

Minimal Access Surgery in Gynaecology

INTRODUCTION

Significant technological advances have widened the use of laparoscopy in gynaecology, as well as in other surgical specialities such as urology, gastroenterology, and general surgery. Laparoscopy is a minimally invasive surgical technique used for both diagnostic and therapeutic purposes. Laparoscopy offers several benefits over traditional open surgery. Typically, the incisions are small and only a few millimetres in length. This minimally invasive approach results in less damage in the surrounding tissue, hence less pain with shorter hospital stays and recovery times when compared to open surgery.¹⁻⁴ Most patients are able to resume their normal activities within 2-3 weeks. Minimally invasive surgery has been shown to be associated with reduced risks of complications when compared to open surgery in particular lower risks of bleeding,⁵ infections, adhesions⁶ and damage to any of the surrounding organs.

Laparoscopy also provides better visualisation of the internal organs which allows for more accurate diagnosis and treatment. This has been improved through advances in technology including the use of high definition cameras.

Some common gynaecological procedures that can be performed using laparoscopy include:

- Diagnosis and treatment of endometriosis
- Removal of ovarian cysts or tumours and risk-reducing surgeries
- Management and treatment of ectopic pregnancy
- Tubal sterilisation
- Myomectomy
- Hysterectomy
- Treatment of pelvic adhesions.

INDICATIONS OF LAPAROSCOPY

Diagnostic Laparoscopy

This is the most common laparoscopic procedure performed in gynaecology and is used to diagnose a variety of gynaecological conditions, including endometriosis, ovarian cysts, pelvic inflammatory disease, ectopic pregnancy and malignancy.⁷

Laparoscopy has become the mainstay in the assessment and management of fertility.



Figure 1. Endometriosis in the Pouch of Douglas.

Treatment of Endometriosis

Laparoscopy is the most common procedure used to diagnose and treat endometriosis⁸ and is considered the gold standard to diagnosis this condition. Delays of up to 10 years can occur between the first reported symptoms and confirmation of the diagnosis. Many women report that the delay in diagnosis leads to increased personal suffering, prolonged ill-health and a disease state that is more difficult to treat. The diagnosis of endometriosis can be challenging as patients present with a wide and varied spectrum of symptoms. Endometriosis lesions may be resected or ablated during laparoscopy. Both of these techniques have shown to improve fertility and decrease pelvic pain in multiple well-designed studies. A systematic review by Franck et al. reported improvements in the quality of sexual life following laparoscopic surgery for endometriosis.⁹

Adnexal Surgery

Ovarian Cystectomy

Up to 10% of women will have some form of surgery during their lifetime due to the presence of an ovarian mass. The overall incidence of a symptomatic ovarian cyst in a premenopausal female which is malignant is approximately 1:1000 increasing to 3:1000 at the age of 50.

A laparoscopic approach is generally considered to be the gold standard for the management of benign ovarian masses.¹⁰⁻¹⁴ Benign ovarian cysts ≥ 6 cm that persist over two

The background of the page features a light blue hexagonal pattern. Within these hexagons are various white medical icons: a cross, a stethoscope, a person with a pulse line, a microscope, a pair of scissors, a virus/cell, a globe, and a heart with a pulse line. A faint, stylized white mountain range is visible in the center background.

or more cycles in a premenopausal, nonpregnant female are not likely to resolve and a cystectomy is indicated. This can be achieved using laparoscopy as this has been shown to reduce morbidity with a shorter recovery time and earlier hospital discharge. The early return to work and resumption of normal activities has important socio-economic benefits.¹⁵

Salpingo-oophorectomy

The incidence of cysts in postmenopausal women is 5-17%^{16,17} and with the increasing use of various imaging modalities a large proportion of these cysts are often an incidental finding. In turn, the vast majority of these cysts are benign. It is important to appropriately manage these, and most importantly distinguish these from the potential malignant ones. Salpingo-oophorectomy may be more appropriate in postmenopausal women with a growing or persistent ovarian cyst. Laparoscopy has been shown to reduce morbidity and improve outcomes in the appropriately selected cases and when performed by suitably trained surgeons. Patients should be counselled that staging laparoscopy or laparotomy may be required if malignancy is revealed at the time of the laparoscopy.

Women with a genetic predisposition of developing gynaecological cancers such as those with BRCA1, BRCA2 or Lynch syndrome have a substantially reduced risk of developing cancer following a laparoscopic bilateral salpingo-oophorectomy when performed as a risk-reducing surgery.

Treatment of Ectopic Pregnancy

Laparoscopy is the surgical approach of choice for most ectopic pregnancies. A salpingostomy or salpingectomy may be performed to remove the embryo and/or gestational sac. The advantage of operative laparoscopy for ectopic pregnancy over laparotomy is well recognised. It is associated with shorter operation times, less intraoperative blood loss, shorter hospital stay, lower analgesic requirements, and in keeping with this, significantly lower costs.¹⁸⁻²⁰ Also, patients are significantly less likely to develop adhesions after laparoscopic surgery.²¹

Tubal Ligation

Tubal sterilisation can be done in various manners, i.e. by using electrosurgery to desiccate the tubes, the application of clips or silastic bands, or complete removal of the fallopian tubes. The latter is also known as opportunistic salpingectomy and is increasingly recommended in women undergoing other pelvic surgery such as hysterectomy. The most common type of epithelial ovarian cancer (90% of ovarian cancers), called high-grade serous ovarian cancer (HGSC), is found to originate in the fallopian tubes before spreading to the ovary.²² Tubal sterilisation can also be carried out to occlude the tubes at the mid-isthmic portion as a permanent form of contraception.

Myomectomy

Uterine fibroids (also called leiomyoma or myoma) are the most common benign tumour among women of childbearing age. Although uterine fibroids are common, they can be asymptomatic in most of the women. Symptomatic patients can have a wide range of symptoms:

- Dysfunctional uterine bleeding
- Mild to severe anaemia
- Pressure effects in pelvic area
- Pelvic pain
- Infertility
- Recurrent miscarriages.²³

New surgical techniques relating to minimal invasive surgery such as laparoscopic myomectomy and many others have been developed as an alternative to open myomectomy.²⁴ Some women with a symptomatic fibroid uterus prefer to preserve fertility. The fibroid may be removed by morcellation or colpotomy. In a Cochrane review, laparoscopic myomectomy was associated with less postoperative pain, reduced febrile morbidity and shorter hospital stay than in the open myomectomy cohorts.²⁵ Although open hysterectomy is technically easier than a laparoscopic hysterectomy, laparoscopic myomectomy leads to faster and smoother recovery periods.²⁶ In 2020 the Food and Drug Administration (FDA) issued recommendations that power morcellation should only be used with a compatible tissue containment system.²⁷

Hysterectomy

Hysterectomy is used to treat many health conditions. Some of these conditions include:

- Uterine fibroids (this is the most common reason for hysterectomy)
- Endometriosis
- Pelvic support problems (such as uterine prolapse)
- Abnormal uterine bleeding
- Chronic pelvic pain
- Gynaecologic cancer or reducing cancer risk.

The three basic laparoscopic approaches for hysterectomy are laparoscopic-assisted vaginal hysterectomy (LAVH), laparoscopic hysterectomy (LH), and laparoscopic supracervical hysterectomy (LSH). The difference lies in the approach used to divide the uterine vessels. In LH and LSH, the uterine vessels are divided laparoscopically. In LSH, the cervix is not removed. In a LAVH, the uterine vessels are divided from the vaginal approach.

LSH is most often promoted for benign indications in particular as the operating time and recovery period are decreased and the risk of both infection and ureteral injury are minimised. However, an increased risk exists for

reoperation for cervical bleeding and prolapse. Furthermore, patients must follow the recommendations for regular cervical cytology.

Adhesions

Adhesions may form due to prior infection, such as a ruptured appendix or pelvic inflammatory disease (PID), endometriosis, or previous surgery. Adhesions may contribute to infertility, bowel obstruction, chronic pelvic pain and difficulty in any future abdominopelvic surgery. They can also make it more difficult to visualise the internal organs during diagnostic and therapeutic surgical procedures. The risk of adhesions after laparoscopy can vary, depending on several factors, including the extent of the surgery and the individual patient's health status. Studies have estimated that between 67-93% of patients who have undergone open abdominal surgery may develop adhesions.²⁸ Studies have shown that the risk of adhesions forming is lower than after open surgery.²⁹

CONCLUSIONS

In recent years, three innovations that have been introduced to the field of laparoscopy i.e. single incision laparoscopy (SILS), robotic surgery³⁰ and natural orifice transluminal surgery.³¹ All three have their advantages and disadvantages compared to traditional laparoscopy. Of these three developing technologies, robotic surgery is having the largest impact on clinical care in particular in gynaecology. The robotic system allows surgeons to perform procedures that previously would have been performed via laparotomy, using modified laparoscopic procedures.

Complications may occur for various reasons. The use of trocars, and their placement on the abdominal wall and pneumoperitoneum in laparoscopy pose unique risks to this surgical approach. The increased intra-abdominal pressures associated with laparoscopy increases anaesthesia-related risks such as aspiration and increased difficulty in ventilation. Furthermore, the delivery of energy within the abdominal cavity during electrosurgery likewise introduces risk. Although the risk of blood loss is relatively low for most procedures, potentially massive blood loss may also occur.

Laparoscopy shares characteristics of both minor and major surgery. To patients, laparoscopic procedures often seem to be minor surgical interventions because of the small incisions, relatively small amount of postoperative pain, and short convalescent period.

Overall, laparoscopy is a safe and effective surgical technique that offers numerous benefits over traditional open surgery. It has become a common procedure in gynaecology due to its many advantages of shorter recovery period, earlier return to work, reduced hospital stay and reduced risk of adhesions and better aesthetic incisions, whilst improving diagnoses to correctly treat women from various gynaecological conditions.

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