Laparoscopy

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Diagnostic laparoscopy is usually performed as an investigation for infertility or pelvic pain. Investigation for infertility is one of the commonest indications for diagnostic laparoscopy. But it is performed as the last investigation when no positive pelvic pathologies are identified either clinically or sonographically. It is delayed in young females with short duration of infertility and those with severe male factors as the incidence of pelvic pathology in this group of patients is less than 12%.

Diagnostic laparoscopy is useful for patients with chronic pelvic pain to identify conditions like chronic PID or endometriosis. It is also done in patients with acute abdominal pain. It helps to identify conditions like acute PID, ectopic pregnancy, and torsion of adnexa.

Equipment

A gynecologist who is trained in operative laparoscopy should keep instruments for operative laparoscopy also ready while performing a diagnostic procedure. The instruments for diagnostic laparoscopy includes :

1. Telescope

The smallest telescope available is utilized for diagnostic laparoscopy. A 4mm hysteroscope along with the 5 mm sheath is ideally suited for this. Small caliber telescopes of less than 3mm (Microlaparoscopes) with improved optics are available now. Diagnostic laparoscopy with microlaparoscope under local anaesthesia is well tolerated by patients with infertility and chronic pelvic pain.

2. CO_2 Insufflator

A Mechanical or electronic carbon dioxide insufflator is used for creating pneumoperitoneum.

3. Video System

A video camera and monitor is not essential for diagnostic laparoscopy. but it is necessary if any advanced laparoscopic surgery has to be carried out.

A 250-watt halogen light source or xenon light with 4.5mm fiber optic cable gives the best picture when used with endoscopic camera. A powerful light source gives good picture when small caliber telescopes are used. 150-watt light source gives enough light when direct viewing is done.

4. Other accessories.

Secondary trocars, palpation probes, suction irrigation cannula, atraumatic graspers are other instruments required for diagnostic laparoscopy.

Procedure:

Diagnostic laparoscopy is most often performed under general anaesthesia with intubation and assisted ventilation. Local anaesthesia under sedation is employed in selected patients.

A pneumoperitoneum is created by introducing a Verres needle through an intraumbilical or infraumbilical incision. The needle is directed at an oblique angle toward the uterine fundus. Care should be taken to avoid angling laterally towards the iliac vessels. The patient should be kept in horizontal position, premature Trendelenburg can alter the usual landmarks.

A direct trocar insertion is also equally safe.

An open laparoscopy is done when there are multiple scars or when there is a large pelvic mass in the abdomen. Make a 1.5 cm long vertical incision at the base of umbilicus. Using small retractors, fat is pulled laterally and sheath is exposed. The sheath is held with two Kocher clamp and incised vertically for 1cm. The peitoneum is opened with a hemostat. Introduce the trocar without the cannula and tighten the skin around the

cannula using a towel clip or a stitch for preventing gas leak.

Patient is usually kept in a semilithotomy position for easy manoeuvering of the secondary portal instruments. The left hand of the patient is better kept on the side of the patient by covering with a towel. The right hand is used for the intravenous medications and if kept abducted, the face should be turned to that side to avoid stretching the brachial plexus.

Once the telescope is introduced a systematic examination of the internal organs is done. After general inspection of the pelvic organs telescope is turned to right pelvic brim then turned in a clockwise direction to examine the appendix, caecum, right lobe of liver, gall bladder, diaphragm, left lobe of liver, stomach, transverse colon, left paracolic gutter and sigmoid colon.

A palpating instrument is always used for assessing the mobility of organs. Simple palpation, aspiration of a follicular cyst or puncture of follicles in PCOD can always be done with a long Verres needle.

Contraindications

There are few absolute contraindications to laparoscopy; each decision should be made individually. Patients with severe cardio-respiratory disease who cannot tolerate 15-20 mm Hg of intraabdominal pressure should not be submitted for laparoscopy. Patient with a large hiatal hernia will not be able to tolerate pneumoperitoneum. Patients with acute bowel obstruction will not be helped by laparoscopy.

An open laparoscopy is possible when there are multiple abdominal incisions or there is a large abdominal mass.

Laparoscopic sterilization

Laparoscopic sterilization offers a number of advantages over other sterilization techniques like small incision, minimal post operative comfort and allows day surgery. It offers an opportunity to inspect abdominal and pelvic organs.

Patient counselling and selection

Patient should be informed about the permanent nature of the procedure and offered other temporary contraceptive methods. Patient should also be informed about the possible complications and failure of the procedure.

Lap sterilization can be performed as an interval, post abortal or post-partum procedure.

Performance of sterilization during the follicular phase will reduce the risk of luteal phase pregnancy.

Surgical approaches

Laparoscopic sterilization may be accomplished under local or general anaesthesia. Patients who are obese, those with history of multiple laparotomies and or peritonitis are not good candidates for Local anaesthesia.

Different methods of tubal occlusion are possible laparoscopically. The most commonly employed method is silastic rubber ring technique. It is a simple and effective method. A 4mm or smaller telescope is sufficient for laparoscopic sterilization.

Silastic Ring sterilization

For silastic ring sterilization a special ring applicator is used. The silastic ring should be of an approved brand, which satisfied the elastic memory criteria. Before loading the band on the ring applicator, it should be lubricated with saline or betadine. It is loaded only prior to its application. The tube is identified, by tracing it to the fimbrial end. The silastic ring is applied in the isthmic segment of the tube. It destroys around 2.5cm of the tube. If it is applied close to the uterus the tube usually breaks and bleeds. The band should not to be applied on the ampullary part of the tube. The tongs of the ring applicator should not include the mesosalpinx while applying the band as it may tear the vessels.

The tube should not be kept taught while applying the band as it increases the chance or breakage. If the tube breaks during application, rings can be applied on both

cut ends. If by mistake a ring has been applied on a wrong structure, a scissors can cut the band. A band dropped in the peritoneal cavity is of no concern and may be left behind.

There are many advantages for Ring method. This technique is a non-electrical one, so easier to use in simple set up. It destroys a fixed amount of tube and so reanastamosis has high chance for success.

If the tube is oedematous, it will not be possible to pull it inside the ring applicator. It can be slowly squeezed with the tongs by grasping it again at half centimeter proxial and distal to the initial site of application. Very thick and oedematous tubes are not suitable for band sterilization. They are sterilized by bipolar coagulation or minilap tubectomy.

Biolar Sterilization

Bipolar sterilization is done using a bipolar forceps. A 3mm spatula or Kleppinger type forceps is preferred. It is introduced through the secondary portal and tube is grasped in the isthmic region and a bipolar current is applied till the tissue is completely blanched. A 2-3 cm of the tube is coagulated. The tube should be lifted away from the surrounding vital structures. If the forceps sticks to the tube, try to remove it while the pedal is active. Most surgeons cut the tube in the centre of the coagulated segment using a scissors without injuring the vessels in the mesosalpinx.

Failures

A generally accepted failure rate is less than 1%. A large prospective study of all female sterilization has reported a higher failure rate. When sterilization failure occurs, the subsequent pregnancy is more likely to be ectopic. The degree of increased risk for ectopic depends on the method of occlusion.

Laparoscopic Surgery for ovarian cysts

Most ovarian cysts in premenopausal and postmenopausal women are benign. So in selected patients, management of ovarian cysts via operative laparoscopy is appropriate. The main objection to laparoscopic management of ovarian cyst is fear of spillage of cancer cells into peritoneal cavity, if the tumour turns out to be malignant. Various studies have reported that the rate of relapse and prognosis of ovarian cancer was not influenced by intraoperative spillage of tumour. With proper pre-operative evaluation benign lesions can be picked up and managed laparoscopically.

Pre Operative evaluation

The patient's age, known risk factors, clinical examinations and ultrasound findings provide information to the benign nature of the mass. Serum CA-125 estimation may be useful in postmenopausal women.

Clinical examination

Although ovarian malignancy can occur at any age, the risk of malignancy is highest during prepuberty and menopause.

Adnexal mass that is fixed, irregular and firm is suggestive of malignancy. Presence of ascites and an upper abdominal mass is suspicious for cancer. Cul-de-sac nodularity, ascites, cystic adnexal structures, and fixed adnexae occur with endometriosis and malignancy.

Sonography

Transvaginal sonography is the imaging modality of choice. Sonographic findings of ovarian cysts with irregular borders, papillae, solid areas, thick septa, ascites or matted bowels are suggestive of malignancy. Dermoid cysts, endometriomas, haemorrhagic cyst have characteristic sonographic appearance.

Colour Doppler study further helps in differentiating between a benign and malignant mass. Vessels with a low resistance index near the centre of the mass or with in papillations or septations are correlated with malignancy.

CA-125

Since CA-125 can be raised in conditions like endometriosis, fibroids, adenomyosis, and cystic teratomas,

its estimation is not useful in premenopausal women. A value of above 35 is suggestive of malignancy in women above the age of 50 years. But this test should not be used alone as a screening test.

Surgical considerations

Functional cysts may be followed up and don't require surgical management. They are usually unilocular and with regular, thin borders on sonogram. They are usually less than 7-10 cm. Consent is taken for a staging laparotomy for patients with ovarian cysts of doubtful nature.

Intraoperatively any peritoneal fluid in POD is aspirated and examined for cytology. The upper abdomen and pelvis are explored and any doubtful areas biopsied. The cyst is now aspirated and the contents examined. The interior of the cyst is also examined to exclude any suspicious areas. If everything is reassuring, the cyst is managed laparoscopically.

The common procedure adopted is either cystectomy or oophorectomy. The decision depends on the age of patient, the risk for malignancy and desire to preserve the fertility.

Cystectomy

Ovarian cystectomy removes the cyst intact with minimal trauma to the ovarian tissue. This technique is used for removal of dermoid cysts, serous cysts, and intraovarian endometriomas.

Infraumbilical fold is the usual site of primary trocar. Occasionally primary trocar may be placed above the umbilicus if ovarian cyst is large. Secondary punctures, two 5-mm or one 5 mm and other 10mm may be used. The 10mm is needed if a spoon forceps or a claw forceps or a claw forceps are to be used. A 10-5mm reducer is used when a 5mm instrument is used in 10mm portal. Once the telescope is in position the surface of ovarian cyst is examined thoroughly for any excrescence. Any peritoneal fluid in POD is aspirated and examined for cytology. The opposite ovary is also examined. The paracolic gutters, liver and diaphragm are examined for any evidence of metastasis. Any doubtful areas are biopsied.

If the cyst appears benign, the cyst is punctured with the 5mm trocar after steadying the ovary with a grasper on the ovarian ligament. The site of puncture is away from the hilum and fimbrial end of the tube.

The suction aspiration cannula on suction mode is kept ready by the assistant to pass into the cannula once the trocar is taken out. Once the content of the cyst is aspirated completely, the cyst is irrigated with Ringer lactate several times till the aspirate is clear.

Pulling the edges away with two graspers enlarges the punctured site. This will separate the layers of ovary and the cyst for easy enucleation. The cyst lining is picked up with a toothed grasper and the ovarian tissue is held with a fine toothed grasper. The cyst enucleation starts by traction and countertraction with the graspers. The separation of the two layers achieved at each step should be optimum. Too much striping of the cyst lining in one step will injure the ovarian tissue. After separating the two layers for 1-2 cm, you release one of the graspers and regrasp at a point close to the cleavage line. Now the second grasper is also released to catch near the cleavage line. Never release both graspers simultaneously. It may be difficult to differentiate between cyst and ovarian tissue, especially in large ovarian cyst. Now the steps are repeated till enucleation is complete.

The ovary is now reconstructed. It rarely requires suturing. The edge of the ovary held together in a manner that gives the best shape for the ovary and exposes the maximum ovarian surface to the fimbrial end of the tube. If the dead space cannot be compressed by this manoeuver, the ovary is rolled on itself and kept pressed against the pelvic sidewall for few minutes. The peritoneal cavity is now lavaged with several liters of warm Ringer lactate. The upper abdomen especially the subdiaphrag-

matic space is washed in a reverse Trendelenburg position. The ovary is now inspected for complete haemostasis.

Tissue removal

Small cyst can be removed through a 10mm trocar by grasping with a spoon forceps or claw forceps. Larger cyst can be cut with scissors to make it in a ribbon shape and then removed.

Alternatively the cyst can be put inside an endobag. It is then pulled out along with the 10mm trocar, after enlarging the trocar wound. Tissue is removed from the endobag before retrieving from wound to reduce the bulk. It is more convenient to retrieve through colpotomy.

Salpingo-oophorectomy

Oophorectomy is usually performed for an ovarian cyst when the adnexa are not salvagable.

Procedure :

If the cyst is large, decompression of the cyst is helpful for better visibility. But it is done only if the ovarian mass is benign. Decompression of the cyst is done as described for cystectomy. If the cyst is adherent, complete ovariolysis is done before attempting oophorectomy. The ureter is identified at the pelvic brim and the distance between the infundibulopelvic ligament and ureter is assessed. The ovary is grasped near the infundibulopelvic ligament and pulled medially with a grasper passed through the contralateral trocar. A bipolar forceps is passed through the ipsilateral trocar and coagulates the stretched infundibulopelvic ligament close to the ovary. Watch for the blanching tissue and make sure it does not extend near the ureter. The bipolar is removed and a curved scissors is used to incise the peritoneum over the coagulated area to skeletonise the vessels. The bipolar is again introduced and the bare ovarian vessels are coagulated thoroughly. The pedicle is then transected in small steps and any bleeder is immediately coagulated. These steps of alternate coagulation and transection is continued, till the cornual end is reached. The ovarian ligament and cornual end of fallopian tube is then divided after coagulation.

Paraovarian cysts

Although the risk of malignancy is low, the paraovarian cysts also should be screened like ovarian cysts.

Procedure

The paraovarian cyst is punctured with a trocar, between the vessels in the mesosalpinx away from the fimbrial end. The decompression of the cyst allows less traumatic enucleation of the cyst. The cyst is very thick and enucleation from the broad ligament is comparatively easy. The cyst is held firmly with a grasper passed through the contralateral port. The broad ligament is separated from the cyst with a suction irrigation probe. Any fibrous attachment to the ovary is divided with scissors after coagulating with a bipolar. After complete enucleation, the edges of the broad ligament are kept pressed with a non-toothed grasper for few minutes. The cyst is removed and inside of the cyst is inspected for any papillations.

Follicular Puncture for PCOD

Polycystic ovarian disease is primarily treated medically with clomiphene citrate or gonadotropins. But CC doesn't induce ovulation in all women. Gonadotropins are expensive, require regular monitoring, and can cause ovarian hyperstimulation. So a selected group of patients can be treated surgically. Wedge resection of the ovary as traditional treatment is offered. A variety of laparoscopic techniques have been described including multiple biopsies, follicular puncture with unipolar needle, creating craters with lasers with comparable pregnancy rates.

Laparoscopic follicular puncture with unipolar needle is the most popular method. It gives an average pregnancy rate of 35.41%. But a disappointing finding is the incidence postoperative adhesions to the tune of 30% . Various modifications of the surgical technique have been suggested to reduce the incidence of adhesions.They include limiting the number of punctures to 5 per ovary,