LAPAROSCOPIC VERSUS OPEN MANAGEMENT OF ADNEXAL TORSION

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ABSTRACT:

Adnexal torsion is a rare gynecologic emergency of women at reproductive ages but may cover pregnancy, childhood, adolescence and pre and postmenopausal periods. Since it covers women who desire fertility in future, early diagnosis and conservative adnexa- sparing surgery is very important. Laparoscopic adnexal detorsion of the torted adnexa with blunt instruments and if necessary cyst excision is the treatment of choice in all women except pre and post menopausal period because of suspicion of malignancy is more. Detorsion must be performed even in necrotic appearing adnexa because of a high rate of survival of ovaries even looking necrotic. Laparoscopy surgery must be the choice for less post operative morbity, and a better cosmetic appearance. Laparoscopic procedures in pregnancy are also safe and fetal and maternal outcome is comparable to laparotomy.The literature supports laparoscopic surgery in carefully selected cases for adnexal torsion.

KEY WORDS:

Adnexal torsion, laparoscopic vs open surgery, adnexal detorsion

INTRODUCTION:

Adnexal torsion is reported to be the fifth most common gynecologic emergency condition encountered with a prevalence of 2.7 %(1).It is a dreaded complication of ovarian tumors either in pregnant or non-pregnant state. Usually adnexal torsion is a process of benign tumors. The causes of adnexal torsion include paraovarian cysts, functional and pathologic ovarian cysts, ovarian hyper stimulation ,ectopic pregnancy,adhesions,and congenital malformations(2,3-4).Although adnexal torsion can occur at all age groups, it is a more common procedure of women at reproductive ages due functional ovaries(4-5).Its prevalence ranges between 3,2 and 28,6% in pregnancy(4-6). Prompt diagnosis and surgical restoration of blood flow may possibly avoid irreversible damage. Since the patients are at the age for deserving fertility in general, minimal access surgery and conservative approach to the torsioned adnexa is gaining popularity in the world.

AIMS:

The aim of this study is to compare the effectiveness and safety of laparoscopic and conventional laparotomy in treatment of adnexal torsion. The following parameters were evaluated for both laparoscopic and open procedures.

1. Method of patient selection

2. Operative technique

3. Operating time.

4. Intra-operative and postoperative complications.

5. Postoperative pain and amount of narcotic used.

6. Postoperative morbidity.

7. Hospital stay.

8. Cost effectiveness

9. Quality of life analyses

MATERIALS AND METHODS:

A literature search was performed using Medline and the search engine Google. The following search terms were used: "management of adnexal torsion laparoscopic versus open", "adnexal torsion", "management of adnexal torsion in pregnancy", "management of adnexal torsion in childhood and adolescence" and 150 citations were foundl. Selected papers were screened for further references. Criteria for selection of literature were methods of analysis (statistical or non statistical), operative procedure (only universally accepted procedures were selected) and the institution where the study was done (Specialized institution for laparoscopic surgery).Number of cases were not considered as a criteria since adnexal torsion is a rare event and literature has limited number cases.

DIAGNOSIS:

Patients having adnexal torsion usually have abdominal pain in the lower abdominal quadrant and additional nausea and vomiting may accompany pain(5,7).All the patients admitting to emergency should have gray scale ultrasonography and always a mass appearance will be there.

It will be mostly an echogenic mass because of ovarian edema and possible hemorrhage (8-9). 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 (6-7).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 (10).In case of suspicion of malignancy more advanced diagnostic modalities may come into action like tumor markers CT scan or MRI..

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.

LAPAROSCOPIC MANAGEMENT OF ADNEXAL TORSION:

 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 (11).

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 cytectomy 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, histhopathologic 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 5mm 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 CO_2 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 materal 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 (12).

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 loosing 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 (13).

In a prospective study by Fanfani et al., management of benign adnexal masses by laparoscopic surgery and by minilaparotomy was compared. One hundred patients were in the study and half were operated laparoscopically and the other half by minilaparotomy.The operating time was significantly shorter in minilaparotomy.When considering the both the early and late post operative complications only the duration of ileus was longer in the minilaparotomy group but it did not changed the day of discharge. They concluded that both surgical approaches fulfill the criteria of minimally invasive surgery. In obese patients and in patients' critical physical status, induction of peritoneum seems to cause serious intra operative complications so these high risk patients should not get pneumoperitoneum and so should not be operated by laparoscopy. Instead they can get minilaparotomy or vaginal surgery. Pelosi and Pelosi showed that the presence of adhesions due to previous surgery or endometriosis, can represent a technical limitation for the minilaparotomy that can be easily overcomed by the wider vision and the abdominal distension offered by laparoscopy. Furthermore, laparoscopy allows an optimal inspection of the peritoneal surface that, when required, should be performed during the surgical management of suspicious adnexal masses (14, 15, 16).

In a study by Havrilesky LJ et al., predictors of clinical outcomes in the laparoscopic management of adnexal masses were studied retrospectively. Complications occurred in 8% of 396 patients. Conversion to laparotomy occurred in 25% of cases and was associated with larger mass, prior hysterectomy and younger age. Mass rupture occurred in 25% and was associated with prior or concurrent hysterectomy and younger age. Blood loss greater than 500 ml was associated with concurrent hysterectomy. Length of stay was associated with concurrent and prior hysterectomy larger mass and prior abdominal surgery and medical comorbidities.So they

attributed the complications and adverse outcomes to hysterectomy rather than removal of the adnexal mass (17).

Eltabbakh et al analyzed 204 consecutive operative laparoscopies and found that a history of at least one prior laparotomy predicted major complications at laparoscopy or conversion to laparotomy.And prior hysterectomy was more strongly associated with adverse outcomes than prior abdominal surgery, probably because adhesions affecting subsequent pelvic surgical procedures are more likely to result from hysterectomy than from most other abdominal procedures (18).

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 (19).

Chapron et al. worked on 27 patients retrospectively who had the intraoperative diagnosis of adnexal torsion. Treatment was carried out by laparoscopy and in half of the cases it was possible to achieve conservative laparoscopic treatment. The nature of the lesions and the experience of the surgeons are two factors which closely govern the outcome of surgical treatment and its consumed that if the surgeons are sufficiently expressed, treatment by conservative laparoscopic surgery for adnexa is both safe and reliable(20).

Argenta et al. retrospectively studied 104 cases of adnexal torsion. 46% had laparoscopic surgeries and 19% had adnexa sparing procedures. Neoplastic and functional tumors of the ovary composed > 90% of the diagnoses at microscopic evaluation, with cancer diagnosed in < 1% of cases. Patients treated in the latter half of the study were not less likely to undergo laparotomy than those treated in the first half; however, conversion from laparoscopy to laparotomy was significantly less common in the latter half. Patients in this study were more likely to receive an adnexa-sparing operation than historical controls, but there was no improvement in this rate from the first to the second half of this study. A history of previous abdominal surgery was the most common associated condition, but 47% of patients had no known risk factors. Ovarian hyperstimulation, previously omitted in series reports, was an antecedent

factor in 9% of patients. And as a result a more-conservative approach to the treatment of this process is becoming increasingly common, as seems warranted in light of the low incidence of malignancy. The need for conversion from a laparoscopic to an open approach appears to have been waning over the last decade; that may correlate with an increased comfort level in gynecologists with laparoscopic approaches (3).

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 (21).

In a retrospective study by Tarik et al., 3572 cases of laparoscopic procedures were studied retrospectively. The overall complication rate was 1.88%.Only one death occurred due to aortic injury during insertion of the principal intraumbilical trocar.Complications during insertion of the Verres needle, principal and accessory trocars constituted the 38.2% of all complications. So they found out that despite advanced technology and experience, complications during installation phase remain a major cause of significant morbidity (22).

MANAGEMENT IN PREGNANCY:

OHSS as a risk factor for adnexal torsion was studied by Mashiach et al.For a period of ten years, 201 OHSS patients were reviewed retrospectively and this complication was observed 16% of pregnant and 2.3% of nonpregnant patients. They told in their study that during OHSS because the symptoms were nonspecific for torsion; this may lead to delayed diagnosis and intervention and to definite damage with loss of ovarian function in these patients. The presence of large ovaries, nausea, abdominal pain and progressive leukocytosis and anemia were suggestive of torsion. Symptoms were generally appearing between the 6th and 13th weeks of

pregnancy; except one case where they started during 20th week. In the series reported by these authors, both ovaries were similarly affected and the mean interval between admission of patients and surgery was 15.5h.Only simple detortion is the surgical procedure and the evolution of pregnancy after surgery seemed mostly favorable(23).

In a study by Parker WH et al.,12 pregnant women were reviewed who had laparoscopic removal of benign cystic teratoma.This is not a literature about detorsion but it gives important information about management of adnexal tumors in pregnancy.Gestational ages at surgery ranged from 9 to 17 weeks, with a mean of 14 weeks. Intraoperative rupture of the cyst occurred in 10 of 12 (93%) women. No patient had evidence of chemical peritonitis. The mean operating time was 87 minutes and the mean postoperative hospital stay was 44 hours. No intraoperative or postoperative maternal or fetal complications occurred. So it can be concluded that laparoscopic removal of benign adnexal masses in pregnancy is safe. . In spite of a significant risk of cyst rupture in benign cystic teratoma, careful operative technique followed by copious irrigation of the pelvis may avoid chemical peritonitis and potential adverse sequelae (24).

In a very recent study by Lenget et al., 26 pregnant patients who underwent the laparoscopic management of ovarian cysts were studied retrospectively. The indications for surgery were persistent adnexal mass abnormal ovarian cysts revealed by ultrasonography, suspicion of cyst complications. Twelve patients were operated during the first trimester of pregnancy, 13 in the second, and one in the third trimester. A 12mm Hg CO_2 pneumoperitoneum was created 'using a Verres needle in 22 cases, and an open technique in 4 cases. Trocar sites were decided according to the uterine size and to the cyst situation. A cystectomy was performed in 11 cases, an adnexectomy in 7 cases, an oophorectomy in one case, a cyst aspiration with a biopsy of the cyst wall in 6 cases and an ovarian torsion removal in one case. A conversion to laparotomy was necessary in 3 cases. There were no immediate postoperative complications and obstetrical outcomes were good in all cases. So they concluded the laparoscopic management of adnexal masses to be safe in pregnancy (25).

In another study by Mathevet P et al., 47 patients with adnexal masses in pregnancy were studied. Laparoscopic surgery was done during the first trimester of pregnancy in 17 cases, in the second trimester of pregnancy in 27 cases and the third trimester of pregnancy in four cases. All the procedures were performed with general anesthesia and curarization. The laparoscopic

cystectomies were performed either with the intra-peritoneal or the trans-peritoneal technique. The indications were: persistant or sonographically abnormal ovarian cyst (36 cases), torsion or rupture of ovarian cyst (8 cases), and symptomatic pelvic mass (3 cases). Two borderline tumors were discovered. The laparoscopic procedure could not be performed in two cases due to dense adhesions and difficulty of hemostasis. No patient encountered complications during the intra- and post-operative periods. The mean hospital stay was 3.8 days. The outcome of the pregnancy was normal in all cases except one fetal loss 4 days after the laparoscopy. And they concluded that laparoscopic management of adnexal masses in pregnancy by an experienced team is a safe and effective procedure that allows, compared to the traditional surgery, a shorter hospital stay, a reduced rate of post-operative complications and a decreased maternal and fetal morbidity (26).

MANAGEMENT IN PEDIATRIC AND ADOLESCENCE AGE GROUP:

The realm of laparoscopic surgery has extended to include the neonate as well as the pediatric patient. The advent of new and smaller instrumentation has facilitated this goal. Previous procedures exclusively relegated to laparotomy can now be accomplished as outpatient procedures. Removal of the acute appendix, correction of torsion of adnexa, as well as the appropriate diagnosis and initial treatment of acute pelvic inflammatory disease are now well established laparoscopic procedures (27).

Pansky et al. retrospectively studied eight premenarchal girls with torsion of the adnexa. Age range was 3-12 yrs. Four patients had torsion of normal-appearing adnexa. The other four had ovarian neoplasms. Two had cystic mature teratomas (dermoid cysts) and one a serous cystadenoma that required additional operation. The fourth girl had a simple ovarian cyst that was aspirated laparoscopically. Seven girls (87%) had normal-appearing ovaries on follow-up ultrasound. In one patient, a small ovary was seen, with no intraovarian blood flow on color Doppler. Although the diagnosis of torsion of the adnexa in premenarchal girls is difficult and usually delayed, laparoscopic detorsion seems to be an effective adnexa-sparing approach. They suggested that laparoscopy should be the treatment of choice and that detorsion, rather than adnexectomy, be performed more often in these patients (28).

In a very recent retrospective study from Johns Hopkins University (2), 82 patients = or < 18 years age undergoing surgery for adnexal mass were studied and identified for demographic, operative, and pathologic data . The median age at surgery was 15 years, and 91.7% of patients

were > or = 12 years of age. A malignant ovarian neoplasm was present in 14.6% of cases. Oophorectomy was performed in 52.4% of cases, while 47.6% of patients underwent ovarian-conserving surgery. Multivariate regression analysis revealed that ovarian-conserving surgery was significantly less likely in the setting of malignancy, torsion, and an ovarian size of > or = 6 cm. The presence of a gynecologic surgeon, compared to other surgical specialties, was statistically significantly and independently associated with ovarian-conserving surgery. Post-menarchal status and age > or = 16 years were the characteristic most predictive of access to gynecologic surgical care. And as conclusion, in pediatric and adolescent patients, operative intervention for an adnexal mass is significantly more likely to result in ovarian conservation when performed by a gynecologic surgeon. For such patients, improved access to gynecologic consultation prior to surgical intervention may reduce the number of patients subjected to oophorectomy for benign conditions (29).

Steayert et al. reviewed 27 adnexal torsions of which seven were neonates and 20 were premenarchal girls. The neonatal cases (7) were all operated upon: 4 adnexectomies, 2 oophorectomies, and 1 detorsion with cystectomy were performed. In the premenarcheal group (20) 8 adnexectomies, 6 oophorectomies, 5 detorsions with cystectomy, and 1 salpingectomy were performed. The authors advocate a laparoscopic approach in the first days of life of all uncomplicated cysts independent of size in order to increase the percentage salvaged. In order to increase adnexal salvage, the authors recommend a laparoscopic approach in the emergency situation if a clinical examination is positive as well as better medical (pediatricians, gynecologists) and general (girls, parents) information. They suggest controlateral oophoropexy in cases of torsion of a normal adnexum (30).

MANAGEMENT AT PERI AND POSTMENOPAUSAL PERIOD:

Not much literature is available on pure torsion of adnexal mass but there is a retrospective study from Korea about postmenopausal cyst operations. The aim of this study was to assess the efficacy and safety of laparoscopic treatment for adnexal cystic masses that were predicted to be benign in postmenopausal women. Postmenopausal women found to have an adnexal cystic mass were retrospectively evaluated with transvaginal ultrasonography, and serum CA-125 levels and 219 of them were in the benign range and were operated laparoscopically. Almost all the masses (99.5%) were accurately predicted to be benign except for one borderline ovarian tumor. Two hundreds thirteen (97.3%) women were successfully managed by operative laparoscopy and six

(2.7%) required laparotomy. For the patients managed by laparoscopy, the mean operative time was 51.3 min; the mean hospital stay was 2.5 days. There was no significant morbidity and surgery-related mortality. So they think that the combination of the Sassone's scoring system for transvaginal ultrasonography and serum CA-125 level can accurately predict benign cystic masses, and operative laparoscopy is technically feasible and safe for the management of adnexal mass in postmenopausal women (31).

OBESITY AND GYNECOLOGIC LAPAROSCOPIC PROCEDURES:

Special considerations are required for the obese patient. Because Veress needle and trocar insertion are almost vertical, the distance between the sacral promontory and trocar is relatively small and there is no room for an uncontrolled entry. It is safer to overdistend the abdomen with CO_2 before trocar insertion (32).

Massive obesity is an important risk factor in gynecology surgery. The traumatic effect of traditional laparotomy on the parietal wall is responsible for important per and postoperative morbidity.

Raiga J et al. reviewed four patients with massive obesity (BMI> or =40kg/m (2)) who underwent laparoscopic surgery. For each patient, they studied the cardiovascular risk factors, indications for operation, surgical technique, anesthesia conditions and follow-up. From the surgical point of view, certain technical difficulties were noted such as the problem of exposure and coagulation difficulties for the vascular pedicles enveloped in a layer of fatty tissue. No conversion to laparotomy was necessary. From the anesthesiology point of view, unlike what was previously feared, there was a reduction in the high operative risk due to obesity, especially due to postoperative benefits. Follow-up in these four patients was uneventful (33).

OPERATING TIME:

Generally all laparoscopic procedures are more time consuming for the following reasons.

1) Inherent nature of slow maneuver of laparoscopic techniques

2) Time taken by careful slow insufflation.

3) Routine diagnostic laparoscopy before starting any laparoscopic procedure.

COMMON POSTOPERATIVE PROBLEMS AFTER LAPAROSCOPIC GYNECOLOGIC PELVIC SURGERY:

Nausea and vomiting are most likely related to intra abdominal CO2 and narcotics frequently used perioperatively.Usually; these symptoms respond to parenteral antiemetic medication. Shoulder pain referred from collection of CO2 under the diaphragm is the most frequent complaint and generally resolves within 48 hours. Resting on the abdomen with pillows under it is helpful. Elevating the lower pelvis also alleviates this pain.

Occasionally a patient will develop hypotension unrelated to blood loss; these patients are cured promptly after a bolus of intravenous fluid is given.

Post operative incisional pain usually is mild and is managed using a heating pad and analgesics although patients who undergo extensive intra abdominal procedures can have severe visceral pain. Narcotic or nonsteroidal anti-inflammatory agents are needed in addition to a heating pad.Persistant pain for more than two hours requires the patient be examined.

When large amounts of fluid are left in the abdomen, the patient tends to drain pinkish fluid through the abdominal puncture wounds, but it resolves within 24 to 48 hours. Reassurance will allay the patient's concern.

It is proved that laparoscopic procedures cause less post-operative pain than their conventional counterparts. Most women return to normal activity within a week and the time required for full recovery 1 to 3 weeks depending on the extend of pelvic surgery (34).

 In this study none of the literature reviewed found more pain after laparoscopic procedure. The post-operative narcotic use is less after laparoscopic appendectomy.

LAPAROSCOPY AND IMMUNITY:

All surgery and anesthesia can cause depression of cell-mediated immunity in the postoperative period, including reduction in the number of circulating lymphocytes, impairment of natural killer cell cytotoxicity, depression of T cell proliferation, and diminished neutrophil function. Animal and clinical studies have shown that laparoscopic surgery impairs a patient's immune state less than open surgery. Cell-mediated immunity is less impaired after laparoscopic operation than after open. Interleukin 6 levels were less in a study on newborn infants undergoing laparoscopic procedures when compared to open. [35].

LAPAROSCOPY AND RISK OF ANAESTHESIA:

The general anaesthesia and the pneumoperitoneum and steep Trendelenberg position required as part of the laparoscopic procedure does increase risk in certain patient groups. The head down positioning shifts intestinal weight against diaphragm, compromising full diaphragmatic excursion and optimal ventilation. Based on these factors and the need for muscle relaxation, general anaesthesia with controlled ventilation with controlled ventilation through an endotracheal tube is required.Intra operative muscle paralysis should be well maintained for a comfortable surgery.Intra operative possible complications are various arrhythmias(usually bradicardia at beginning of insufflation which does not need treatment), CO2 gas embolus(very rare),pulmonary edema from aggressive fluid replacement of absorption of irrigation fluid. In early post operative period referred shoulder pain from gas collected under diaphragm or pain due to formation of carbonic acid in peritoneal cavity may occur. But these are transient and analgesic use for pain relief is enough (36).

Most surgeons would not recommend laparoscopic gynecologic procedures in;

1) Patients with cardiac diseases and COPD should not be considered a good candidate for laparoscopic appendectomy.

2) In patients who have had previous lower abdominal surgery laparoscopic surgeries may also be more difficult

3) The elderly may also be at increased risk for complications with general anaesthesia combined with pneumoperitoneum. Those with lowered cardio-pulmonary reserve

4) With regard to the consequences of the pneumoperitoneum and a longer operative time.

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 torted adnexa has a benign histopathology mostly. Operative laparoscopical 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(11,13,14,15,16).For a number of gynecologic conditions (ectopic pregnancy, benign ovarian cysts ,tubaperitoneal infertility.etc.) the results of laparoscopic treatment are comparable with those of laparotomy.For these reasons operative laparoscopy has become the surgical treatment of choice for the conditions listed above. Like all surgery, operative laparoscopy does bring with it a risk of complications which need to be assessed.

Since mostly the lesions are benign in nature simply detorsion of the torted 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 (13).

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(21).

Some literature says that only simple detorsion procedure procedure may cause retorsion and the rate of retortion 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 (19).

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 (13).

Risk factors for conversion to laparotomy are studied in some articles and it is found that the most important risk factor for conversion to laparotomy is previous pelvic surgery and especially hysterectomy (17, 18).

In cases where laparoscopic access can not be performed, minilaparotomy is an alternative method and the results are comparable to laparoscopic surgery (14, 15, 16).

Adnexal torsion in pregnant patients may occur due to drugs used for ovarian hyperstimulation at infertility therapy that increases the size of ovary or due to persistence of corpus luteum or other pathologic procedures of the adnexa. Laparoscopic detorsion and cyst excision procedures were safely applied in pregnant patients even in third trimester of pregnancy. The maternal and fetal outcomes after procedure was satisfactory and comparable to laparotomy.Open laparoscopy technique is advised in literature for the safety of the procure in advanced pregnancy (23, 24, 25, 26).

In case of premenarchal and adolescence period although very rare, adnexal torsion may occur and sometimes an additional congenital malformation accompany. With the advent of new and smaller instrumentation laparoscopic surgery has extended to include the neonate as well as the pediatric patient. Laparoscopic detorsion and the sparing of the adnexa is the type of treatment encouraged in the literature in case of benign neoplasm, although the patients numbers are very limited. Some authors suggest contralateral oophoropexy in case of normal appearing adnexa (27, 28, 29, 30).

In post menopausal women due to increase in rate of malignant formations, preoperative investigations for predicting malignant and benign lesions is very important. Literature supports that in case of good analyses of the patient preoperatively and the criteria for the lesion to be benign are fullfillng, laparoscopic surgery is safe and if the intraoperative histopathological diagnosis is also benign bilateral salphyngo-oophororectomy is the treatment of choice. But in advanced centers with a skilled surgeon at malignant procedures laparoscopic surgery and laparoscopic staging may be performed in case suspicion of malignancy (31).

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. Laparoscopic surgery has the benefits of its own such as less morbidity at post-operative period, early recovery and discharge from hospital and better cosmetic results.

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