

Is it Time to Abandon Traditional Oophorectomy for Ovarian Torsion? A Literature Review

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Abstract

Ovarian torsion is one of the gynecological causes of acute abdomen in females of all ages. In the last two decades, there has been an increase in the conservative surgery for ovarian torsion. However necrotic/block looking ovary is still considered as an indication for oophorectomy. Reviewing the literature, it was noted that even conservative surgery for ovaries that appear necrotic, have yielded reasonable post-operative ovarian functions. So here we present, a literature review on the advancements in the diagnosis and management of ovarian torsion, with reference to a case report.

Keywords: Oophorectomy; Oophoropexy; Ovarian torsion

disclosed by the patient prior to the surgery.

Introduction

Ovarian torsion is one of the gynecological causes of acute abdomen in the pediatric, adolescent, and reproductive age females. The incidence of ovarian torsion is reported, as low as 2% to as high as 15% [1,2]. Though it may affect females of all the age groups, its incidence is reported to be maximum in women of reproductive ages, followed by the pediatric and adolescent females and is least common in the post-menopausal women [3]. The diagnosis is suspected on the clinical history and examination and supported by the diagnostic imaging [3-5]. However, laparoscopy is the mainstay of the diagnosis in these cases [3,4,6,7].

The incidence of conservative surgery for ovarian torsion, ovarian detorsion was reported to be 18.1 % in 2001 and had significantly increased to 25% in 2015 [7,8]. Nowadays, most of the surgeons perform ovarian /fertility preserving options in cases where it is feasible [8-10]. However, the long-term outcomes of conservative surgery are directly proportional to prompt diagnosis and management. Delays in the diagnosis and management may have severe implications. Cases of ovarian torsion in patients with previous contralateral oophorectomy are exceedingly rare. The management in these cases is incredibly challenging in cases wherein the remaining ovary is already necrotic. Here we present a case report of a patient of reproductive age with ovarian torsion and operative findings of previous oophorectomy, which was not

Case Report

A 27 years female, para 2 presented to the adult Emergency Department with acute onset abdominal pain. Pain was moderate to severe in intensity, colicky in nature. It was localized in the left iliac fossa with radiation to whole abdomen. It was associated with recurrent vomiting. She was a known case of polycystic ovaries and had delayed and irregular cycles. She had her last period around 45 days back. She had history of appendectomy 11 years back. There was no history of recurrent vaginal discharge, fever, symptoms of pregnancy or ovarian cyst. On examination, she was anxious due to pain. Her pulse rate was 100/m, normal volume. Blood pressure was 158/98 mm Hg. She was afebrile with normal respiratory rate (18/min). Abdominal examination revealed tenderness in left iliac fossa with guarding and rigidity. Rest of the systemic exam was within normal limits.

In view of her clinical presentation the differential diagnosis of ectopic pregnancy, twisted ovarian cyst or pelvic inflammatory disease was considered. Serum beta HCG was negative. There was mild leukocytosis (13300/microliter-normal value $4-10 \times 10^3/\mu\text{L}$) and a significant increase in the Absolute Neutrophil count, $11.6 \times 10^3/\mu\text{L}$ (normal value $2-7 \times 10^3/\mu\text{L}$) was noted. C-reactive protein was less than 5 mg/L. Rest of the lab results were unremarkable. Ultrasound pelvis revealed anteverted uterus measuring 5.8 x 3.5 cm. Endometrial thickness was 1.1 cm. Left

ovary was enlarged with echogenic central stroma and peripherally displaced ovarian follicles with minimal free fluid seen in left adnexa and posterior Cul-de-sac. Twisting of left pedicle was seen with high resistance flow on spectral doppler scan (Figure 1(a,b)). No intra ovarian blood flow was noted.

On the grounds of clinical and radiological findings, diagnosis of ovarian torsion was made. Patient was counselled, risk for the need to salvage the affected ovary was explained and consent was taken. Diagnostic laparoscopy confirmed the diagnosis. Intra-operatively, the left ovary was edematous and bluish-black in color with the ovary and tube twisted five times around ovarian and infundibulopelvic ligament. There was no cyst in the left ovary (Figure 2(a)). Right tube and ovary were absent (Figure 2(b)). As patient did not disclose the history of previous salpingo-oophorectomy with edematous and necrotic left ovary, the management was challenging. As patient was in her reproductive age group, so decision for conservative surgery was considered. Untwisting of the right ovary and tube was performed. After 30 minutes (Given to allow the blood flow to resume), color of the ovary improved. Laparoscopic left Oophoropexy to the back of the uterus was carried out (Figure 2 (c, d)).

She had uneventful post-operative period and was discharged home with 12 hours of surgery. She was counselled about the operative findings and management and the need for follow up. Serum Follicle Stimulating Hormone (FSH), Luteinizing Hormone (LH) and Anti-Mullerian Hormone (AMH) were evaluated post-operatively and again after 6 weeks and 6 months after surgery. Low AMH (4.08 pmol/l) and high FSH (16.2 IU/l) levels were noted after surgery. She had a follow up after 6 weeks and 6 months. FSH was normalized and significant increase in AMH levels were recorded (Table 1).

After 6 months, she had a repeat ultrasound pelvis, which suggested decrease in the ovarian size and with normal blood flow (Figure 1(c, d)).

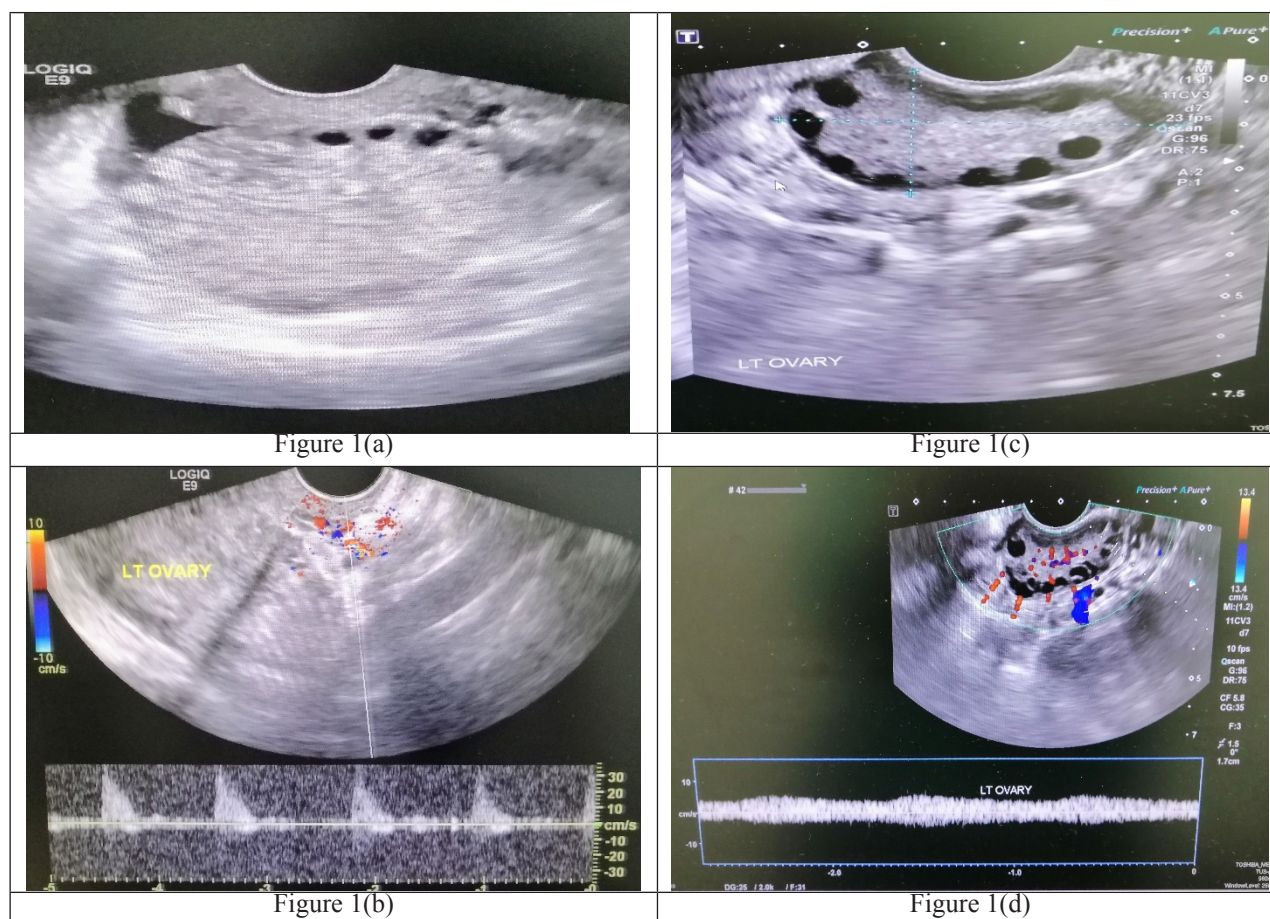


Figure 1: Ultrasound images, preoperatively and post operatively. (a) Preop grey scale sonography depicting bulky and edematous left ovary with follicles displaced to periphery with stromal edema. (b): Preop color Doppler sonography revealing diminished blood flow to left ovary and absent end diastolic flow. (c): Postop grey scale sonography depicting normal appearance of left polycystic ovary. (d): Post-operative color Doppler sonography revealing improved blood flow to left ovary.

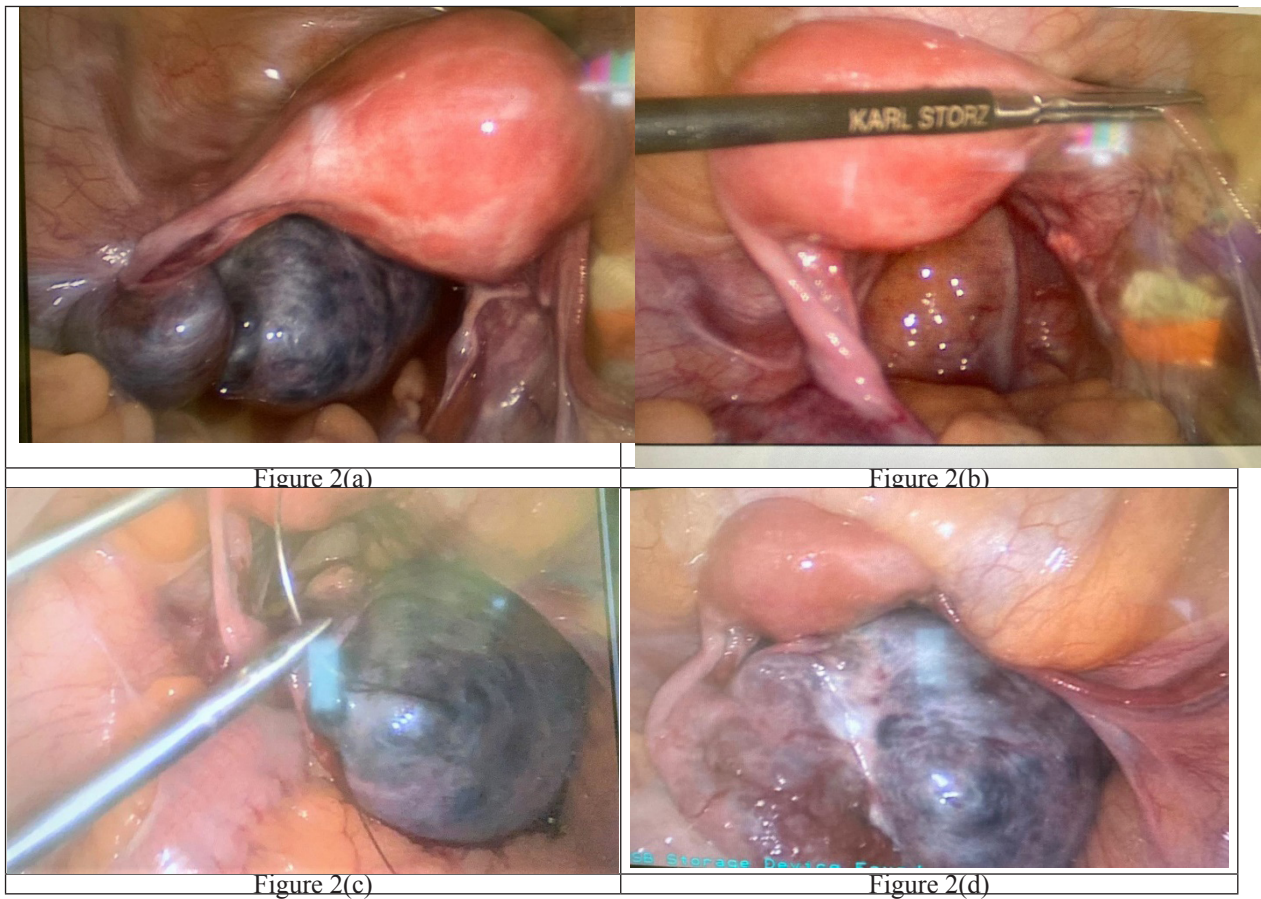


Figure 2: Operative Findings. **(a):** Laparoscopy revealed a very necrotic left ovary with tube twisted five times around ovarian and infundibulopelvic ligament. **(b):** Absent right ovary and right fallopian tube were noted. **(c):** Oophoropexy to the back of the uterus. **(d):** Color changes as compared to image 2(a) after untwisting the pedicle were noted.

	Post op 2 months	Post op 6 months
Follicle Stimulating Hormone (IU/L)	16.2	4.2
Luteinizing Hormone (IU/L)	4.3	4.1
Anti-Mullerian Hormone (pmol/l)	4.08	52.7

Table 1: FSH, LH and AMH levels of patient with ovarian torsion. Normal levels were attained after 6 months post-operative.

Discussion

Incidence the systematic reviews on ovarian torsion have depicted variance in the incidence of ovarian torsion. It was noted in 2.7% of emergency cases. The prevalence in patients with adnexal mass is reported as 2-15% [1,2]. Oelsner et al have reported that is common in women of reproductive age and less frequently diagnosed in pre-menarchal girls and after menopause [3]. In the review study on pediatric ovarian torsion by Poonai et al, ovarian torsion was reported even at the age of 7 months. However, the mean age of diagnosis was 12 years [4].

Pathogenesis

It is usually caused by the twisting of the ovary on its pedicle (Infundibulopelvic and utero-ovarian ligament). In many cases, twisting of the ipsilateral fallopian tube may be the cause. Even a long pedicle or a bulky ovary may lead to torsion in the absence of any

pathology. Due to the winding of the pedicle, there is compromise of the venous return, lymphatic and arterial from the ovarian vessels. This may further progress to stromal edema, hemorrhage, and necrosis [2,11]. The complications worsen with the duration and severity of the torsion. The irritation and necrosis of nerves and ischemia causes the abdominal pain, which will be localized to the laterality of the pathological site. If not addressed early, it may lead loss of tubal and ovarian function.

Risk Factors

Numerous factors, that increase the risk of ovarian torsion have been described by the authors. Torsion is more common in the right ovary. It is suggested that relatively longer right infundibulopelvic ligament predisposes to torsion. Some authors have also described the presence of sigmoid colon on left side as an inhibitory factor for torsion in the left ovary. The most obvious and common risk factor for torsion is the ovarian size. Enlarged ovaries due to cysts, benign or malignant tumors or after stimulation during Artificial Reproductive Techniques (ART) have higher likelihood of torsion [11]. Ovarian size more than 5 cm is at risk of ovarian torsion [2]. The incidence is higher with the benign tumors [1]. In pediatric age group, torsion is reported in more often normal ovaries as compared to other age groups [11]. In comparison to the non-pregnant females, pregnant females have higher possibility of ovarian torsion [1,2,11]. Some authors have proclaimed that females with polycystic ovaries and tubal ligation are also at risk [5,11].

Diagnosis

Acute onset pelvic pain, nausea and vomiting are the commonest symptoms with which these patients present. Other frequently noted symptoms are adnexal mass, fever and abnormal uterine bleeding. Usually patient presents within 48 hours of the onset of the symptoms due to the severity of the symptoms. Examination may reveal restlessness, irritability, and anxiety due to the pain. Tachycardia and low-grade fever may be the positive finding on general examination. Abdominal examination may elicit tenderness with/without a palpable mass. Tenderness may be absent in some patients. Signs of peritonitis are rarely noted [1,2,4,12]. Laboratory studies are not immensely helpful in these cases. Mild leukocytosis may be noted. But a negative result of serum or urine HCG, excludes pregnancy in women of reproductive age.

Ultrasonography is the diagnostic modality of choice in these patients. It has similar diagnostic accuracy as that of CT/MRI [11]. The findings on sonography are consistent with the chronicity of the torsion. In early cases an enlarged unilateral ovary or a tubo-ovarian mass may be noted. Presence of a twisted pedicle confirms the diagnosis. Free fluid in the pelvis, heterogenous stoma and multiple uniformly arranged cysts at the periphery of the ovary known as 'strings of pearls' may be notable after ischemia [11,13].

Displaced ovary, deviation of uterus towards the side of torsion, adnexal fat stranding and tubal dilatation are other radiological features consistent with ovarian torsion. Color doppler sonography displays reduced or absent arterial blood flow on the effected side in classical cases. Nevertheless, normal arterial flow may be noted in these cases [2,11,13]. Venous flows abnormalities are pathognomonic. In a study by Nizar et al on diagnostic accuracy of color doppler flow in ovarian torsion, the absence of arterial flow and absent or abnormal venous flow had sensitivity and specificity of 76% and 100% and specificity of 99% and 97 % respectively [14].

MRI and CT are applicable in cases with equivocal findings on sonography. They may also be indicated in cases with associated gastrointestinal or urinary pathology in case of acute abdomen. CT findings are nearly like that of sonography. They are suggestive of enlarged adnexa with smooth margins, dilated fallopian tubes, deviation of uterus to the ipsilateral side. Infiltration of the peri-adnexal fat is consistent with ovarian necrosis. On contrary, necrosis cannot be excluded in its absence [11,15].

MRI is less often used as a diagnostic tool in acute cases. Similar findings are noted as that in CT. In cases of hemorrhage, there is an absence of enhancement, with engorged vessels and hematoma [13,14]. MRI may be useful in differentiating benign and malignant adnexal masses in subacute cases.

Management

Surgery is the only option of management of these cases. The earlier it is performed, the better are the chances of reversion to normal ovarian function [16,18,20,21]. Laparoscopy is the gold standard modality in the diagnosis and management of ovarian torsion in benign cases. Laparotomy is considered in cases with large adnexal mass, if malignancy is suspected or in cases wherein laparoscopy is not feasible. The further management depends on the clinical scenario.

For benign cases, usually conservative surgery is preferred. Detorsion of the ovary with /without cystectomy is commonly performed. Conservative surgery for ovarian torsion, was reported to be 18.1 % in 2001 and had significantly increased to 25% in 2015 [7,8]. Nowadays, most of the surgeons perform ovarian /fertility preserving options in cases where it is feasible [8-10]. Reviews have suggested that ovaries gain their function after torsion even in cases of necrotic looking ovaries [20]. Conservative surgery is also associated with lesser intra-operative and post-operative complications and shorter hospital stay. In their study Cohen et al have reported statistically significant ($P < 0.001$) reduction in operative and post-operative complications after conservative surgeries for torsion. He also reported that there were no cases of sepsis or thromboembolism [8].

Complications

Delay in the diagnosis and management can lead to loss of ovarian function, infection, and peritonitis [1,2,11]. Infertility or subfertility is also reported in these cases by a few authors [16,21,22]. Impaired ovarian function was detected more often in patients with ovarian cystectomy [16]. Mild fever was noted on first and second post-operative day in some patients [16]. In a study by Oelsner et al, patients with necrotic appearing ovaries, managed conservatively were followed up. None of the patients had complications later. In patients with ovarian cyst with necrotic ovary, where cystectomy was not performed had repeat torsion subsequently. In patients (n=14), who had subsequent unrelated surgery, adnexa were observed. In all them, except one ovary appeared normal. In one of them adnexa could not be identified. Thromboembolism was not noted in any of the cases [16]. Thromboembolism was reported by Pryor et al in 0.2% cases [23].

Prevention of Recurrence

Oophoropexy

Some experts advise that Oophoropexy should be performed in cases of ovarian torsion in childhood to prevent recurrence particularly when one ovary has been removed [19]. Bertozzi et al have reported the incidence of recurrence in 12% of patients. After Oophoropexy the recurrence rate was 5.2% [24]. Comeau et al have described two commonly used techniques for Oophoropexy. In patients with long utero-ovarian pedicle, plication is preferred. In other cases, ovaries are fixed by suturing to round ligaments or uterosacral ligament. Ovaries can also be fixed to peritoneum between the mesorectum and ureter/between iliac veins and ureter. Some surgeons prefer fixing ovary to posterior uterine serosa while others prefer sidewalls of pelvis [25]. Considering the ease in technique and anatomic issues, plication is considered as a safer alternative [26]. Fixating the utero-ovarian ligament to round ligament after folding it was described as a newer technique by one author [27]. However, there are doubts about the routine use of Oophoropexy due to the lack of long-term follow-up studies regarding its effect on future fertility [28,29].

Conclusion

Prompt diagnosis and expedited surgical intervention is the mainstay in patients with ovarian torsion to retain future ovarian function. Conservative surgery is a viable option over ovarian salvage except in post-menopausal women and in cases with ovarian malignancy. Even in cases with necrotic ovary, conservation of ovaries should be considered. Oophoropexy may be done in cases where it is feasible. The technique to be used depends on the surgeons' expertise and anatomic considerations. Due to lack of long-term studies regarding the fertility after Oophoropexy, future studies are recommended.

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Conflict of Interest

None

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