

LAPAROSCOPIC OOPHOROPEXY TO PRESERVE OVARIAN FUNCTION IN ADNEXAL TORSION

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Abstract:

Objective: Laparoscopic oophoropexy is performed by a minimally invasive technique that can be offered to any age premenopausal women with an appropriate indication. Adnexal torsion is an uncommon but important cause of emergency admission to the gynaecologist. Torsion of the adnexa has traditionally been treated by involved surgical excision of the affected structure, usually via laparotomy, because of the fear of emboli departing from thrombosed ovarian veins. Several recent reports have described successful conservative management with unwinding of the twisted adnexa. As the trend toward conservative management progresses, the incidence of recurrent adnexal torsion may increase. A more conservative surgical approach of untwisting the torsion has been widely reported in paediatric cases. Despite reports of the successful treatment of torsion with this approach in the adult population.

Aims: The aim of this study is to evaluate the effectiveness and safety of laparoscopic oophoropexy in treatment of adnexal torsion. The following parameters were evaluated ovarian function after ovarian transposition.

Material and Methods: A literature search was performed using Medline and the search engine google. The following search terms were used: adnexal torsion, management of adnexal torsion in pregnancy, management of adnexal torsion in childhood and adolescence.

Conclusion: Adnexal torsion is a rare emergency condition of young women deserving for fertility mostly. Studies show that adnexal torsion occurs mostly on benign conditions so laparoscopic surgery and adnexal detortion even in necrotic appearing adnexa is the golden standard for women who desire for future fertility.

Keywords: Adnexal torsion, laparoscopic oophoropexy, fertility preservation

Introduction:

Ovarian torsion classically occurs unilaterally in a pathologically enlarged ovary. The irregularity of the ovary likely creates a fulcrum around which the oviduct revolves. The process can involve the ovary alone but more commonly affects both the ovary and the oviduct (adnexal torsion). Approximately 60% of torsion occurs on the right side. Multiple factors have been found to be responsible for the development of ovarian torsion. Although torsion may rarely occur in normal adnexa, it more frequently arises from one of many anatomic changes. Torsion of a normal ovary is most common among young children, in whom developmental abnormalities such as excessively long fallopian tubes or absent mesosalpinx may be responsible. During early pregnancy, the presence of an enlarged corpus luteum cyst likely predisposes the ovary to torsion.

Women undergoing induction of ovulation for infertility carry an even greater risk, as numerous theca lutein cysts significantly expand the ovarian volume. Ovarian tumors, both benign and malignant, are implicated in 50-60% of cases of torsion. Involved masses are nearly all greater than 4-6 cm, although torsion is possible with smaller masses. Dermoid tumors are most common. Malignant tumors are much less likely to result in torsion than benign tumors. This is due to the presence of cancerous adhesions that fix the ovary to surrounding tissues. Conversely, patients with a history of pelvic surgery (principally tubal ligation) have an increased risk of torsion, likely owing to adhesions providing a site around which the ovarian pedicle may twist. Ovarian torsion is encountered more often in women who have had ovarian stimulation, which likely accounts for a small increased incidence in developed countries.(1-4)

Most patients with ovarian torsion have a delayed diagnosis, often resulting in infarction and necrosis of the ovary. The ovarian salvage rate has been reported below 10%. Although it is unlikely that the loss of a single ovary results in significantly reduced fertility and no cases of death have been reported due to ovarian torsion, early diagnosis allows for conservative laparoscopic treatment and reduction in complications.(1,3)

Ovarian torsion can occur at any age, but most cases occur in the early reproductive years. Approximately 17% of cases have been found to occur in premenarchal or postmenopausal women. The median age reported by one large review was 28 years. The percentage of patients younger than 30 years is approximately 70-75%.(1) The traditional recommended treatment for ovarian torsion is removal of the ovary without detorsion. However, conservative therapy for preservation of ovarian function should be undertaken, because most women with adnexal torsion are of reproductive age.(5)

Diagnosis

Patients having adnexal torsion usually have abdominal pain in the lower abdominal quadrant and additional nausea and vomiting may accompany pain.(6-7) The pain usually is localized over the involved side, often radiating to the back, pelvis, or thigh. Approximately 25% of patients experience bilateral lower quadrant pain. It may be described as sharp and stabbing or less frequently crampy. Nausea and vomiting occur in approximately 70% of patients, mimicking a gastrointestinal source of pain and further obscuring the diagnosis. History of prior episodes may be elicited possibly due to partial, spontaneously resolving torsion. Fever may occur as a late finding as the ovary becomes necrotic. Onset during exercise or other agitating movement is common.(1)

The physical examination, like the history, is typically nonspecific and is highly variable. A unilateral, tender adnexal mass has been reported in between 50 and 90% of patients. However, absence of such a finding does not exclude the diagnosis. Tenderness to palpation is common; however, it is mild in approximately 30% and absent in another 30% of patients. Therefore, the absence of tenderness cannot be used to rule out torsion. Peritoneal findings are infrequent and indicate advanced disease if present.(1,3)

All the patients admitting to emergency should have gray scale ultrasonography as the primary modality of imaging for patients with suspected ovarian torsion and always a mass appearance will be there. Ovarian enlargement secondary to impaired venous and lymphatic drainage is the most common sonographic finding in ovarian torsion. It will be mostly an echogenic mass because of ovarian edema and possible hemorrhage.(8-9) The finding of an ovarian mass may suggest a focus for torsion but may also mislead the physician as to being the source of pain itself. Because implicated masses are most frequently non-neoplastic or hemorrhagic cysts, which can themselves produce pain of similar quality and location, diagnosis even with appropriate imaging can be challenging. Nevertheless, given a history reminiscent of torsion the discovery of an ovarian cyst should greatly increase one's suspicion of the diagnosis. Ovarian blood supply is gradually compromised during the process of torsion. Colored Doppler sonography with its non-invasive modality detects blood flow patterns within the ovarian vascular networks and gives important information about the diagnosis of torsion. (7,10) Additionally, if the scan is performed during a transient period of detorsing of the ovary a normal Doppler flow may falsely suggest a normal ovary. Although absence of arterial blood flow may be diagnostic, early in the progression of disease arterial perfusion may be preserved with only obstruction of venous and lymphatic flow. Color Doppler sonography may be helpful in predicting viability of adnexal structures by depicting blood flow within the twisted vascular pedicle and presence of central venous flow.(1)

Recently IL-6 levels were found significantly high in patients proven to be adnexal torsion. So it can be used as a diagnostic tool in the future.(11) Computed tomography may demonstrate an enlarged ovary and adnexal masses but is unable to evaluate the presence or absence of blood flow to the involved ovary. However, CT may be useful in ruling out other possible causes of lower abdominal pain in cases of diagnostic uncertainty. Additionally, CT can exclude the presence of a pelvic mass, which greatly adds in the ability to rule out torsion. In case of suspicion of malignancy more advanced diagnostic modalities may come into action like tumor markers CT scan or MRI.(1,4)

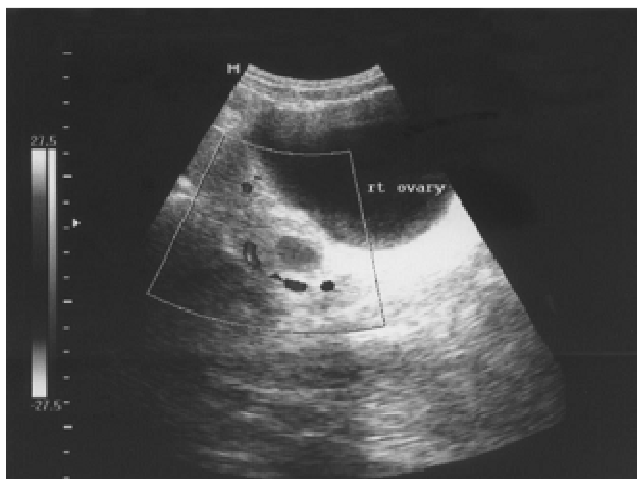


Figure 1: Pelvic ultrasonography showing a normal-sized ovary with follicular growth and blood flow in the vessels.

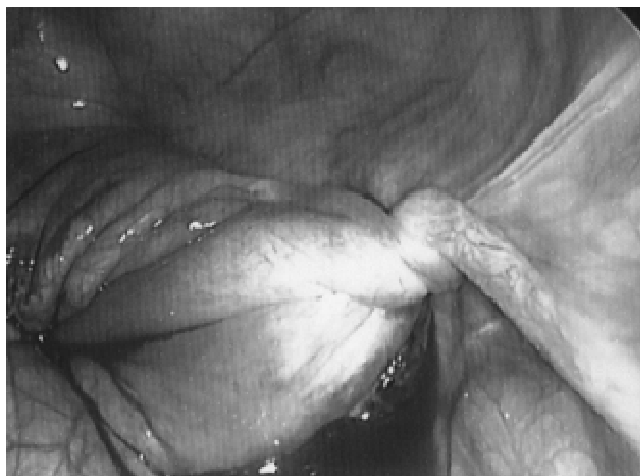


Figure 2: Laparoscopic aspect of the twisted right ovary.

The diagnosis and surgery period should be as short as possible because the ischemia of the may cause complete ovarian failure which is important for patients in reproductive period who desire fertility preservation.

For the patient with a concerning history, physical examination, or ultrasonographic findings suspicious for torsion, prompt gynecologic consultation should be sought for evaluation and definitive treatment. Conservative management is favored early in the course of disease and consists of laparoscopy with uncoiling of the torted ovary and possible oophoropexy. Since recurrence of torsion is rare except in profoundly enlarged ovaries (ie, polycystic ovaries), some suggest that fixation of the ovary to the pelvic wall is unwarranted. Salpingo-oophorectomy may be indicated if severe vascular compromise, peritonitis, or tissue necrosis is clearly evident. However, since the size, color, and edema of the ovary may not accurately reflect the amount of tissue injury, multiple studies now support early conservative management with a success rate of 88% or greater. Recently, laparoscopic triplication of the utero-ovarian ligament has been performed to prevent recurrent torsion in young patients in attempt to shorten the excessively long ligament.

Operative technique

In the last decade, operative laparoscopic procedures are performed increasingly in gynecology. The major advantages of this newer minimally invasive approach are decreased postoperative morbidity, less pain and decreased need for analgesics, early normal bowel function, shorter hospital stay, and early return to normal activity. (12)

Since the patients with adnexal torsion are usually at the reproductive age period ,the common approach gaining popularity is minimal surgery which is usually detorsion for the twisted ischemic adnexa and to preserve ovarian functions.

In case of presence of ovarian cyst, ovarian cystectomy may be necessary. An ovarian cystectomy removes the cyst intact with minimal trauma to the residual ovarian tissue. Alternatively, the cyst fluid can be drained to minimize spillage and facilitate its removal. By excising the cyst, histopathologic examination is more complete and risk

of recurrence is minimized. Many cysts are ruptured during their manipulation despite a delicate technique. The removal of a cyst 10 cm or larger intact is difficult laparoscopically. Aspiration before removal of large cysts is practical can be accomplished using an 18 gauge laparoscopic needle or suction irrigator system .Alternatively, a 5 mm trocar and sleeve are introduced through a suprapubic port. The trocar is placed into the cyst, and then removed, and the suction irrigator inserted. This is good for mucinous cystadenomas and endometriomas but is not advisable for benign teratomas, which contain hair. The aspirate is sent for cytologic examination and cyst and pelvis wall are irrigated continuously especially benign cystic teratomas, mucinous cystadenomas or endometriomas. The most dependent part of cyst wall is opened and the internal surface is inspected. If there is suspicious lesion, biopsy is taken for frozen section. By using two grasping forceps and suction irrigator probe for traction and counteraction the capsule is stripped and sent for histological examination. If it is difficult to remove capsule from ovarian capsule dilute vasopressin between the capsule and cortex facilitates the stripping. If the cyst wall can not be identified clearly, the edge of the ovarian incision can be freshened with scissors and the resulting clean edge reveals the different structures. If this does not free the capsule, the base of the cyst is grasped and traction applied to the cyst with counteraction to the ovary. Sharp or laser dissection to completely free the cyst wall may be necessary. Teratomas often can be excised intact but if rupture occurs spillage is more than if cyst is opened and aspirated. A plane between cyst wall and ovarian tissue is developed by hydrodissection first by 7.5 inch spinal needle than by suction irrigator probe. After cyst is removed the base of the capsule is irrigated and coagulation with either CO2 laser or bipolar electrocoagulation is achieved. If ovarian edges overlap, the defect is left to heal without suturing because adhesion formation is more with sutures. If suture is necessary it must inside ovary so there will be less adhesion formation. The lining of teratoma is removed from the pelvis through a 10 mm accessory trocar, a culdotomy the operating channel of laparoscope or in an endobag. Any cyst capsule should be sent to frozen examination and in case teratoma the pelvis should be irrigated copiously with saline to get rid of all possible sebaceous material which may lead to peritonitis. For teratomas greater than 8 cm , the ovary can be placed in the cul de sac adjacent to a culdotomy incision. Draining the cyst and removing its wall transvaginally minimizes the risk of contamination and maintains a minimally invasive approach. (13)

Materials and methods

A literature search was performed using Medline and the search engine google. The following search terms were used: adnexal torsion, management of adnexal torsion in pregnancy, management of adnexal torsion in childhood and adolescence. and 150 citations were found. Selected papers were screened for further references. Criteria for selection of literature were methods of analysis (statistical or non statistical). Number of cases were not considered as a criteria since adnexal torsion is a rare event and literature has limited number cases.

Results

In a retrospective study by Canis M et al. (2002) in their report analyzed 72 patients with a mean age of 31 years (10–72) who were diagnosed by laparoscopy with an adnexal torsion. Conservative treatment was decided 32 according to the ischaemic lesion and the aetiology of the torsion. Apart from the patients with irreversible/necrotic lesions, untwisting of the adnexa was always performed. They found that Forty-eight patients

(66.7%) underwent a conservative laparoscopic procedure. We observed no significant post-operative complications. Fifty-eight patients were followed-up to 1995, mean follow-up 88.7 \pm 58 months. They observed five recurrences, three on the ipsilateral adnexa and two on the contralateral. Four were managed conservatively. The mean adhesion score of the treated adnexa was 2.6 \pm 5.1 at laparoscopic treatment and 3.5 \pm 6.2 at second-look laparoscopy. Nine of the 10 patients who desired pregnancy conceived. They suggested that Conservative laparoscopic management is safe, preserves normal and functional adnexae, and should be recommended in young patients. Guidelines for the indication of oophoropexy will be proposed.(14)

Yiu-Tai Li et al. (2005) reported that an 18-year-old female presented with a 6-day history of lower abdominal pain. Transabdominal ultrasonography revealed a right adnexal cyst measuring 9 cm. Laparoscopic examination demonstrated a 10-cm right paratubal cyst and a 5-cm right ovarian torsion with gangrenous discoloration. After removal of the right paratubal cyst, untwisting of the right ovary was performed. The postoperative period was uneventful. During follow-up, ultrasonography revealed restoration of right ovarian size with follicular growth. Arterial and venous blood flows were seen on Doppler examination. The right ovary appeared to be completely viable through a second-look laparoscopic examination. A twisted ovary may be completely restored with conservative management.(5)

Another a retrospective study by M. Abeş and H. Sarihan. (2004) Analyzed the medical records of 10 patients with ovarian torsion, who underwent oophorectomy and contralateral oophoropexy between April 1992 and April 2003, were reviewed retrospectively. The ovary was connected to the peritoneum of the posterior abdominal wall avoiding a disturbance of the tubo-ovarian anatomic relationship. They found that the ages of patients ranged from 5 days to 14 years, with a mean age of 7.7 years. The period from onset of symptoms to hospital admission was ranged from 2 hours to 11 months. Only 1 ovary was salvaged after detorsion and bilateral oophoropexy was performed. In the other patients, the torsion caused necrosis, and oophorectomy or salpingo-oophorectomy and contralateral oophoropexy were carried out. Ovarian torsion occurred in 4 previously normal ovaries, in 5 cystic ovaries, and in 1 ovary containing a mature cystic teratoma. Two out of 10 patients had thrombus formation within the vessels of the twisted ovaries. An embolic phenomenon did not develop in any of the cases. At follow-up, all pubertal girls had normal menstrual periods. They concluded that failure to protect ovaries from subsequent torsions can result in castration, and we performed oophoropexy in both retained detorsed and contralateral ovaries without any postoperative complication. They performed medial oophoropexy to avoid tubo-ovarian disturbance. Oophoropexy is an easy and reversible procedure, and should be done in all cases of ovarian torsion.(15)

Roxanna V et al. (1995) Reported a case of a 33 year old gravida 3, para 2 Caucasian female who presented at 7 weeks gestation complaining of symptoms similar to those experienced during an episode of right ovarian torsion treated by laparoscopic unwinding 6 years earlier. Colour Doppler sonography revealed absent flow in the right adnexa. The twisted right adnexa containing the presumed corpus luteum of pregnancy was laparoscopically unwound. Using an extracorporeal suturing technique, a laparoscopic oophoropexy was performed to prevent any further rotatory movement. This appears to be the first reported case of laparoscopic oophoropexy for a recurrent

ovarian torsion; they encourage the use of this simple, minimally invasive procedure in cases of recurrent adnexal torsion. (16)

In a retrospective study by Oelsner et al. 110 patients were operated for adnexal torsion of which 102 were children or women of childbearing age and the other eight were postmenopausal to whom bilateral salphingo-oophorectomy is applied. All the remaining 102 patients underwent detorsion of which 67 had it laparoscopic route. The ultrasonographically measured cyst sizes were significantly smaller in the laparoscopy group. In the laparoscopy group the duration of the hospitalization was significantly short. All the patients had vaginal ultrasonography after 8-10 weeks after operation and all but one had ovaries of normal size and follicular development. The only patient losing the ovarian function was a 9 year old girl having laparotomy and in a subsequent surgery after 5 years it was found that she had no adnexa there were extensive adhesions. Oelsner et al. says that even if the adnexa seems necrotic, it should not be removed and since it is friable detorsion must be performed with care, and preferably with blunt instruments if laparoscopy is used. They recommend that detorsion alone should be performed, cystectomy should be avoided because there is no clear plane of separation between cyst and its bed and excision of cyst may cause undue amount of ovarian tissue to be removed inadvertently. However, if cystectomy is deferred, it should not be delayed too long since these patients may have repeat torsion. Laparoscopy must be the choice of surgery whenever experienced surgeons available because of short length of hospitalization, and greater degree of patient comfort. (17)

Recurrence of adnexal torsion may occur. In a by study Pansky M et al. recurrence of torsion of pathologic adnexa and normal adnexa is compared. They found out that after performing only detorsion procedure of the normal appearing adnexa the recurrence rate was more common than after detorsion and cyst excision procedure of the pathological appearing adnexa so it seems that the current adnexa-sparing laparoscopic management of adnexal torsion by simply untwisting may predispose to recurrent torsion of normal adnexa. The role of ovarian suspension procedures in the prevention of recurrent torsion events remains uncertain. (18)

The classical teaching in the past was that twisted adnexa should be resected and not untwisted, so as not to increase the risk of pulmonary embolism (PE). of recurrent torsion events remains uncertain. McGovern PG et al. examined the literature for cases of adnexal torsion and PE to see if the operative management (untwisting vs. excision without untwisting) could be implicated as a contributing factor. Three hundred nine cases of adnexal torsion managed by untwisting and 672 cases treated by adnexectomy without detorsion (untwisting) were found. The incidence of PE after adnexal torsion was 0.2 percent, and this incidence was not increased when the adnexa were untwisted. Therefore, they concluded that detorsion of twisted adnexa does not increase the risk of PE, compared with excision without untwisting. PE does occur in cases in which adnexal resection is performed without untwisting. Thus, detorsion of twisted adnexa should be considered at laparoscopy or laparotomy without fear of increasing the incidence of PE. (19)

Oelsner et al reported that 102 adnexal torsion patients routinely underwent detorsion

without oophorectomy or salpingo-oophorectomy, regardless of the ischemic appearance of the adnexa. They used either laparoscopy or laparotomy to complete the operations. No patient in their study had clinical signs of thromboembolism postoperatively. Recovery of normal ovarian size and function, as shown by follicular development, was 93.3% and 90.6% in the laparoscopy and laparotomy groups, respectively.(20)

Moreover, McGovern et al performed a literature review of 309 patients with adnexal torsion who were treated by detorsion and 672 patients who were treated by adnexectomy without detorsion. The incidence of pulmonary embolism after adnexal torsion was 0.2%, and they found that this incidence was not increased with detorsion ($p=0.47$). Pulmonary embolism actually did not occur in patients in the detorsion group.(21)

Discussion

Adnexal torsion is a rare gynecologic emergency of women who are mostly at reproductive ages. So there is an increasing trend towards conservative approach for preservation of fertility in young women. Literature has all come to a point of agreement that as minimal surgery as possible and sparing of adnexa for these women of reproductive age since torsed adnexa has a benign histopathology mostly. Operative laparoscopic procedures are being performed increasingly in gynecology in recent years. It presents some main advantages over laparotomy. Smaller surgical scars which has better healing process than a single big scar, reduced postoperative pain and morbidity and; shorter hospital stays and recovery periods with a lower cost are the major advantages of laparoscopy.(12,17)

Since mostly the lesions are benign in nature simply detorsion of the torsed adnexa and if necessary the cyst excision is the preferred procedure. But what is very important is the time period between the diagnosis and treatment of the pathology. Since the torsion of adnexa causes a relative ischemia of the ovarian tissue, it may result in failure and loss of ovarian function.(17)

In older studies it was advised to remove the necrotic adnexa since they thought that it would cause pulmonary emboly. But in recent literature it is not advised to remove the adnexa even if the adnexa looks necrotic because even severely necrotic looking adnexa may save its function after surgery. (19)

Some literature says that only simple detorsion procedure may cause retorsion and the rate of retorsion is higher patients with normal looking adnexa and its lower in the patients who have pathologic adnexa and some other procedure also applied with detorsion. Ovariopexy may be applied additionally if especially there is a long ovarian pedicle more studies are needed to evaluate its value.(18)

In the literature it is shown in retrospective studies that in the patient selection for laparoscopic surgery, size of the adnexal cystic pathology is an important criteria that is the mean size of the cyst is smaller in laparoscopic surgeries compared to laparotomy.(17)

Conclusion

Adnexal torsion is a rare emergency condition of young women deserving for fertility mostly. Studies show that adnexal torsion occurs mostly on benign conditions so laparoscopic surgery and adnexal detorsion even in necrotic appearing adnexa is the golden standard for women who desire for future fertility.

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