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Ovarian Reserve After Ischemic Changes in Ovarian Torsion. A Case Series

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ABSTRACT

This article discusses the management of reproductive age in three women with a delayed diagnosis of adnexal torsion associated with a risk factor whose ovaries were successfully preserved, followed by a laparoscopic second look.

All of them presented to the emergency room with a typical history of acute abdominal pain associated with nausea and vomiting. The suspicion of ovarian torsion is supported by gynecology ultrasound and abdominal CT to rule out other causes of acute abdominal pain. Emergency laparoscopy done to all of them confirmed ovarian torsion, two of them 4 times and one of them 7 times with a purple-blackish color, so detorsion done with preservation to the affected ovary. Also during surgery, there were risk factors for all patients, including dermoid cyst, tubal endometerioma cyst, and pelvic peritoneal sac. After the primary procedure, a laparoscopic second look was done after 4 weeks of detorsion, which revealed normal ovary and adnexa in color and structure. At the same time, risk factors were corrected for all patients. Post-operation was uneventfull in both primary and second-look surgery. Also, no ovarian torsion recurrence occurred during the 4-week period between two surgeries with clear instructions given to reduce the aggressive activities. Preserving the ovaries in reproductive women with a delayed diagnosis of ovarian torsion was successful and unharmful.

Keywords

Gynaecology, Ovarian torsion, Fertility.

Introduction and Background

Diagnosis of ovarian torsions remains a challenging condition for physicians, and this is mainly for nonspecific presentation and findings such as sudden abdominal pain, nausea, vomiting, leucocytosis, and fever. With delayed recognition, ischemic changes can happen and later can affect ovarian reservation and fertility. For that, once ovarian torsion is suspected, emergency diagnostic surgery should be performed as soon as possible to release the torsion and salvage ovarian function and fertility as much as possible.

Diagnosis is basically clinical; for that, care providers need to be aware of symptoms, signs, as well as risk factors for ovarian torsion. However, imaging studies, started with transvaginal ultrasound, can give nonspecific features to confirm adnexal torsion. With Doppler evaluation of ovarian blood flow, some pictures raise suspicions of diagnosis and exclude similar conditions. Pelvic [CT] computed tomography may confirm and help exclude other causes of acute abdominal pain [1,2].

Confirm or exclude adnexal torsion by laprascopy, which is the gold standard tool. Usually salpingoopherectomy is done to manage the ischemic, gangrenous adnexa due to the fear of infection, sepsis, malignancy, and thrombosis, which were very rare conditions, and no strong evidence supported these theories [1,3]. A minimally invasive surgical approach is recommended with detorsion and preservation of the adnexal structures regardless of the appearance of the ovary. Surgeons should not remove a torsed ovary unless oophorectomy is unavoidable, such as when a severely necrotic ovary falls apart [ACOG].

In this article we present 3 cases of ovarian torsion with a purple to blackish color, 4–7 times torsion, all cases associated with risk factors of ovarian torsion, all of them managed by laparoscopy detorsion, and reserve the overy. All cases had a second take by laparoscopy, which revealed healthy ovary with normal colcor and structure and at the same time treated the risk factor that was associated with torsion.

We provide pictures for all cases in both surgical sets to give caregivers visual guidance and help in making decisions to keep adnexa and to have less adnexal removed, as well as reassure them that regardless of the color, ovarian reserve can be achieved.

Research Cases

First Case

A 26-year-old single girl with a known case of chronic gastritis presented to the emergency department complaining of epigastric pain radiating to the upper quadrant that started more than 24 hours associated with one episode of vomiting. A CT scan done showed a bulky right ovary measuring 5x3.5x6 cm and showed a large 7x6 cm right ovarian cyst with a twisted right fallopian tube. The patient was counseled regarding the CT scan finding and taken to the operating room for diagnostic laparoscopy.

Intraoperative finding: the right ovary and the tube shown in Figure 1.1 were torted 4 times; the right ovary was edematous and blackish in color; the right tube distended with a cystic structure very attached to the right ovary, so detortion was done; aspiration of the parafallopian tube cyst was around 30 cm (Figure 1.2). Cyst aspiration came as dark fluid sent for histopathology. After 4 weeks, the patient was admitted to the hospital for elective laparoscopy right paratubal cystectomy, as ultrasound showed still there was a paratubal cyst.

Intraoperative finding: The right ovary and the tube were normal and pinkish in color, and the left ovary and tube were normal, as well as normal pelvic structures with no adhesions or endometriosis patches or discoloration (shown in Figure 1.3). There was a right parafallopian tube-enlarged cyst measuring 6x5 cm; a cystectomy was done for parafallopian and sent for histopathology. Patient seen in the clinic doing well and informed about histopathology result: Right para fallopian tube: consistent with endometriotic cyst.

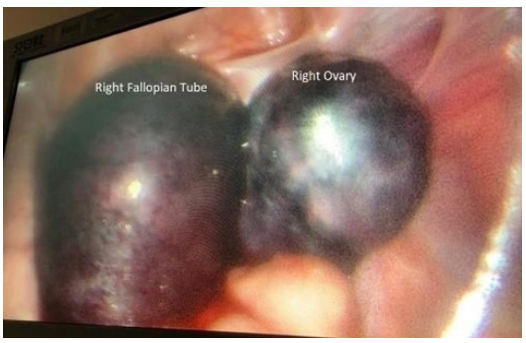

Figure 1.1 Right ovary and fallopian tube was torted 4 times. Edamatous right ovary & blackish in colour.

Figure 1.2: Yellow arrow: right fallopian tube after fluid aspiration. (30 cc) White arrow: right ovary after de-torsion.

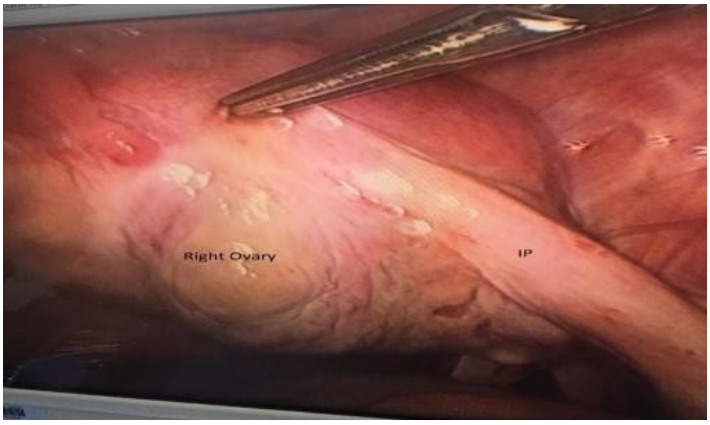

Figure 1.3: second look. (4 weeks post operative) Right ovary with right fallopian tube. Normal colour and vasculatures

Second Case

27-year-old single lady, unknown previous medical history A surgically gastric sleeve patient presented to the ER complaining of severe right lower quadrant pain associated with nausea and vomiting for 1 day. The patient has been reported from outside the hospital as having a having a right ovarian torsion. Gyne ultrasound done showed enlarged right ovary with no blood flow seen, so patient consented and was taken for diagnostic laparoscopy.

Intraoperative finding: There was torsion of the right ovary and tube 4 times, and it was bluish and enlarged, and it was impacting in the posterior pouch on the right side of the pelvic peritoneal pouch (Figure 2.1), so detorsion was done for both the ovary and the tube. After 4 weeks, the patient was admitted for elective laparoscopy peritoneal pouch repair.

Intraoperative finding: Both the right and left ovarian and tube were normal and pinkish in color (see Figure 2.2); There was a defect in the left side of the peritoneum around 5-6 cm. The pouch margin was refreshed by scissors to create a new margin, then was closed by 2-0 vicryl by 3 stitches.

Figure 2.1: Right ovary & fallopian tube torted four times. Oedematous and blue in colour. Yellow arrow: ovarian epithelium. White arrow: area where ovarian stroma exposed.

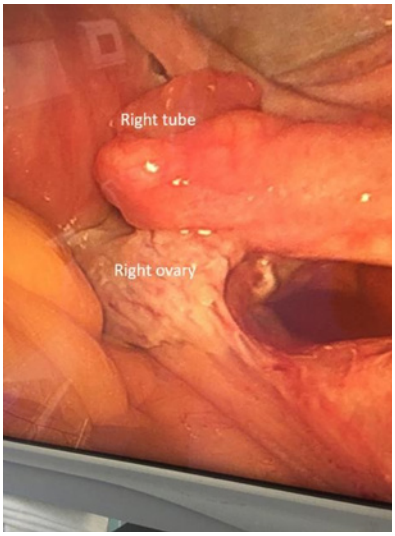

Figure 2.2: second look (4 weeks post-operative) Right ovary and right fallopian tube. Normal colour and texture. Area of adhesion between the ovary and the previous exposed stromal ovarian area.

Third Case

A 30-year-old lady, unknown past medical or surgical history, presented to the ER complaining of left lower abdominal pain association with nausea and vomiting for 5 days. A CT scan done showed left ovary enlarged with dermoid cysts [6x5 cm], and a gynecology scan done showed left ovary seen in the right side enlarged and edematous with very tiny vascularity, so the patient consented and took an emergency diagnostic laparoscopy.

Intraoperative finding: left large ovary seen bluish in color, very fragile, and huge around 9x7 cm (Figure 3.1). It was torted 7 times with the left fallopian tube (Figure 3.2), detorsion genitally done, part of the ovarian tissue was detached spontaneously and sent for histopathology, and the left tube was checked again. Was having good supply and normal appearance. There was atresia in the IP ligament (Figure 3.3). After detorsion, the dermoid cyst can't be distinguished from the entire ovary; the ovary is huge, retched to the other pelvic side, edematous with bluish discoloration, with small peace found detached from the left ovary (Figure 3.4). After 4 weeks, the patient was admitted for elective laparoscopy for dermoid cystectomy.

Intraoperative finding: there were 2 ovarian cysts (Figure 3.5A) of dermoid and endometrioma [containing chocolate material] around 8x6 cm, both removed and sent to histopathology; there were endometriotic patches in the fundus and posterior wall of the uterus in the uterosacral ligament; the left IP ligament was seen as normal with no atresia seen as noted from previous laparoscopy with torsion. The left ovary and tube were normal in color and healthy tissue with a normal tube and normal right ovary and tube.

Patient seen in the clinic doing well and informed about the histopathology [dermoid cyst, endometerioma cyst].

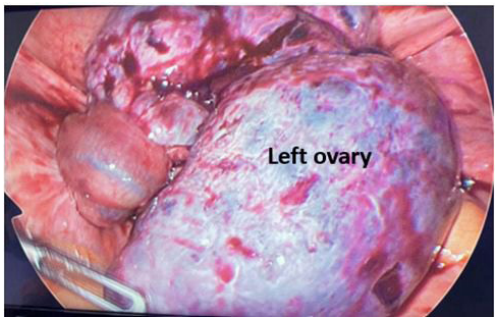

Figure 3.1: yellow arrow: twisted left tube above twisted pedicle.

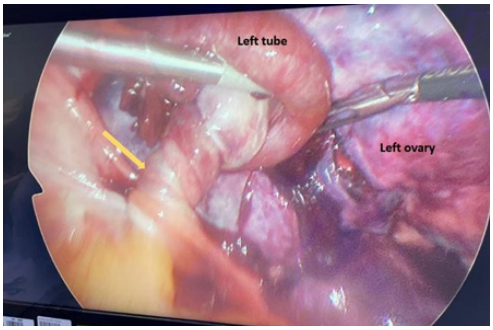

Figure 3.2: yellow arrow: twisted pedicle, seven times.

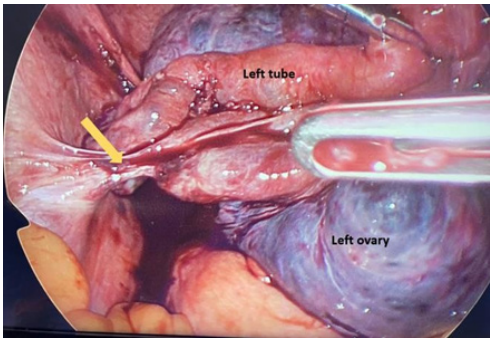

Figure 3.3: After complete de-torstion of Left adnexa. Yellow arrow: Infadibulopelvic Ligament stenosed with fibrosed.

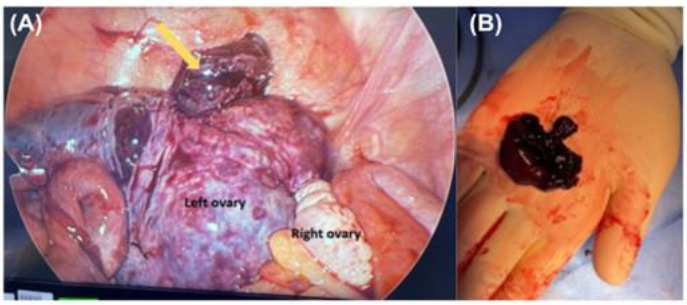

Figure 3.4: (A) Yellow arrow: detached tissue from Left ovary found. (B) tissue Extracted and sent to histopathology.

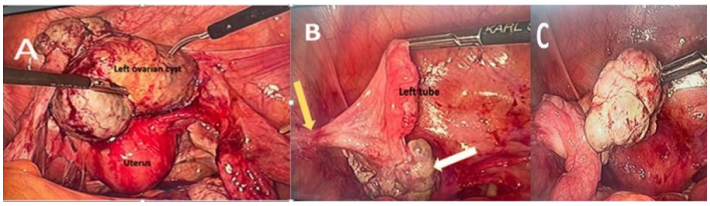

Figure 3.5: Second look (4 weeks post operative) (A) left Adenexa with normal color and texture, mild adhesion noted. (B) White arrow: left ovary post cystectomy. Yellow arrow: Infundibulo- pelvic ligament: Normal color and diameter no more stenosis. (C) Left ovary after cystectomy.

Discussion

Ovarian torsion is described as a partial or complete rotation of the vascular pedicle of the ovary, which impairs the venous outflow and arterial inflow [3]. Ovarian torsion is a rare condition but is a gynecological emergency [4]. Of all gynecological emergencies, ovarian torsion is seen in 2.7–7.4% of cases [5].

The prime risk factor for the ovarian torsion is an ovarian mass greater than 5 cm. This condition is more commonly associated with the benign pathology [97% of cases], and the right side ovary is more commonly involved than the left ovary, probably due to the longer right ovarian ligament and the presence of sigmoid colon on the left side [6]. The most common etiologies associated with the torsion are follicular cysts, parovarian cysts, benign cystic teratomas, and mucinous or serous cystadenomas.

Ovarian torsion accounts for approximately 20 to 30 percent of ovarian surgeries in pediatric patients between 9 and 14 years old [1]. Adnexal torsion is the fifth most common gynecologic emergency [2]. In children, ovarian torsion is usually distinguished by sudden onset iliac or hypogastric pain. Pain is usually associated with nausea and vomiting. History of similar episodes in the past [subtorsion] is a very evocative sign of ovarian torsion [3]. On physical examination, tenderness and guarding are usually present in the iliac and the hypogastric regions. There can be a palpable mass in the lower abdomen suggestive of a torsion.

Diagnostic procedures may include pelvic ultrasound, color Doppler ultrasound, computed tomography, magnetic resonance imaging, pelvic ultrasound, and diagnostic laparoscopy. Pelvic ultrasound is the modality of choice when torsion is suspected, particularly in reproductive-age women, due to the lack of ionizing radiation, and the overall diagnostic accuracy is reported to be 79% compared to 42% on CT [7].

Although there are no sufficient clinical or imaging criteria to confirm the preoperative diagnosis of adnexal torsion, patients commonly presenting with pain and the presence of a pelvic mass measuring 5 cm or larger on imaging have an 83% sensitivity for ovarian torsion [8]. The primary [and sometimes only] ultrasound finding of adnexal torsion is an enlarged ovary [53–85% of confirmed cases]. The expected ovarian volume for a premenarchal child is 1-2 cm^3. The next most common ultrasound finding is increased central echogenicity [40–85% of confirmed cases] thought to be secondary to stromal edema and/or hemorrhage [9]. Doppler studies are helpful in diagnosis when results show limited or no flow, but this should not guide clinical decision-making. Vascular flow can be normal in a torsed ovary with intermittent torsion and detorsion. Multiple ovarian follicles should be seen on ultrasound even in premenarchal patients.

If findings are suggestive of adnexal torsion, surgical evaluation is promptly indicated. If findings are not suggestive of adnexal torsion, evaluate for other etiologies if the pain persists versus observation and precautions for intermittent torsion [2]. CT is not indicated for patients with suspected torsion. The imaging features of CT often demonstrate an asymmetrically enlarged ovary. However, normal CT results have a high negative predictive value when both ovaries are visualized [10]. MRI is reserved for indeterminate cases but results in delayed treatment and is therefore rarely used. Imaging features on MRI are best visualized on T2-weighted sequences without fat saturation. T1-weighted sequences with fat saturation can be useful for identifying hemorrhage [11]. There is no specific duration of time after symptom onset that is predictive of certain ovarian necrosis. In one observational study of 22 pediatric patients with ovarian torsion, the 6 patients with

Salvaged ovaries had a mean time from symptom onset to surgical evaluation of 87 hours [range 7 to 159]. A laparoscopic approach is highly recommended in an emergency situation with a remarkable clinical exam [i.e., sudden-onset severe pelvic pain and acute abdomen] to preserve ovarian function and future fertility. In 50% of cases, torsion is not found at laparoscopy [12,13]. Minimally invasive surgery with detorsion and preservation of the adnexal structures regardless of the appearance of the ovary is recommended as the standard treatment of care for adolescents with adnexal torsion. Even though intraoperative findings of a black or blue ovary suggest necrosis, this is not a reliable indicator of ovarian viability, and oophorectomy is generally not necessary. Multiple studies report future ovarian function despite gross ischemia intraoperative findings. It can take around 36 hours after detorsion to see improvement in the color of the ovary [2]. Due to significant edema and concern that dissection may further compromise vascular perfusion, aspiration of the cyst is on occasion safer than cystectomy, which was the case

for this patient. If needed, a two-staged procedure is an option that would allow time for the edema to decrease and reperfusion to occur, allowing for safer dissection of the cyst wall from the ovarian cortex. Oophorectomy should be avoided unless the ovary is nonviable [falling by itself], malignancy is suspected, or the patient is postmenopausal. Oophorectomies are also not indicated to prevent venous thromboembolism after detorsion, as there is no evidence in the literature to support this practice [14,15].

Our successful treatment of these patients has indicated that, although twisted adnexa may appear to be ischemic or hemorrhagic, it can safely be revived by detorsion with preservation of function. The ability to retain viability even after prolonged ischemia was proved by the excellent results in a severely damaged ovary and demonstrated that complete arterial obstruction is not commonly encountered and blood perfusion can still be gained from either the ovarian or uterine arteries. In our cases mentioned, we provide pictures for both stages [primary procedure and second look and manage the secondary causes]. You can see how the ovary became normal in color, size, and texture, including the tube, although there was severe torsion in the 3rd case by 7 times torsion for a long time [5 days since abdominal pain started]. After detorsion, the infundibulopelvic ligament appeared stenosed as shown in the picture [3.3], and that area was doubtful whether it was going to recover or not, but after 4 weeks, the patient taken for a second look, and an ovarian cystectomy showed the IP ligament completely recovered (Figure 3.5B). No more stenosis, and the fibrotic stenosed area disappeared with full tissue recovery of normal color, size, and texture. Also, the ovary with cysts seen in normal color and healthy tissue provide easy operation and accurate location to the ovarian cyst with a clear margin during cystectomy, which saves a lot of ovarian tissue. Although there was a small ovarian part that fell down spontaneously (Figure 3.4) and was sent to histopathology, the result showed extensive hemorrhagic infarction of ovarian tissue with no viable ovarian tissue, but the recovery completely happened for all ovary and cysts.

There was adhesion seen in cases 2 and 3, while no adhesion was seen in case 1, and this happened due to the loss of some ovarian epithelium tissue in the 2nd and 3rd cases due to oedematous ovarian tissue, which is fragile, easy to tear, and broken either spontaneously due to extensive edema or even with gentel manipulation during detortion to the oedematous, fragile ovarian tissue. This will expose ovarian stroma and build adhesion (Figure 2.2) due to loss of ovarian epithelial layer (Figure 2.1). But these adhesions were not firm and easy to release; we were able to release them pliantly, and it did not require sharp dissection.

In cases of risk factors, they can be managed temporarily, like in the in the 1st case, and fluid aspiration of the adnexal cyst (Figure 1.2) can be done. This can reduce the ovarian torsion possibility in the near future, but patients need to be followed up with ultrasound to differentiate the natural adnexal cyst and if they need surgical excision in 2nd set of surgery [second look] as you are not able to know wither this cyste is primary cyst or secodery to ovarian torsion process where the tissue is changed in color and fragile. While in the 3rd case there is a dermoid cyst as diagnosed by abdominal CT, in primary surgery the dermoid cyst is not clear as the left ovary is oedematous and purple in color and fragile in touch (Figure 3.4.A), so in this situation you cannot differentiate where the dermoid cyst is and do cystectomy, but after 4 weeks in the second look surgery it was obvious and clear borders of the ovarian cyst with healthy and normal color ovary (Figure 3.5.A) also less ovarian tissue loss during cystectomy in healthy tissue.

And according to ACOG, they recommend that the differential diagnosis of an adolescent presenting with abdominal pain should include adnexal torsion. A minimally invasive surgical approach is recommended with detorsion and preservation of the adnexal structures regardless of the appearance of the ovary. Surgeons should not remove a torsed ovary unless oophorectomy is unavoidable, such as when a severely necrotic ovary falls apart [2]. Continued educational efforts targeted at emergency care providers, general surgeons, pediatric surgeons, and gynecologic surgeons about current treatment recommendations for adnexal torsion in young patients are needed, and collaborative care pathways should be encouraged [16-20].

Conclusion

Preserving the ovaries in reproductive women with a delayed diagnosis of ovarian torsion was successful and unharmful regardless of ovarian color and appearance. The presence of a risk factor like an ovarian cyst can be corrected and removed in a planned procedure with no chance of recurrence soon after detorsion and giving clear instructions of limited aggressive activity.

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