33.33)	5.6	20		12.9	3 (23)
Leukocytosis	6 (50)		63.3		44	8 (61.53)
Dysuria	2 (16.66)	5.6			8.6	
Palpable pelviabdominal mass	4 (33.33)	22.2		47.6	42.9	
Torsion diagnosis by US and Doppler study	10 (83.33)		63.3	95.2	25.7	50
Right-side adnexal cyst	5 (41.66)	50	70		55.7	11 (84.6)
Left-side adnexal cyst	5 (41.66)	38.9	30		42.9	
Cyst size 5-10 cm	4 (33.33)	33.3			71.4	
Cyst size more than 10 cm	5 (41.66)	44.4			11.4	
Laparoscopic approach	8 (66.66)		40		81.4	
Open surgery approach	4 (33.33)		60		18.6	
Conservative surgery	9 (75)		46.7		64.3	6 (46.15)
Radical surgery	3 (25)		53.3		45.7	6 (46.15)
Median time interval from pain to surgery	36 h		12 h		24 h	40 h

US, ultrasound.

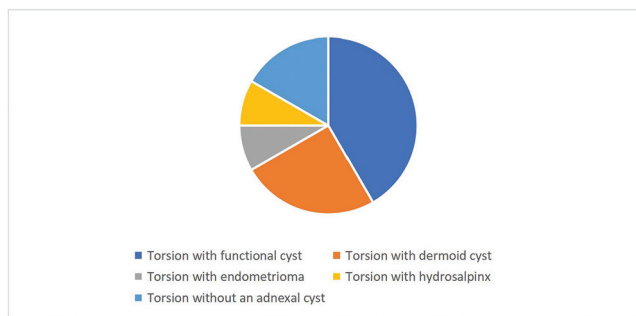


Figure 2: Pathological diagnosis of the different cysts.

DISCUSSION

Ovarian torsion is a relatively common gynecologic emergency ranked fifth among the commonest conditions that require instant surgical intervention, aiming to save a twisted strangulated adnexa from proceeding to necrosis [10]. The estimated incidence of adnexal torsion is 2.5–7.5% [34]. There is an uprising trend toward preserving an adnexa with apparent black/blue necrosed tissue following torsion [7,11].

In a retrospective study of 70 patients by Nair *et al.* [34], all presented with lower abdominal pain, in addition to symptoms such as nausea, vomiting, diarrhea or constipation, dysuria, and sometimes urine retention. A total of 69 (98.6%) patients had an adnexal mass detected on US examination. The size of the adnexal cystic mass was between 5 and 10 cm in 50 cases (representing 71%) and more than 10 cm in eight (11.4%) cases. By clinical examination, 30 (43%) of those patients had a palpable pelvic mass. Only four of those patients were with suspected diagnosis of torsion on US examination. Furthermore, on Doppler study, 14 of 21 cases were suspected to have adnexal torsion, with further CT diagnosing 3 of 13 cases with torsion, and MRI

diagnosing three of seven cases with torsion. Ovarian cyst was diagnosed in 32 (45.3%) cases, with no conclusive finding to support torsion, whereas 12 (16.8%) cases had pelvic free fluid associated with the cyst. Polycystic ovary syndrome of the contralateral ovary was diagnosed in preoperative and postoperative scan in 18 cases; in addition, 10 of those patients had tumor as another risk factor. All patients went through surgical exploration, of whom 13 (18.6%) underwent laparotomy and 57 (81.4%) cases had laparoscopic exploration. A total of 40 (57.1%) cases had isolated ovarian torsion, whereas 15 (21.3%) cases had adnexal torsion involving both the ovary and the tube: five (7.1%) cases had isolated tubal torsion and 10 (14.3%) cases had either paraovarian/paratubal cyst inducing torsion. They reported doing detorsion for 38 (54.3%) cases, of whom 37 cases had associated cystectomy as an adjuvant procedure. Salpingo-oophorectomy was done in 18 (25.7%) cases. Salpingectomy was done in five (7.5%) cases, whereas hysterectomy with bilateral salpingo-oophorectomy was done in nine cases. Ovarian cystectomy was done in five (30.4%) of 21 cases, suspected of having hemorrhagic necrosis, whereas 16 underwent radical surgery. Of the five cases whose ovaries were managed by conservative surgery, four had their ovaries revived during the 2-year follow-up duration, whereas one had her ovary atrophied. The authors concluded a relation between the length of the lag interval between the start of symptoms and commencing on surgery, realizing markedly decreasing chance of saving the ovary with the increase of the elapsing duration between the start of clinical symptoms and surgical intervention.

In another retrospective study by Poonai *et al.* [5], 13 patients were mentioned with adnexal torsion and having an age range between 7 months and 18 years (mean of 12 years); most of the patients were reported to be menarcheal or perimenarcheal (10 out of 13), with a localized right quadrant pain of duration less than 48 h before seeking medical advice. Most of the patients

had vomiting as a prominent symptom. Appendicitis was the probable initial diagnosis in seven patients. Concerning imaging and scans on the path to diagnose those patients, pelvic US diagnosed an ipsilateral ovarian cyst in 11 of 13 patients with right-side pelvic pain. Doppler US done while investigating four patients showed absent adnexal venous blood flow in two of them, whereas three patients had intact arterial blood flow. CT scan was done for two patients and revealed ovarian cysts in both cases. Surgical management was radical in six patients in which salpingo-oophorectomy was done, whereas only two patients of those who underwent detorsion were followed up: one of them for whom oophoropexy was performed in addition to detorsion showed on two-year follow-up a normal ovarian volume and blood flow, whereas the other one who had additional cystectomy done with detorsion showed a smaller affected ovary with follicles, and she delivered a healthy infant several years later.

Ultrasonography has always been the first imaging modality in cases of acute abdomen, with heterogenous ovarian stroma, string of pearls, and free fluid in the Douglas pouch being the most consistent findings, and also US scanning is frequently associated with Doppler study, showing distinctive findings in case of torsion such as absent or reversed venous and arterial blood flow, in addition to the whirlpool sign [10].

In a case series presented by Jain *et al.* [10], one of the cases had inconclusive US of any mass or structured changes to the adnexa except for small amount of free fluid in Douglas pouch, yet on laparoscopy, a left torted adnexa with an ovarian cyst was found. In a second case, the US was able to detect an ovarian cyst whereas Doppler study appeared normal, but on laparoscopy, adnexa with ovarian torsion was found, indicating a limited capability for Doppler in detecting adnexal torsion. The conflicting results about the role of US and Doppler in diagnosing twisted adnexa and its accuracy in detecting a necrosed adnexa has kept on confluence for decades.

Ben-Ami *et al.*[42] in an earlier study found the positive predictive value of Doppler in detecting ovarian torsion in cases with absent venous blood flow uprising up to 94%, whereas in cases where the venous flow is not impaired, it would be very difficult to predict ovarian torsion; such results restrict the role of Doppler in identifying a necrosed ovary rather than a torted adnexa. Such older studies as well as the more recent ones all show a limited role for Doppler in detecting adnexal torsion as long as the venous blood flow is maintained.

Concerning the underlying pathology that might contribute to the torsion process, enlarged adnexa has always been associated with the inception of torsion leading to revolving of the adnexa around its axis. This does not exclude the possibility of adnexal torsion in apparently normal adnexa. Rousseau *et al.* [35], in a retrospective study of 40 cases with ovarian torsion, detected an ovarian mass in 29 (72.5%) cases, of which 14 cases were mature teratoma. Spinelli *et al.*[41]

found 56.7% of cases with ovarian torsion to have underlying functional cyst or a benign ovarian tumor in 20% of cases.

In the past, salpingo-oophorectomy was considered a classic treatment of ovarian torsion to avoid any thromboembolic complications, yet uprising recent trends toward conservative management and preserving the adnexa have led to more cyst aspiration, cystectomy, and adnexal untwisting [11].

Aziz *et al.*[43] in a retrospective study including 17 cases for whom detorsion was done, with or without cystectomy, reached a conclusion denoting detorsion to be a better choice to deal with ovaries even with moderate–severe ischemia. Fourteen out of 17 cases for whom detorsion was done showed regain of normal activity of the torted ovary on follow-up, which was confirmed either by US or ovarian biopsy.

Tsafir *et al.*[44] also conducted a retrospective study including 22 patients with ovarian torsion, for whom detorsion and cyst drainage or cystectomy was done for 19 patients, with oophoropexy done for additional three cases. The retrieved results endorsed detorsion with cystectomy to be the preferred method.

The current study is a descriptive retrospective study involving 12 patients presenting to the emergency room with right or left lower abdominal pain, with a mean pain duration of 36.166 ± 23.205 . Nine of the 12 patients showed a cystic adnexal mass, whereas one had a left hydrosalpinx. US associated with Doppler study adequately and successfully helped in ruling out a provisional diagnosis in 10 patients, whereas one case was in need for further CT to confirm the nature of the cystic mass, proved later to be hydrosalpinx, and one patient had the cystic mass diagnosed on MRI. Of those 12 patients, five had right cystic ovarian adnexal mass, whereas four of them had left cystic adnexal mass. All the cystic masses ranged in size between 4 and 18 cm, with a mean size of 10.2 ± 4.42 cm. All those results were matching on comparison with most of the relevant studies. CT or MRI was done for eight patients for further confirmation and for getting the necessary documents to request a consent and explaining a justified plan of intervention. In three patients Oophorectomy done via laparotomy for suspected gangrenous adnexa, and due to an 18cm ovarian cyst in a 52 year old postmenopausal women, additional hysterectomy and bilateral salpingo-oophorectomy was done for one of those patients. Necrotic adnexa was suspected in five cases, of whom three had the affected adnexa removed, whereas two were treated conservatively, by doing detorsion and cystectomy. All the conservatively treated and untwisted cases showed regain of normal activity of the ovary within four months of follow-up period, assessed by vaginal US. No cases had any thromboembolic events four months after adnexectomy, or adnexal detorsion. Those results were much in concomitance with most of the other relevant studies. Moreover, the current study revealed a direct relation between the time elapsed from the start of symptoms and the inception of surgery with higher incidence of adnexal necrosis and

excision, with prolongation of the waiting time from the start of symptoms.

CONCLUSION

Adnexal detorsion of twisted adnexa followed by removal of any torsion triggering cyst should be considered the decision of choice even with an apparently necrosed adnexa. The incidence of complication after untwisting is minimal with revival of all the twisted and most of the apparently necrosed adnexa to resume normal ovarian activity within a few weeks.

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This study is a retrospective observational descriptive study.

The author, who wrote that paper, has operated those patients included in the study. In addition, the author gathered and collected all of the data and references included in the written paper of that work.

The author has read and revised that paper, and the author believes he has met the inclusion criteria for that work, and believes that work to be a true and honest work.

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Conflicts of interest

There are no conflicts of interest.

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