



La-Net

OBG 518

GYNAECOLOGICAL ENDOSCOPY



Course video is available on our app

lanetonline.com



la-NET | ONLINE LEARNING VIDEO PLATFORM FOR POST-SECONDARY & HIGHER INSTITUTION STUDENTS

Course code: OBG 518

Course title: Gynaecological Endoscopy

Course credit load: 2 Units

Series 1: Indications for Laparoscopy

- **Part 1.1: Overview of Diagnostic and Operative Laparoscopy**
 - Sub Part 1.1.1: Principles and equipment of laparoscopy
 - Sub Part 1.1.2: Diagnostic versus operative laparoscopy
 - Sub Part 1.1.3: Patient selection and contraindications
- **Part 1.2: Laparoscopy in Infertility and Pelvic Pain**
 - Sub Part 1.2.1: Laparoscopy in the infertility workup
 - Sub Part 1.2.2: Laparoscopy in chronic pelvic pain
 - Sub Part 1.2.3: Laparoscopy in suspected endometriosis
- **Part 1.3: Laparoscopy in Acute Gynaecological Conditions**
 - Sub Part 1.3.1: Laparoscopy in suspected ectopic pregnancy
 - Sub Part 1.3.2: Laparoscopy in ovarian cyst accidents
 - Sub Part 1.3.3: Laparoscopy in suspected pelvic inflammatory disease
- **Part 1.4: Laparoscopy in Adnexal Mass Evaluation and Sterilisation**
 - Sub Part 1.4.1: Laparoscopy in adnexal mass evaluation
 - Sub Part 1.4.2: Laparoscopic tubal sterilisation
 - Sub Part 1.4.3: Second-look laparoscopy and oncological staging

Introduction

A young woman presents with six months of pelvic pain and difficulty conceiving, and despite a normal pelvic ultrasound, her symptoms persist. Rather than continuing to guess at a diagnosis from the outside, her gynaecologist proposes **laparoscopy**, a procedure that allows the pelvis to be seen directly, often revealing **endometriosis**, **adhesions**, or other pathology invisible to imaging. This ability to look inside the abdomen and pelvis through a small incision, with minimal disruption to the patient, has transformed **gynaecological practice** over the past several decades.



Gynaecological endoscopy, encompassing **laparoscopy**, **hysteroscopy**, and **colposcopy**, now underpins a very wide range of diagnostic and therapeutic gynaecological care, from the investigation of **infertility** and **chronic pelvic pain** to the management of **acute abdominal emergencies** and **gynaecological malignancy**. Understanding when each technique is indicated, and the specific value it adds over other investigations, is fundamental to modern gynaecological training.

This Series introduces **laparoscopy**, covering its **principles and equipment**, the distinction between **diagnostic** and **operative** laparoscopy, and its indications across **infertility and pelvic pain**, **acute gynaecological conditions**, and **adnexal mass evaluation, sterilisation, and oncological staging**.

Series Learning Outcomes

At the end of this Series, you should be able to:

- **SLO 1.1:** describe the principles and equipment used in laparoscopy,
- **SLO 1.2:** distinguish diagnostic from operative laparoscopy,
- **SLO 1.3:** describe patient selection and contraindications for laparoscopy,
- **SLO 1.4:** list the indications for laparoscopy in infertility and chronic pelvic pain,
- **SLO 1.5:** describe the role of laparoscopy in suspected endometriosis,
- **SLO 1.6:** list the indications for laparoscopy in acute gynaecological conditions,
- **SLO 1.7:** describe the role of laparoscopy in adnexal mass evaluation and sterilisation, and
- **SLO 1.8:** describe the role of laparoscopy in oncological staging.

Part 1.1: Overview of Diagnostic and Operative Laparoscopy

1.1.1 Principles and equipment of laparoscopy

Laparoscopy involves introducing a rigid **telescope**, or **laparoscope**, connected to a **camera** and **light source**, into the abdominal cavity through a small **umbilical incision**, after first creating a working space by insufflating the abdomen with **carbon dioxide gas** using a **Veress needle** or **direct entry technique**, allowing direct visualisation of the pelvic and abdominal organs on a monitor.

Additional **accessory ports**, generally two or three, are placed in the lower abdomen under direct vision to introduce instruments such as **graspers**, **scissors**, and **diathermy** or **energy devices** for



dissection and haemostasis, with the number and position of ports tailored to the complexity of the planned procedure and the surgeon's preferred approach.

Fill in the blank: Laparoscopy requires insufflation of the abdomen with _____ gas before telescope insertion. A _____ needle or direct entry technique is used to establish the initial working space.

1.1.2 Diagnostic versus operative laparoscopy

Diagnostic laparoscopy is performed purely to visualise and assess the pelvic and abdominal organs, confirming or excluding suspected pathology such as **endometriosis**, **adhesions**, or **tubal disease**, without any therapeutic intervention beyond the diagnostic assessment itself, and is often the definitive step when non-invasive investigations have failed to establish a clear diagnosis.

Operative laparoscopy extends this same access to perform **therapeutic procedures**, including **adhesiolysis**, **cystectomy**, **myomectomy**, **tubal surgery**, and **hysterectomy**, converting what began as a purely diagnostic procedure into a treatment in the same setting wherever the findings and the patient's prior consent make this appropriate.

Fill in the blank: Diagnostic laparoscopy confirms or excludes pathology without any _____ intervention. Operative laparoscopy can extend to procedures such as adhesiolysis, cystectomy, and _____.

1.1.3 Patient selection and contraindications

Careful **patient selection** requires assessment of **fitness for general anaesthesia**, since laparoscopy is generally performed under general anaesthetic, and consideration of factors that may complicate **safe abdominal entry** or **pneumoperitoneum**, including significant **obesity**, extensive previous **abdominal surgery** with likely adhesions, and large **abdominal masses**.

Absolute contraindications include **haemodynamic instability**, **severe cardiorespiratory disease** unable to tolerate pneumoperitoneum, and **bowel obstruction**, while **relative contraindications**, such as **advanced pregnancy** or **extensive prior surgery**, require individualised judgement weighing the benefits of laparoscopy against the increased technical risk in each specific case.

Fill in the blank: Laparoscopy is generally performed under _____ anaesthesia. Haemodynamic instability and severe cardiorespiratory disease are _____ contraindications to laparoscopy.



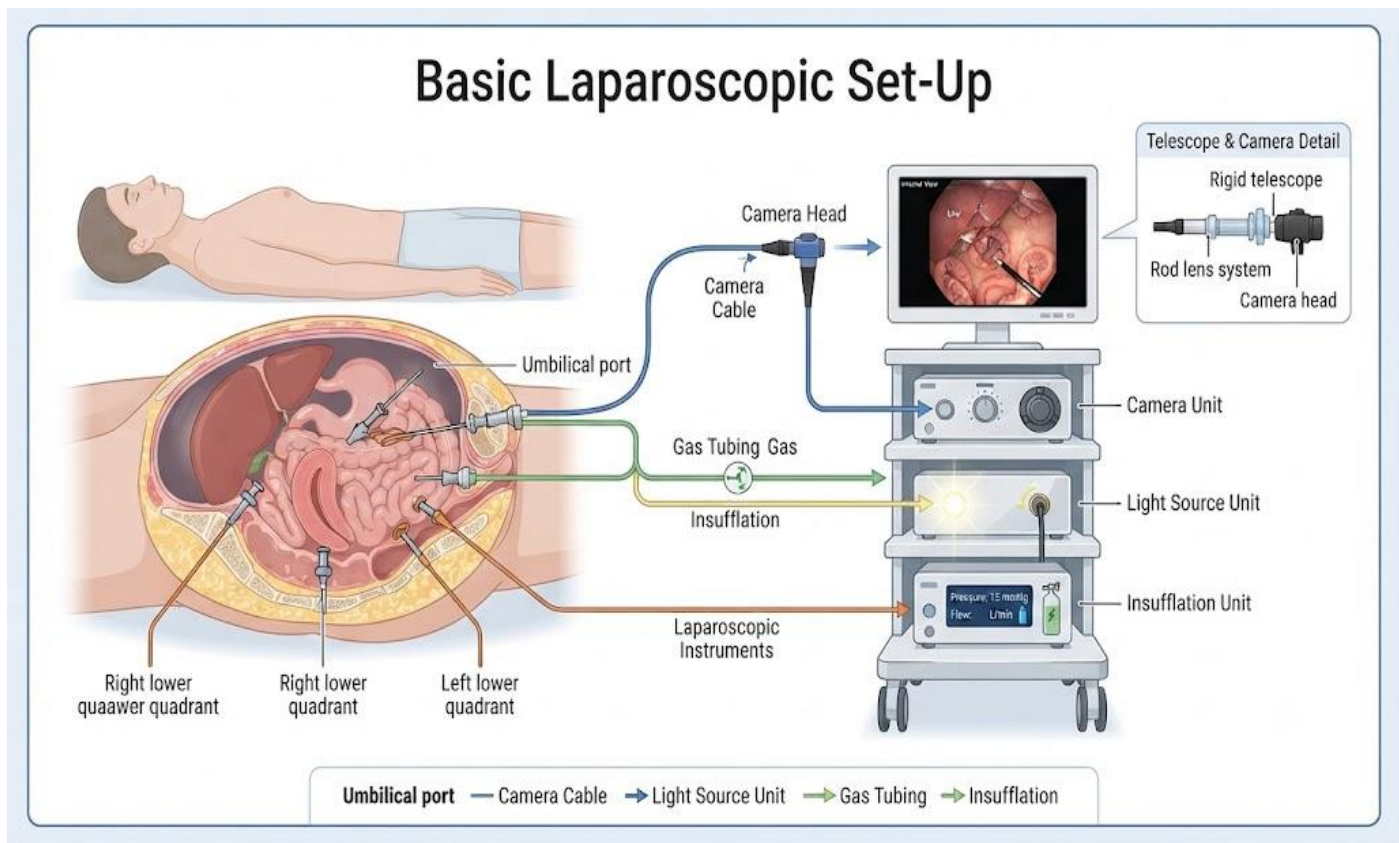


Figure 1.1: Basic laparoscopic set-up showing telescope, camera, and port placement.

Pilot questions 1.1

1. Describe the equipment and steps involved in establishing laparoscopic access. (Linked to SLO 1.1)
2. Describe the purpose and placement of accessory ports during laparoscopy. (Linked to SLO 1.1)
3. Distinguish diagnostic from operative laparoscopy with examples of each. (Linked to SLO 1.2)
4. Describe the factors considered in patient selection for laparoscopy. (Linked to SLO 1.3)
5. List the absolute and relative contraindications to laparoscopy. (Linked to SLO 1.3)

Part 1.2: Laparoscopy in Infertility and Pelvic Pain

1.2.1 Laparoscopy in the infertility workup

Laparoscopy, often combined with a **dye test** through the cervix, allows direct assessment of **tubal patency** and pelvic anatomy in the **infertility workup**, identifying **tubal occlusion**, **peritubal adhesions**, or **endometriosis** that may not be visible on **hysterosalpingography** or



pelvic ultrasound, and is generally reserved for women with an abnormal or equivocal initial investigation, or specific risk factors for pelvic pathology.

Where pathology is identified during diagnostic laparoscopy for infertility, **operative correction**, such as **adhesiolysis** or **excision of endometriotic deposits**, can often be performed in the same procedure, potentially improving natural conception rates and, in some cases, avoiding or delaying the need for **assisted reproductive technology**.

Fill in the blank: Laparoscopy combined with a _____ test assesses tubal patency during the infertility workup. Operative correction such as adhesiolysis can often be performed in the _____ procedure as diagnosis.

1.2.2 Laparoscopy in chronic pelvic pain

Chronic pelvic pain, defined as pain persisting for six months or more, is a common and often frustrating presentation, and **laparoscopy** is indicated when initial history, examination, and imaging fail to identify a clear cause, or when specific findings, such as suspected **endometriosis** or **pelvic adhesions**, are strongly suspected clinically.

Laparoscopy in chronic pelvic pain serves both diagnostic and, where appropriate, therapeutic purposes, allowing biopsy or excision of suspected **endometriotic lesions**, division of **adhesions**, and, importantly, providing reassurance to the patient where no significant pathology is found, which itself carries genuine value in the overall management of chronic pain.

Fill in the blank: Chronic pelvic pain is defined as pain persisting for _____ months or more. Laparoscopy can provide diagnostic _____ to the patient where no significant pathology is found.

1.2.3 Laparoscopy in suspected endometriosis

Laparoscopy remains the **gold standard** for diagnosing **endometriosis**, allowing direct visualisation of characteristic **peritoneal implants**, **endometriomas**, and **deep infiltrating disease**, with **histological confirmation** obtained through biopsy of visualised lesions, since the appearance alone, while often characteristic, is not always definitive.

Beyond diagnosis, laparoscopy allows **staging** of endometriosis severity and, in the same setting, **excision** or **ablation** of visualised disease, meaning a single procedure frequently combines definitive diagnosis with meaningful therapeutic benefit for women whose symptoms have often been present, and sometimes dismissed, for a considerable period before referral.

Fill in the blank: Laparoscopy remains the _____ standard for diagnosing endometriosis. Histological confirmation of endometriosis is obtained through _____ of visualised lesions.



<u>Indication</u>	<u>Role</u>
<u>Endometriosis</u>	Diagnosis, staging, and excision/ablation of lesions to improve fertility and relieve pain
<u>Tubal factor infertility</u>	Assessment of tubal patency, adhesiolysis, and correction of tubal pathology
<u>Pelvic adhesions</u>	Identification and adhesiolysis to restore pelvic anatomy and reduce pain
<u>Ovarian cysts</u>	Cystectomy or drainage to improve ovarian function and relieve pain
<u>Unexplained infertility</u>	Diagnostic laparoscopy to detect subtle pelvic pathology not seen on imaging
<u>Chronic pelvic pain</u>	Direct visualization to identify causes (endometriosis, adhesions, PID) and provide therapeutic intervention
<u>Suspected pelvic inflammatory disease sequelae</u>	Evaluation of tubal damage, adhesions, and possible surgical correction
<u>Congenital anomalies</u>	Assessment and correction of Müllerian anomalies affecting fertility

Table 1.2: Indications for laparoscopy in infertility and pelvic pain.

Pilot questions 1.2

1. Describe the role of laparoscopy in the infertility workup. (Linked to SLO 1.4)
2. Explain how operative correction can be combined with diagnostic laparoscopy in infertility. (Linked to SLO 1.4)
3. Describe the indications for laparoscopy in chronic pelvic pain. (Linked to SLO 1.4)
4. Explain why laparoscopy is considered the gold standard for diagnosing endometriosis. (Linked to SLO 1.5)
5. Describe the diagnostic and therapeutic role of laparoscopy in suspected endometriosis. (Linked to SLO 1.5)

Part 1.3: Laparoscopy in Acute Gynaecological Conditions

1.3.1 Laparoscopy in suspected ectopic pregnancy



Laparoscopy is central to the management of **suspected ectopic pregnancy** in a **haemodynamically stable** woman, allowing direct confirmation of the diagnosis and, in the same procedure, **laparoscopic salpingectomy** or **salpingostomy** to remove or treat the ectopic pregnancy, avoiding the larger incision and longer recovery associated with **open laparotomy**.

In a **haemodynamically unstable** woman with suspected **ruptured ectopic pregnancy**, urgent surgical intervention, whether laparoscopic or open, takes priority over further imaging or confirmatory testing, since delay in a woman with significant **intra-abdominal haemorrhage** carries serious risk to life.

Fill in the blank: Laparoscopic salpingectomy or salpingostomy treats ectopic pregnancy in a haemodynamically _____ woman. In an unstable woman, urgent surgical intervention takes _____ over further imaging.

1.3.2 Laparoscopy in ovarian cyst accidents

Ovarian cyst accidents, including **torsion**, **rupture**, and **haemorrhage into a cyst**, typically present with acute pelvic pain and are well suited to laparoscopic management, allowing **detorsion** and **ovarian conservation** where the ovary remains viable, or **cystectomy** or **oophorectomy** where necessary, generally with better cosmetic and recovery outcomes than open surgery.

Prompt laparoscopic assessment in suspected **ovarian torsion** is particularly important, since the ovary can often be salvaged through timely **detorsion** even when it appears initially dusky or discoloured, meaning a cautious 'wait and see' approach based on appearance alone risks unnecessary loss of the ovary.

Fill in the blank: Ovarian cyst accidents include torsion, rupture, and _____ into a cyst. Prompt laparoscopic _____ in suspected torsion can often salvage an initially dusky-appearing ovary.

1.3.3 Laparoscopy in suspected pelvic inflammatory disease

Laparoscopy is indicated in suspected **pelvic inflammatory disease** when the diagnosis remains uncertain despite clinical assessment, when a woman fails to respond to **empirical antibiotic treatment**, or when a **tubo-ovarian abscess** is suspected, allowing direct visualisation of **tubal inflammation**, **pelvic adhesions**, or **abscess formation**, alongside collection of specimens for microbiological culture.

Where a **tubo-ovarian abscess** is confirmed, laparoscopic **drainage** and **washout** can be performed in the same procedure, often avoiding the need for open surgery and allowing continued **intravenous antibiotic therapy** to proceed alongside definitive source control of the infection.



Fill in the blank: Laparoscopy is indicated in suspected PID when a woman fails to respond to empirical _____ treatment. A confirmed tubo-ovarian abscess can be treated with laparoscopic drainage and _____.

Indication

Suspected ectopic pregnancy

Acute adnexal torsion

Ruptured ovarian cyst

Acute pelvic pain of unclear origin

Pelvic abscess or tubo-ovarian abscess

Postoperative complications

Acute haemoperitoneum

Box 1.3: Indications for laparoscopy in acute gynaecological presentations.

Pilot questions 1.3

1. Describe the role of laparoscopy in a haemodynamically stable woman with suspected ectopic pregnancy. (Linked to SLO 1.6)
2. Explain why urgent intervention takes priority over imaging in a haemodynamically unstable woman. (Linked to SLO 1.6)
3. Describe the laparoscopic management options for ovarian cyst accidents. (Linked to SLO 1.6)
4. Explain why prompt laparoscopic assessment is important in suspected ovarian torsion. (Linked to SLO 1.6)
5. Describe the indications for laparoscopy in suspected pelvic inflammatory disease and tubo-ovarian abscess. (Linked to SLO 1.6)

Part 1.4: Laparoscopy in Adnexal Mass Evaluation and Sterilisation

1.4.1 Laparoscopy in adnexal mass evaluation

Laparoscopy allows direct visualisation and, where appropriate, **removal** of an **adnexal mass** that is indeterminate on imaging, with careful pre-operative assessment of **malignancy risk**,



using tools such as the **risk of malignancy index**, guiding whether laparoscopic management is appropriate or whether **open surgery** with immediate access to full staging is safer.

Intact removal of the mass is preferred wherever malignancy cannot be confidently excluded, using a **specimen retrieval bag** to avoid **spillage** of cyst contents into the peritoneal cavity, since spillage of an unsuspected malignant cyst can adversely affect the woman's prognosis by upstaging otherwise early disease.

Fill in the blank: The risk of malignancy index helps guide whether laparoscopic or _____ surgery is appropriate for an adnexal mass. A specimen retrieval _____ is used to avoid spillage of cyst contents.

1.4.2 Laparoscopic tubal sterilisation

Laparoscopic tubal sterilisation is a common **permanent contraceptive method**, achieved through **tubal occlusion** using **clips, rings, or diathermy**, or through **partial salpingectomy**, performed as a day case procedure with rapid recovery, and requires thorough **pre-procedure counselling** given its intended permanence and the small but recognised risk of subsequent **failure**.

Counselling before laparoscopic sterilisation should cover the **permanence** of the procedure, the **small failure rate**, the **increased risk of ectopic pregnancy** if failure does occur, and available **reversible alternatives**, ensuring the decision is genuinely informed and voluntary rather than made under time pressure or external influence.

Fill in the blank: Laparoscopic sterilisation may be achieved through tubal occlusion or partial _____. If sterilisation failure occurs, there is an increased risk of _____ pregnancy.

1.4.3 Second-look laparoscopy and oncological staging

Second-look laparoscopy is occasionally used to reassess the pelvis after treatment for conditions such as **endometriosis** or following **fertility surgery**, evaluating for **recurrence** or **new adhesion formation** and guiding further management, though its routine use has declined as imaging and clinical follow-up have improved.

In **gynaecological oncology**, **laparoscopic staging** allows assessment of **disease extent**, collection of **peritoneal washings**, and **lymph node sampling** in selected early-stage cancers, offering the same staging information as open surgery with the recognised benefits of **minimally invasive surgery**, including faster recovery and reduced perioperative morbidity.

Fill in the blank: Second-look laparoscopy evaluates for recurrence or new _____ formation after prior surgery. Laparoscopic staging allows collection of peritoneal washings and _____ sampling.



Decision Pathway for Laparoscopic Management of an Adnexal Mass

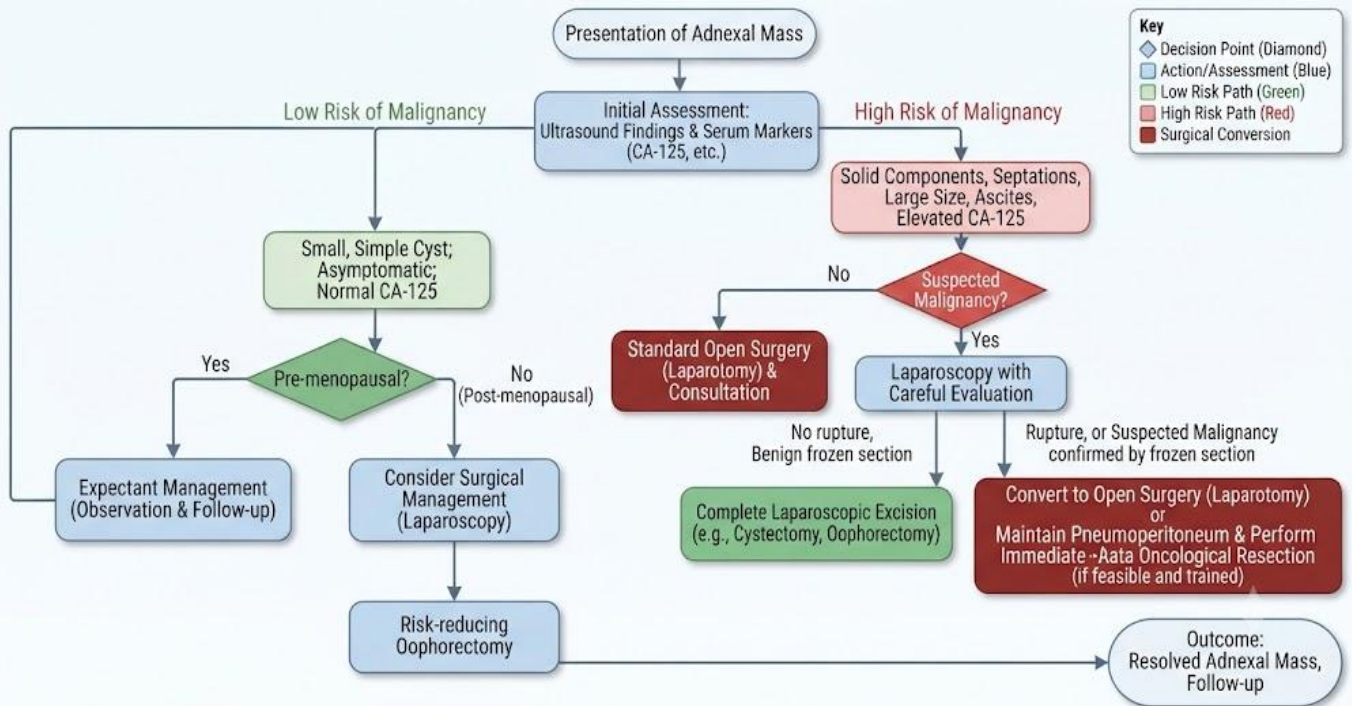


Figure 1.4: Decision pathway for laparoscopic management of an adnexal mass.

Pilot questions 1.4

1. Describe the assessment of an adnexal mass before deciding on laparoscopic management. (Linked to SLO 1.7)
2. Explain why intact removal of an adnexal mass is preferred where malignancy cannot be excluded. (Linked to SLO 1.7)
3. Describe the methods used for laparoscopic tubal sterilisation. (Linked to SLO 1.7)
4. Discuss the counselling required before laparoscopic sterilisation. (Linked to SLO 1.7)
5. Describe the role of laparoscopy in oncological staging. (Linked to SLO 1.8)

Series Summary

This Series introduced **laparoscopy**, covering the **principles and equipment** underlying the technique, the distinction between **diagnostic** and **operative laparoscopy**, and the careful **patient selection** required given its recognised contraindications. Its central role in the **infertility**



workup, chronic pelvic pain, and diagnosis of **endometriosis** was examined, alongside its value in **acute gynaecological conditions** such as **ectopic pregnancy, ovarian cyst accidents**, and **pelvic inflammatory disease**.

Finally, the Series addressed the role of laparoscopy in **adnexal mass evaluation, tubal sterilisation**, and **oncological staging**, establishing the broad diagnostic and therapeutic reach of this technique across gynaecological practice. The next Series turns to **hysteroscopy**, examining its indications within the endoscopic approach to gynaecological diagnosis and treatment.

Glossary of Terms

- **Laparoscopy:** a minimally invasive procedure using a telescope inserted through a small incision to visualise the abdomen and pelvis.
- **Pneumoperitoneum:** insufflation of the abdominal cavity with carbon dioxide gas to create a working space for laparoscopy.
- **Diagnostic laparoscopy:** laparoscopy performed to visualise and assess pathology without therapeutic intervention.
- **Operative laparoscopy:** laparoscopy extended to perform therapeutic surgical procedures.
- **Endometriosis:** presence of endometrial-like tissue outside the uterine cavity, for which laparoscopy is the gold standard diagnostic method.
- **Adhesiolysis:** surgical division of adhesions, often performed laparoscopically.
- **Salpingectomy:** surgical removal of a fallopian tube.
- **Ovarian torsion:** twisting of the ovary on its supporting ligaments, a gynaecological emergency requiring prompt laparoscopic assessment.
- **Tubo-ovarian abscess:** a collection of pus involving the fallopian tube and ovary, a complication of pelvic inflammatory disease.
- **Risk of malignancy index:** a scoring tool used to estimate the likelihood of malignancy in an adnexal mass.
- **Laparoscopic tubal sterilisation:** a permanent contraceptive method achieved through tubal occlusion or salpingectomy.
- **Laparoscopic staging:** assessment of cancer extent through laparoscopic visualisation, washings, and lymph node sampling.

Concept Check Questions [Series 1]



Objective questions

1. Laparoscopy requires insufflation of the abdomen with _____ gas.
2. Diagnostic laparoscopy confirms or excludes pathology without any _____ intervention.
3. Laparoscopy remains the _____ standard for diagnosing endometriosis.
4. In a haemodynamically unstable woman with suspected ruptured ectopic pregnancy, urgent surgical intervention takes _____ over imaging.
5. The _____ of malignancy index helps guide management of an indeterminate adnexal mass.

Short-answer questions

6. Distinguish diagnostic from operative laparoscopy with examples of each. (Linked to SLO 1.2)
7. Describe the role of laparoscopy in the infertility workup. (Linked to SLO 1.4)
8. Describe the laparoscopic management options for ovarian cyst accidents. (Linked to SLO 1.6)
9. Describe the assessment of an adnexal mass before deciding on laparoscopic management. (Linked to SLO 1.7)
10. Describe the role of laparoscopy in oncological staging. (Linked to SLO 1.8)

Long-answer questions

11. Describe the principles and equipment used in laparoscopy, and distinguish diagnostic from operative laparoscopy. (Linked to SLO 1.1, SLO 1.2)
12. Describe patient selection and contraindications for laparoscopy. (Linked to SLO 1.3)
13. Discuss the indications for laparoscopy in infertility, chronic pelvic pain, and suspected endometriosis. (Linked to SLO 1.4, SLO 1.5)
14. Discuss the indications for laparoscopy in acute gynaecological conditions. (Linked to SLO 1.6)
15. Describe the role of laparoscopy in adnexal mass evaluation, sterilisation, and oncological staging. (Linked to SLO 1.7, SLO 1.8)

Answers to Concept Check Questions [Series 1]

Objective questions

1. Carbon dioxide.



2. Therapeutic.
3. Gold.
4. Priority.
5. Risk.

Short-answer questions

6. Diagnostic laparoscopy visualises and assesses pathology only; operative laparoscopy adds therapeutic procedures such as adhesiolysis or cystectomy.
7. Laparoscopy with dye test assesses tubal patency and pelvic anatomy, identifying pathology not seen on hysterosalpingography or ultrasound.
8. Detorsion with ovarian conservation where viable, or cystectomy or oophorectomy where necessary.
9. Pre-operative assessment of malignancy risk using tools such as the risk of malignancy index, guiding laparoscopic versus open surgery.
10. Assessment of disease extent, collection of peritoneal washings, and lymph node sampling in selected early-stage cancers.

Long-answer questions

11. **Basic response:** Laparoscopy uses a telescope inserted through the umbilicus after establishing pneumoperitoneum, with diagnostic laparoscopy limited to visualisation and operative laparoscopy extending to therapeutic procedures.

Value-added response: Whether a diagnostic procedure becomes operative often depends on findings at the time, requiring appropriate consent to be obtained beforehand.

12. **Basic response:** Patient selection considers fitness for anaesthesia and factors complicating safe entry, with absolute contraindications including haemodynamic instability and severe cardiorespiratory disease.

Value-added response: Relative contraindications require individualised judgement weighing the benefits of laparoscopy against increased technical risk in each case.

13. **Basic response:** Laparoscopy is indicated in infertility to assess tubal patency and pelvic pathology, in chronic pelvic pain when other investigations are inconclusive, and remains the gold standard for diagnosing endometriosis.



Value-added response: A single laparoscopic procedure frequently combines definitive diagnosis with meaningful therapeutic benefit for these presentations.

14. **Basic response:** Laparoscopy is indicated in stable suspected ectopic pregnancy, ovarian cyst accidents, and suspected pelvic inflammatory disease or tubo-ovarian abscess.

Value-added response: Urgent surgical intervention takes priority over further imaging in haemodynamically unstable presentations given the risk to life from ongoing haemorrhage.

15. **Basic response:** Laparoscopy allows evaluation and management of indeterminate adnexal masses, permanent contraception through tubal sterilisation, and staging in selected early-stage gynaecological cancers.

Value-added response: Intact removal using a specimen retrieval bag is preferred wherever malignancy cannot be confidently excluded, to avoid adversely affecting prognosis through spillage.

Answers to Pilot Questions [Series 1]

Part 1.1

1. A laparoscope with camera and light source is inserted through the umbilicus after establishing pneumoperitoneum with carbon dioxide gas.
2. Accessory ports are placed in the lower abdomen under direct vision to introduce instruments for dissection and haemostasis.
3. Diagnostic laparoscopy visualises pathology only; operative laparoscopy adds therapeutic procedures such as adhesiolysis or myomectomy.
4. Fitness for general anaesthesia and factors that may complicate safe entry, including obesity and previous abdominal surgery.
5. Absolute: haemodynamic instability, severe cardiorespiratory disease, bowel obstruction.
Relative: advanced pregnancy, extensive prior surgery.

Part 1.2



1. Laparoscopy with dye test assesses tubal patency and identifies pathology not visible on hysterosalpingography or ultrasound.
2. Pathology identified during diagnostic laparoscopy can often be corrected operatively in the same procedure.
3. When history, examination, and imaging fail to identify a clear cause, or specific pathology is strongly suspected.
4. It allows direct visualisation and histological confirmation of characteristic implants and deep infiltrating disease.
5. It provides definitive diagnosis and, in the same setting, staging and excision or ablation of visualised disease.

Part 1.3

1. It confirms the diagnosis and allows laparoscopic salpingectomy or salpingostomy in the same procedure.
2. Delay in an unstable woman with intra-abdominal haemorrhage carries serious risk to life.
3. Detorsion with ovarian conservation where viable, or cystectomy or oophorectomy where necessary.
4. The ovary can often be salvaged through timely detorsion even when it initially appears dusky or discoloured.
5. When diagnosis is uncertain, there is failure of empirical antibiotics, or tubo-ovarian abscess is suspected.

Part 1.4

1. Pre-operative risk assessment using tools such as the risk of malignancy index guides laparoscopic versus open management.
2. Spillage of an unsuspected malignant cyst can adversely affect prognosis by upstaging otherwise early disease.
3. Tubal occlusion using clips, rings, or diathermy, or partial salpingectomy.
4. Permanence, small failure rate, increased ectopic pregnancy risk if failure occurs, and reversible alternatives.
5. It allows assessment of disease extent, peritoneal washings, and lymph node sampling in selected early-stage cancers.



References and Attributions [Series 1]

- Hoffman, B. L., Schorge, J. O., Halvorson, L. M. et al. (2020). Williams Gynecology (4th ed.). McGraw-Hill Education.
- Royal College of Obstetricians and Gynaecologists (2018). Diagnostic Laparoscopy: Green-top Guideline.
- American College of Obstetricians and Gynecologists (2020). Diagnosis and Management of Adnexal Masses. Practice Bulletin.
- Berek, J. S. and Berek, D. L. (2019). Berek and Novak's Gynecology (16th ed.). Wolters Kluwer.

Figures, Plates, Tables, and Boxes

- Figure 1.1: Basic laparoscopic set-up showing telescope, camera, and port placement. AI-generated using the prompt: "Create a professional medical diagram titled Basic Laparoscopic Set-Up, showing telescope, camera, insufflation, and port placement. Clean clinical educational diagram style."
- Table 1.2: Indications for laparoscopy in infertility and pelvic pain. AI-generated using the prompt: "Create a clean reference table titled Indications for Laparoscopy in Infertility and Pelvic Pain, listing indication and role. Simple clinical reference table style with outside border."
- Box 1.3: Indications for laparoscopy in acute gynaecological presentations. AI-generated using the prompt: "Create a simple single-column reference box titled Indications for Laparoscopy in Acute Gynaecological Presentations. Clean clinical reference box style."
- Figure 1.4: Decision pathway for laparoscopic management of an adnexal mass. AI-generated using the prompt: "Create a professional medical flowchart titled Decision Pathway for Laparoscopic Management of an Adnexal Mass, showing risk-based decision points. Clean clinical educational diagram style."



Course code: OBG 518

Course title: Gynaecological Endoscopy

Course credit load: 2 Units

Series 2: Indications for Hysteroscopy

- **Part 2.1: Exploring the Principles of Hysteroscopy**
 - Sub Part 2.1.1: What hysteroscopy involves
 - Sub Part 2.1.2: Preparing for and performing hysteroscopy
 - Sub Part 2.1.3: Diagnostic versus operative hysteroscopy
- **Part 2.2: Examining Hysteroscopy in Abnormal Uterine Bleeding**
 - Sub Part 2.2.1: Hysteroscopy in the assessment of abnormal uterine bleeding
 - Sub Part 2.2.2: Hysteroscopy in suspected endometrial pathology
 - Sub Part 2.2.3: Hysteroscopic management of polyps and fibroids
- **Part 2.3: Applying Hysteroscopy in Infertility and Reproductive Anomalies**
 - Sub Part 2.3.1: Hysteroscopy in the infertility workup
 - Sub Part 2.3.2: Hysteroscopy in suspected uterine septum and adhesions
 - Sub Part 2.3.3: Hysteroscopic treatment of septae and adhesions
- **Part 2.4: Considering Contraindications and Complications of Hysteroscopy**
 - Sub Part 2.4.1: Contraindications to hysteroscopy
 - Sub Part 2.4.2: Complications associated with hysteroscopy
 - Sub Part 2.4.3: Hysteroscopic sterilisation and its current status

Introduction

In the last Series, we explored **laparoscopy** and its wide-ranging indications across gynaecological practice. We now turn to **hysteroscopy**, a technique that lets us look directly inside the uterine cavity itself, giving us a view of the endometrium and cavity shape that no external imaging test can quite match. You will find, as we work through this Series, that



hysteroscopy sits right at the heart of how we investigate **abnormal uterine bleeding**, **infertility**, and structural problems of the womb.

Much of what makes **hysteroscopy** so valuable is its dual nature: in the same short procedure, we can both **see** a problem and, very often, **treat** it, whether that is removing a troublesome **polyp** or dividing an **intrauterine adhesion**. This Series will help you build a clear, practical understanding of when hysteroscopy is the right tool to reach for, and when it is not.

This Series covers the **principles of hysteroscopy**, its role in **abnormal uterine bleeding** and **endometrial pathology**, its application in **infertility and reproductive anomalies**, and its **contraindications and complications**.

Series Learning Outcomes

At the end of this Series, you should be able to:

- **SLO 2.1:** describe the principles and technique of hysteroscopy,
- **SLO 2.2:** distinguish diagnostic from operative hysteroscopy,
- **SLO 2.3:** describe the role of hysteroscopy in the assessment of abnormal uterine bleeding,
- **SLO 2.4:** describe the hysteroscopic management of polyps and fibroids,
- **SLO 2.5:** describe the role of hysteroscopy in the infertility workup,
- **SLO 2.6:** describe the hysteroscopic diagnosis and treatment of uterine septum and adhesions,
- **SLO 2.7:** list the contraindications to hysteroscopy, and
- **SLO 2.8:** enumerate the complications associated with hysteroscopy.

2.1 Exploring the Principles of Hysteroscopy

2.1.1 what hysteroscopy involves

The hysteroscope and distension medium

Hysteroscopy lets us look directly inside your patient's uterus using a slender, lighted telescope called a **hysteroscope**, passed gently through the cervix without any incision at all. As you work through this Part, you will come to see why this simple idea, looking directly at the lining of the



womb, has become such a powerful diagnostic and therapeutic tool in modern gynaecology, allowing the clinician to spot problems that other tests might easily miss and, in many cases, to treat them within the very same sitting.

A **distension medium**, usually **normal saline**, or, less often, **carbon dioxide gas**, is used to gently expand the uterine cavity so its walls separate enough to be seen clearly, since the uterus is normally a collapsed, slit-like space. Getting the distension right matters a great deal: too little and the view remains obscured, too much and the patient experiences unnecessary discomfort, or, rarely, fluid is absorbed into the circulation in a way that needs to be carefully monitored throughout longer operative procedures.

If the uterine cavity were not distended before hysteroscopy, what would the operator actually see through the telescope?

2.1.2 preparing for and performing hysteroscopy

Most **diagnostic hysteroscopy** is performed as an **outpatient procedure**, often without any anaesthesia or with only **local anaesthetic** to the cervix, using a narrow-diameter hysteroscope that most women tolerate well, and is best timed in the **early proliferative phase**, shortly after menstruation, when the endometrium is thin and any abnormality is easiest to visualise clearly against the background lining.

Operative hysteroscopy, by contrast, generally requires a wider instrument to accommodate working channels for scissors, graspers, or a **resectoscope**, and is more often performed under **general** or **regional anaesthesia** in a theatre setting, particularly where the planned procedure, such as **fibroid resection**, is likely to take longer or cause more discomfort than a brief diagnostic look would.

Fill in the blank: Diagnostic hysteroscopy is best timed in the early _____ phase, shortly after menstruation, when the endometrium is thin.

2.1.3 diagnostic versus operative hysteroscopy

Much like laparoscopy, hysteroscopy can be purely **diagnostic**, used simply to inspect the cavity and confirm or exclude suspected pathology, or it can be **operative**, extending the same access to treat what is found, whether that means removing a **polyp**, resecting a **submucous fibroid**, or dividing a **uterine septum**, often within the same visit that first revealed the problem.

This 'see and treat' capability is one of the most attractive features of hysteroscopy for both clinician and patient, since it can spare a woman a second procedure and a second wait, though the decision to proceed straight from diagnosis to treatment always depends on adequate **prior consent**, the complexity of the finding, and whether the necessary equipment and anaesthetic support are already in place.



The Hysteroscope and Uterine Distension

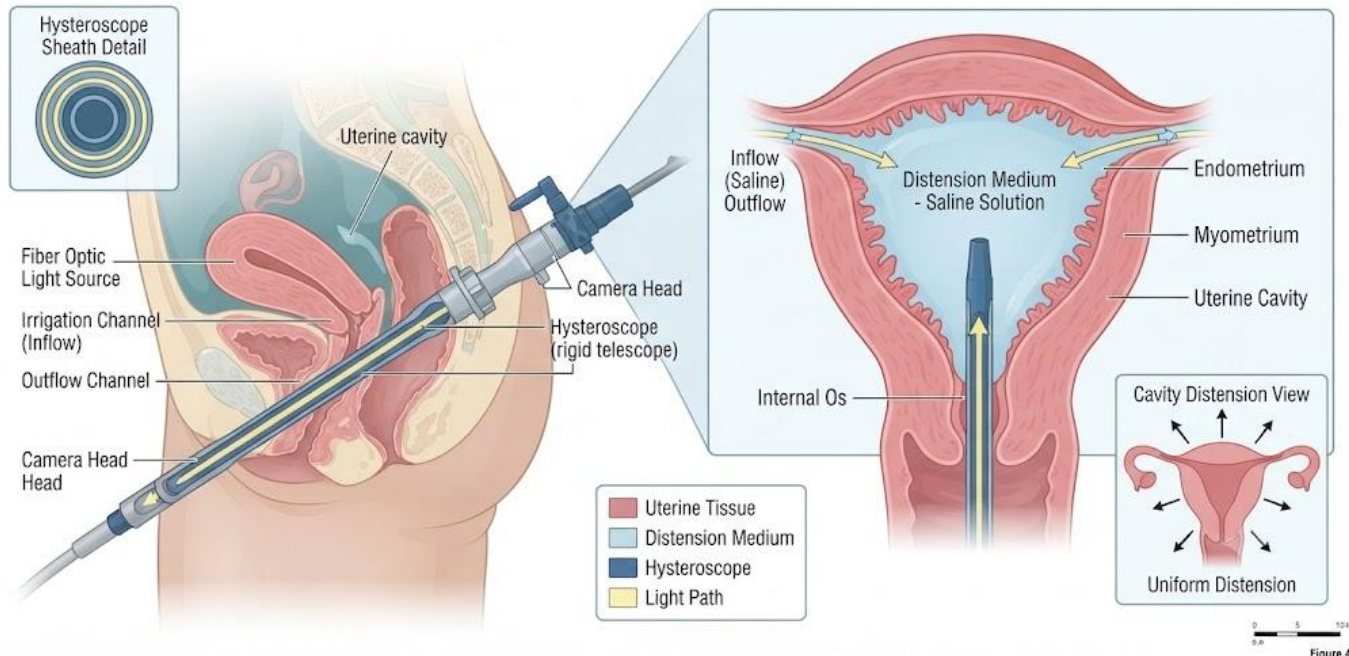


Figure 2.1: The hysteroscope in place within a distended uterine cavity.

Pilot questions 2.1

- Describe the purpose of a distension medium in hysteroscopy. (Linked to SLO 2.1)
- Explain why getting the degree of uterine distension right matters clinically. (Linked to SLO 2.1)
- Describe when diagnostic hysteroscopy is best timed within the menstrual cycle and why. (Linked to SLO 2.1)
- Distinguish diagnostic from operative hysteroscopy with examples of each. (Linked to SLO 2.2)
- Discuss the factors that determine whether hysteroscopy can proceed from diagnosis straight to treatment. (Linked to SLO 2.2)

2.2 Examining Hysteroscopy in Abnormal Uterine Bleeding

2.2.1 hysteroscopy in the assessment of abnormal uterine bleeding



Why direct visualisation matters

Abnormal uterine bleeding, whether **heavy menstrual bleeding**, **intermenstrual bleeding**, or **postmenopausal bleeding**, is one of the most common reasons a woman is referred for hysteroscopy, since **transvaginal ultrasound**, while a useful first step, cannot always distinguish reliably between a focal lesion, such as a **polyp** or **submucous fibroid**, and simple **endometrial thickening**, a distinction that matters considerably for planning the right treatment.

Postmenopausal bleeding deserves particular attention, since it always warrants prompt investigation to exclude **endometrial carcinoma**, and hysteroscopy, generally combined with **endometrial biopsy**, allows both direct visualisation of the cavity and targeted, rather than blind, sampling of any suspicious area, considerably improving the diagnostic yield compared with blind sampling procedures alone.

Why might a blind endometrial biopsy miss a small focal polyp that hysteroscopy would readily identify?

2.2.2 hysteroscopy in suspected endometrial pathology

Where **endometrial hyperplasia** or **endometrial carcinoma** is suspected, based on risk factors such as **obesity**, **unopposed oestrogen exposure**, or persistent abnormal bleeding, hysteroscopy allows the clinician to see the overall pattern of the endometrium, identify any focal or irregular areas, and take **directed biopsies** from precisely those areas, rather than sampling blindly and hoping to capture the relevant tissue by chance.

A **normal-appearing endometrium** on hysteroscopy is genuinely reassuring, though it does not entirely eliminate the possibility of an early or subtle lesion, meaning histological confirmation from biopsy remains essential whenever malignancy is a serious clinical concern, rather than relying on visual appearance alone.

Fill in the blank: Postmenopausal bleeding always warrants prompt investigation to exclude endometrial _____.

2.2.3 hysteroscopic management of polyps and fibroids

Endometrial polyps, benign overgrowths of endometrial tissue, and **submucous fibroids**, fibroids that bulge into the uterine cavity, are both readily treated hysteroscopically, using either **mechanical resection** with specialised instruments or **electrosurgical resection** with a **resectoscope**, generally achieving complete removal in a single procedure with excellent symptom resolution for bleeding related directly to these lesions.

Larger or more deeply embedded **submucous fibroids** may occasionally require a **staged approach**, with an initial partial resection followed by a period of medical treatment to shrink the remaining fibroid tissue before a second, completing procedure, particularly where a single-stage resection would risk excessive fluid absorption or an unacceptably long operating time.



<u>Lesion</u>	<u>Appearance</u>	<u>Management</u>
<u>Endometrial polyps</u>	Smooth, reddish or pale, pedunculated or sessile lesions protruding into cavity	Polypectomy using scissors, graspers, or resectoscope
<u>Submucous fibroids (Type 0)</u>	Round, firm, white mass entirely within cavity, well-defined	Hysteroscopic myomectomy with resectoscope or morcellator
<u>Submucous fibroids (Type I)</u>	Intracavitary mass with <50% intramural extension	Stepwise hysteroscopic resection; may require staged procedure
<u>Submucous fibroids (Type II)</u>	Mass with ≥50% intramural extension, cavity distortion	Complex hysteroscopic myomectomy; sometimes combined laparoscopic/abdominal approach
<u>Multiple lesions</u>	Mixed appearance of polyps and fibroids	Sequential removal; may require multiple sessions

Table 2.2: Hysteroscopic appearance and management of polyps and submucous fibroids.

Pilot questions 2.2

1. Explain why transvaginal ultrasound alone may not reliably distinguish a focal lesion from endometrial thickening. (Linked to SLO 2.3)
2. Describe why postmenopausal bleeding always warrants prompt hysteroscopic investigation. (Linked to SLO 2.3)
3. Describe the advantage of directed biopsy over blind endometrial sampling. (Linked to SLO 2.3)
4. Describe the hysteroscopic management of endometrial polyps and submucous fibroids. (Linked to SLO 2.4)
5. Explain when a staged approach to fibroid resection may be preferred over a single-stage procedure. (Linked to SLO 2.4)

2.3 Applying Hysteroscopy in Infertility and Reproductive Anomalies

2.3.1 hysteroscopy in the infertility workup



Assessing the uterine cavity before treatment

A normal **uterine cavity** is an important, though often overlooked, prerequisite for successful **implantation**, so hysteroscopy is frequently included in the **infertility workup**, particularly before **assisted reproductive technology**, to exclude or treat subtle cavity abnormalities such as small **polyps**, **submucous fibroids**, or **intrauterine adhesions** that might otherwise reduce the chance of a pregnancy successfully implanting and continuing.

Even abnormalities that seem minor on other imaging, or that produce no bleeding symptoms at all, can still meaningfully affect **fertility outcomes**, which is why many fertility units now perform a routine **hysteroscopic assessment** of the cavity before proceeding to **in vitro fertilisation**, treating anything unexpected that is found along the way.

Why might a small intrauterine polyp affect fertility even if it causes no abnormal bleeding at all?

2.3.2 hysteroscopy in suspected uterine septum and adhesions

A **uterine septum**, a congenital division of the uterine cavity by a fibrous or muscular band, and **intrauterine adhesions**, also known as **Asherman syndrome**, most often resulting from previous **uterine surgery** such as curettage, are both important structural causes of **infertility** and **recurrent pregnancy loss**, and both are diagnosed with considerably greater accuracy by direct hysteroscopic visualisation than by ultrasound or hysterosalpingography alone.

Distinguishing a **septate uterus** from a **bicornuate uterus**, which can appear superficially similar on some imaging, matters considerably, since the septate uterus is amenable to hysteroscopic correction while a bicornuate uterus is not, meaning accurate diagnosis directly determines whether hysteroscopic treatment is even an appropriate option for the woman in front of you.

Fill in the blank: Intrauterine adhesions resulting from previous uterine surgery are also known as _____ syndrome.

2.3.3 hysteroscopic treatment of septae and adhesions

Hysteroscopic metroplasty, the surgical division of a **uterine septum**, is generally a relatively straightforward outpatient or day-case procedure with good subsequent reproductive outcomes, restoring a single, normally shaped cavity and meaningfully improving the chances of a successful pregnancy in women who have previously experienced **recurrent miscarriage**.

Hysteroscopic adhesiolysis for **Asherman syndrome** is more technically demanding, particularly with extensive adhesions, and carries a recognised risk of **recurrence**, meaning many women require adjunctive treatment afterward, such as **oestrogen therapy** or, occasionally, a temporary **intrauterine device** or balloon, to help keep the cavity walls separated while the endometrium heals and regenerates.



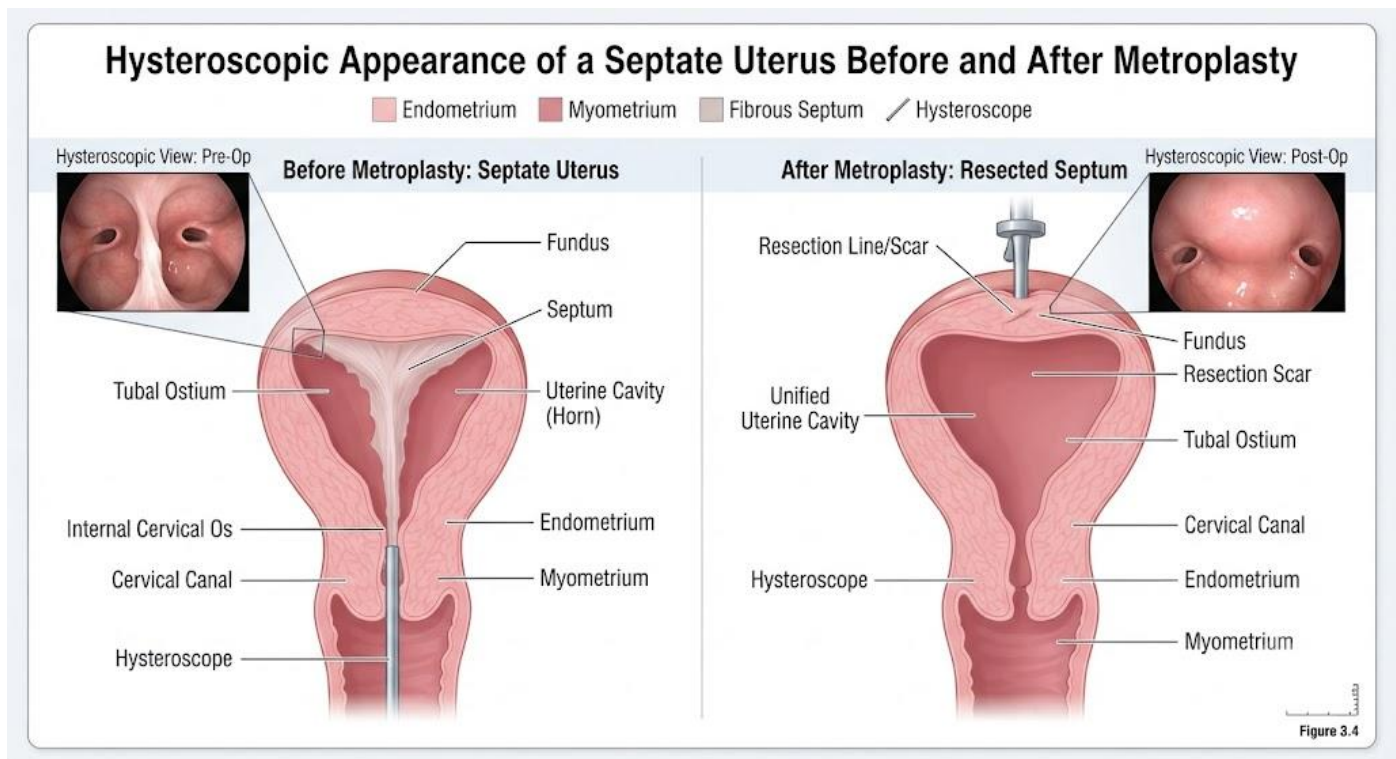


Figure 2.3: Hysteroscopic appearance of a septate uterus before and after metroplasty.

Pilot questions 2.3

1. Describe the role of hysteroscopy in the infertility workup. (Linked to SLO 2.5)
2. Explain why hysteroscopic assessment of the cavity is often performed before IVF. (Linked to SLO 2.5)
3. Describe the causes and hysteroscopic diagnosis of a uterine septum and intrauterine adhesions. (Linked to SLO 2.6)
4. Explain why distinguishing a septate from a bicornuate uterus is clinically important. (Linked to SLO 2.6)
5. Describe the hysteroscopic treatment of uterine septum and Asherman syndrome. (Linked to SLO 2.6)

2.4 Considering Contraindications and Complications of Hysteroscopy

2.4.1 contraindications to hysteroscopy



Absolute and relative contraindications

Absolute contraindications to hysteroscopy include **known pregnancy**, since the procedure risks disrupting an ongoing pregnancy, and active **pelvic infection**, which should always be treated first to avoid spreading infection upward into the pelvis during the procedure, alongside untreated **cervical or uterine cancer** where the diagnosis is already established and hysteroscopy would add little further value.

Relative contraindications include **heavy active uterine bleeding**, which can obscure the hysteroscopic view considerably, and **cervical stenosis**, which can make safely passing the hysteroscope more technically difficult, though both can often be managed with careful technique, appropriate timing, or preliminary **cervical preparation** rather than necessarily abandoning the procedure altogether.

Why is active pelvic infection treated before proceeding with hysteroscopy rather than during the same visit?

2.4.2 complications associated with hysteroscopy

Uterine perforation is the most recognised complication of hysteroscopy, occurring when the hysteroscope or an operative instrument passes through the uterine wall, with risk increased in a **distorted cavity**, during **cervical dilation**, or with extensive operative resection, and generally managed conservatively when recognised promptly, though laparoscopic assessment is occasionally needed to exclude injury to adjacent organs.

Fluid overload, from excessive absorption of the distension medium during longer operative procedures, is a less common but potentially serious complication, which is why **fluid input and output** are carefully monitored throughout any operative hysteroscopy, with the procedure stopped if the absorbed volume approaches a predetermined safety threshold, alongside less common risks including **infection**, **haemorrhage**, and, rarely, **gas embolism** when carbon dioxide is used as the distension medium.

Fill in the blank: _____ is the most recognised complication of hysteroscopy, occurring when the instrument passes through the uterine wall.

2.4.3 hysteroscopic sterilisation and its current status

Hysteroscopic sterilisation, historically achieved by placing small **tubal occlusion devices** into the proximal fallopian tubes under hysteroscopic guidance, once offered women a permanent contraceptive option without any abdominal incision at all, relying on the device gradually inducing **tubal fibrosis** and occlusion over several months, confirmed afterward with a dedicated imaging study.

In several countries, the most widely used **hysteroscopic sterilisation device** has since been withdrawn from the market following concerns about **complication rates** and **device migration**, meaning **laparoscopic tubal sterilisation** has generally become the more widely available and



preferred permanent sterilisation option, though awareness of the hysteroscopic approach and its history remains relevant to understanding the evolution of this field.

Contraindications and Complications of Hysteroscopy at a Glance

⊗ Contraindications (Absolute and Relative)

- Pregnancy (Absolute)
- Active Pelvic Inflammatory Disease (PID) (Absolute)
- Cervical or Endometrial Malignancy (Relative, depending on procedure)
- Severe Cervical Stenosis (Relative, may require dilation)
- Active Genital Herpes Infection (Relative)

⚠ Complications (Intraoperative and Postoperative)

- Intraoperative Complications:
 - Uterine Perforation
 - Excessive Bleeding (Hemorrhage)
 - Fluid Overload (from distension media)
 - Cervical Laceration
- Postoperative Complications:
 - Infection (Endometritis)
 - Intrauterine Adhesions (Asherman Syndrome)
 - Delayed Bleeding
 - Persistent Pain

Box 2.4: Contraindications and complications of hysteroscopy at a glance.

Pilot questions 2.4

1. List the absolute contraindications to hysteroscopy. (Linked to SLO 2.7)
2. Describe the relative contraindications to hysteroscopy and how they may be managed. (Linked to SLO 2.7)
3. Describe uterine perforation as a complication of hysteroscopy, including its risk factors and management. (Linked to SLO 2.8)
4. Explain why fluid input and output are carefully monitored during operative hysteroscopy. (Linked to SLO 2.8)
5. Discuss the current status of hysteroscopic sterilisation compared with laparoscopic tubal sterilisation. (Linked to SLO 2.8)



Series Summary

This Series introduced **hysteroscopy**, beginning with its **principles**, the role of **uterine distension**, and the distinction between **diagnostic** and **operative** procedures. Its central place in investigating **abnormal uterine bleeding**, including the important task of excluding **endometrial carcinoma** in postmenopausal bleeding, was explored, alongside its use in treating **polyps** and **submucous fibroids**.

We then examined the value of hysteroscopy in the **infertility workup** and in diagnosing and treating **uterine septum** and **intrauterine adhesions**, before turning to its **contraindications** and recognised **complications**, including **uterine perforation** and **fluid overload**. Having worked through this Series, you should now be able to describe when hysteroscopy is indicated, distinguish its diagnostic and operative uses, and recognise its risks. The next Series turns to **colposcopy**, continuing our exploration of gynaecological endoscopic technique.

Glossary of Terms

1. **Hysteroscopy:** a procedure using a slender telescope passed through the cervix to visualise the uterine cavity.
2. **Distension medium:** fluid or gas, usually normal saline, used to expand the uterine cavity for hysteroscopic viewing.
3. **Resectoscope:** a wider operative hysteroscope with a working channel for electrosurgical resection.
4. **Endometrial polyp:** a benign overgrowth of endometrial tissue projecting into the uterine cavity.
5. **Submucous fibroid:** a fibroid that bulges into the uterine cavity.
6. **Endometrial hyperplasia:** abnormal thickening of the endometrium, a risk factor for endometrial carcinoma.
7. **Uterine septum:** a congenital fibrous or muscular division of the uterine cavity.
8. **Asherman syndrome:** intrauterine adhesions, most often resulting from previous uterine surgery.
9. **Hysteroscopic metroplasty:** surgical division of a uterine septum under hysteroscopic guidance.
10. **Uterine perforation:** passage of the hysteroscope or an instrument through the uterine wall, the most recognised hysteroscopy complication.



11. **Fluid overload:** excessive absorption of distension medium during operative hysteroscopy.
12. **Hysteroscopic sterilisation:** a historical permanent contraceptive method using tubal occlusion devices placed hysteroscopically.

Concept Check Questions [Series 2]

Objective questions

- Diagnostic hysteroscopy is best timed in the early _____ phase, shortly after menstruation.
- Postmenopausal bleeding always warrants prompt investigation to exclude endometrial _____.
- Intrauterine adhesions resulting from previous uterine surgery are also known as _____ syndrome.
- _____ is the most recognised complication of hysteroscopy.
- _____ is used to gently expand the uterine cavity before viewing.

Short-answer questions

1. Distinguish diagnostic from operative hysteroscopy with examples of each. (Linked to SLO 2.2)
2. Describe the role of hysteroscopy in the assessment of abnormal uterine bleeding. (Linked to SLO 2.3)
3. Describe the hysteroscopic management of polyps and submucous fibroids. (Linked to SLO 2.4)
4. Describe the hysteroscopic diagnosis and treatment of a uterine septum. (Linked to SLO 2.6)
5. List the absolute and relative contraindications to hysteroscopy. (Linked to SLO 2.7)

Long-answer questions



6. Describe the principles of hysteroscopy and distinguish diagnostic from operative procedures. (Linked to SLO 2.1, SLO 2.2)
7. Discuss the role of hysteroscopy in abnormal uterine bleeding and endometrial pathology, including its management of polyps and fibroids. (Linked to SLO 2.3, SLO 2.4)
8. Describe the role of hysteroscopy in the infertility workup. (Linked to SLO 2.5)
9. Describe the hysteroscopic diagnosis and treatment of uterine septum and intrauterine adhesions. (Linked to SLO 2.6)
10. Discuss the contraindications and complications of hysteroscopy, including the current status of hysteroscopic sterilisation. (Linked to SLO 2.7, SLO 2.8)

Answers to Concept Check Questions [Series 2]

Objective questions

11. Proliferative.
12. Carcinoma.
13. Asherman.
14. Uterine perforation.
15. Normal saline.

Short-answer questions

16. Diagnostic hysteroscopy only visualises the cavity; operative hysteroscopy extends to treating what is found, such as removing a polyp.
17. Hysteroscopy allows direct visualisation, distinguishing focal lesions from diffuse thickening and, in postmenopausal bleeding, excluding carcinoma.
18. Mechanical or electrosurgical resection using a resectoscope, generally achieving complete removal in a single procedure.
19. Hysteroscopic metroplasty divides the septum in a relatively straightforward day-case procedure, improving subsequent reproductive outcomes.



20. **Absolute:** known pregnancy, active pelvic infection, untreated cervical or uterine cancer.
Relative: heavy bleeding, cervical stenosis.

Long-answer questions

21. **Basic response:** Hysteroscopy uses a telescope passed through the cervix with a distension medium to view the cavity, with diagnostic procedures limited to visualisation and operative procedures extending to treatment.

Value-added response: The 'see and treat' capability of hysteroscopy can spare a woman a second procedure, provided consent and equipment allow immediate treatment.

22. **Basic response:** Hysteroscopy distinguishes focal lesions from diffuse endometrial change in abnormal uterine bleeding, and allows directed removal of polyps and submucous fibroids.

Value-added response: Directed biopsy of visually suspicious areas considerably improves diagnostic yield compared with blind endometrial sampling.

23. **Basic response:** Hysteroscopy is included in the infertility workup to exclude or treat cavity abnormalities that may impair implantation, often before assisted reproductive technology.

Value-added response: Even minor abnormalities causing no bleeding symptoms can still meaningfully affect fertility outcomes, justifying routine assessment.

24. **Basic response:** A uterine septum is divided by hysteroscopic metroplasty with good outcomes; intrauterine adhesions from Asherman syndrome are treated by adhesiolysis, which carries a recognised risk of recurrence.

Value-added response: Distinguishing a septate from a bicornuate uterus is essential, since only the septate uterus is amenable to hysteroscopic correction.

25. **Basic response:** Contraindications include known pregnancy and active infection; complications include uterine perforation and fluid overload, both requiring careful monitoring.

Value-added response: Hysteroscopic sterilisation has been largely superseded by laparoscopic tubal sterilisation following device withdrawal in several countries.



Answers to Pilot Questions [Series 2]

Part 2.1

1. It gently expands the uterine cavity so the walls separate enough to be seen clearly.
2. Too little distension leaves the view obscured; too much causes discomfort or excess fluid absorption.
3. Early proliferative phase, shortly after menstruation, when the thin endometrium makes abnormalities easiest to see.
4. Diagnostic hysteroscopy only visualises the cavity; operative hysteroscopy extends to treatment such as polyp removal.
5. Adequate prior consent, complexity of the finding, and availability of the necessary equipment and anaesthetic support.

Part 2.2

6. Ultrasound cannot always distinguish a focal lesion, such as a polyp, from simple diffuse endometrial thickening.
7. It always warrants exclusion of endometrial carcinoma given the associated risk in this age group.
8. Directed biopsy targets visually suspicious areas rather than sampling blindly and hoping to capture relevant tissue.
9. Mechanical or electrosurgical resection with a resectoscope, generally achieving complete removal in one procedure.
10. When a single-stage resection would risk excessive fluid absorption or an unacceptably long operating time.

Part 2.3

11. It excludes or treats subtle cavity abnormalities that might otherwise reduce the chance of successful implantation.
12. To identify and treat unexpected abnormalities before committing to a costly and demanding IVF cycle.
13. Both are diagnosed with greater accuracy by direct hysteroscopic visualisation than by ultrasound or hysterosalpingography alone.



14. Only the septate uterus is amenable to hysteroscopic correction, unlike the bicornuate uterus.
15. Hysteroscopic metroplasty for septum; hysteroscopic adhesiolysis, sometimes with adjunctive oestrogen, for Asherman syndrome.

Part 2.4

1. Known pregnancy, active pelvic infection, and untreated cervical or uterine cancer.
2. Heavy bleeding and cervical stenosis, managed with careful technique, timing, or cervical preparation.
3. Passage of the hysteroscope or instrument through the uterine wall, more likely in a distorted cavity.
4. To detect fluid overload early and stop the procedure before absorbed volume reaches a safety threshold.
5. Hysteroscopic sterilisation has largely been superseded by laparoscopic tubal sterilisation following device withdrawal.

References and Attributions [Series 2]

1. Hoffman, B. L., Schorge, J. O., Halvorson, L. M. et al. (2020). Williams Gynecology (4th ed.). McGraw-Hill Education.
2. Royal College of Obstetricians and Gynaecologists (2011). Best Practice in Outpatient Hysteroscopy: Green-top Guideline No. 59.
3. American Association of Gynecologic Laparoscopists (2019). AAGL Practice Report: Practice Guidelines for Management of Intrauterine Synechiae.
4. Berek, J. S. and Berek, D. L. (2019). Berek and Novak's Gynecology (16th ed.). Wolters Kluwer.

Figures, Plates, Tables, and Boxes

1. Figure 2.1: The hysteroscope in place within a distended uterine cavity. AI-generated using the prompt: "Create a clean medical diagram titled The Hysteroscope and Uterine



Distension, showing telescope placement and cavity distension. Clinical educational diagram style."

2. Table 2.2: Hysteroscopic appearance and management of polyps and submucous fibroids. AI-generated using the prompt: "Create a clean reference table titled Hysteroscopic Appearance and Management of Polyps and Submucous Fibroids. Simple clinical reference table style with outside border."
3. Figure 2.3: Hysteroscopic appearance of a septate uterus before and after metroplasty. AI-generated using the prompt: "Create a professional medical diagram titled Hysteroscopic Appearance of a Septate Uterus Before and After Metroplasty. Clean clinical educational diagram style."
4. Box 2.4: Contraindications and complications of hysteroscopy at a glance. AI-generated using the prompt: "Create a simple single-column reference box titled Contraindications and Complications of Hysteroscopy at a Glance. Clean clinical reference box style."



Course code: OBG 518

Course title: Gynaecological Endoscopy

Course credit load: 2 Units

Series 3: Indications for Colposcopy

- **Part 3.1: Exploring the Principles of Colposcopy**
 - Sub Part 3.1.1: What colposcopy involves
 - Sub Part 3.1.2: Preparing for and performing colposcopy
 - Sub Part 3.1.3: Recognising the transformation zone
- **Part 3.2: Applying Colposcopy in Cervical Screening Abnormalities**
 - Sub Part 3.2.1: Colposcopy after an abnormal cervical screening result
 - Sub Part 3.2.2: Colposcopic appearances of normal and abnormal epithelium
 - Sub Part 3.2.3: Colposcopically directed biopsy
- **Part 3.3: Colposcopy in Suspected Cervical, Vaginal, and Vulval Disease**
 - Sub Part 3.3.1: Colposcopy in suspected cervical intraepithelial neoplasia
 - Sub Part 3.3.2: Colposcopy of the vagina and vulva
 - Sub Part 3.3.3: Colposcopy in suspected invasive disease
- **Part 3.4: Treatment Guided by Colposcopy and Follow-up**
 - Sub Part 3.4.1: Excisional and ablative treatment of cervical intraepithelial neoplasia
 - Sub Part 3.4.2: Post-treatment follow-up
 - Sub Part 3.4.3: Colposcopy in pregnancy and special circumstances

Introduction

In the last Series, we explored **hysteroscopy** and the many ways it lets us see, and often treat, problems within the uterine cavity itself. We now turn our attention lower down the reproductive tract, to **colposcopy**, a technique that magnifies our view of the **cervix**, **vagina**, and **vulva** so that



we can detect very early, often symptomless, changes long before they would ever declare themselves through bleeding, pain, or any other complaint a woman might bring to clinic.

You will already be familiar with the idea of **cervical screening**, whether through **cytology** or **HPV testing**, as a population-level tool for catching cervical disease early. **Colposcopy** is the essential next step for the smaller group of women whose screening result suggests something needs a closer look, and it is where population screening meets individual, hands-on clinical assessment. Understanding exactly when colposcopy is indicated, and what it allows us to do once we get there, is central to preventing cervical cancer, one of the genuinely preventable cancers affecting women worldwide, including here in Nigeria, where organised screening coverage still has considerable room to grow.

This Series covers the **principles of colposcopy**, its role following an **abnormal cervical screening result**, its use in evaluating suspected disease of the **cervix, vagina, and vulva**, and the **treatment** and **follow-up** that colposcopy guides once abnormal tissue has been confirmed.

Series Learning Outcomes

At the end of this Series, you should be able to:

- **SLO 3.1:** describe the principles and technique of colposcopy,
- **SLO 3.2:** describe the colposcopic appearances of normal and abnormal cervical epithelium,
- **SLO 3.3:** describe the indications for colposcopy following an abnormal cervical screening result,
- **SLO 3.4:** describe the technique and purpose of colposcopically directed biopsy,
- **SLO 3.5:** describe the role of colposcopy in suspected cervical intraepithelial neoplasia,
- **SLO 3.6:** describe the role of colposcopy in vaginal and vulval disease,
- **SLO 3.7:** describe the excisional and ablative treatments guided by colposcopy, and
- **SLO 3.8:** describe the post-treatment follow-up and special circumstances relevant to colposcopy.

3.1 Exploring the Principles of Colposcopy

3.1.1 what colposcopy involves



The colposcope and magnified examination

Colposcopy is, at its heart, simply a very good look. Using a **colposcope**, an instrument that combines **bright illumination** with **binocular magnification**, typically between six and forty times, the examiner is able to inspect the surface of the **cervix**, and, where indicated, the **vagina** and **vulva**, in far greater detail than is ever possible with the naked eye alone. You will find that this magnified view transforms what would otherwise be a fairly featureless pink surface into a landscape of subtle colour, vessel pattern, and surface contour that experienced colposcopists learn to read with real precision, distinguishing normal tissue from tissue that needs closer attention or sampling.

The **colposcope** itself does not touch the patient. It sits at some distance from the examination couch, much like a large pair of mounted binoculars on a stand, while the actual examination is performed using a standard vaginal **speculum** to expose the cervix, exactly as you would for taking a cervical smear. This means colposcopy, despite sounding like a more invasive or technical procedure, is in most respects a straightforward outpatient examination that the great majority of women tolerate comfortably, usually taking no more than fifteen to twenty minutes from start to finish, including time for any biopsies that may be needed.

If the colposcope itself never touches the patient, what does the examiner actually use to expose the cervix for viewing?

3.1.2 preparing for and performing colposcopy

Before the examination proper begins, the cervix is gently cleaned and then two key solutions are applied in sequence, each revealing a different layer of diagnostic information. **Acetic acid**, usually a three to five per cent solution, is applied first, and causes abnormal areas of the cervix, where cells contain increased **nuclear protein** and are more densely packed than normal, to turn temporarily white, a change referred to as **acetowhitening**. This single, simple step is arguably the single most important part of the entire examination, since the density, edge definition, and speed of onset of any acetowhite change all carry real diagnostic weight.

Lugol's iodine, applied after acetic acid in what is known as **Schiller's test**, works on a different principle entirely: normal, glycogen-rich squamous epithelium stains a deep mahogany brown, while abnormal or immature epithelium, which lacks glycogen, remains pale or unstained, a pattern that helps confirm and further map the boundaries of any suspicious area already identified with acetic acid. Used together, these two simple solutions turn an otherwise unremarkable-looking cervix into a map that guides exactly where, if anywhere, a biopsy should be taken.

Fill in the blank: Acetic acid causes abnormal cervical areas with increased nuclear protein to turn temporarily _____.

3.1.3 recognising the transformation zone



The **transformation zone**, the area of the cervix where the original **columnar epithelium** of the endocervical canal is gradually being replaced by new **squamous epithelium** through a normal physiological process called **squamous metaplasia**, is the single most important area to identify during colposcopy, since this is where the overwhelming majority of **cervical intraepithelial neoplasia** and **cervical cancer** actually arise. Metaplastic cells undergoing active division are simply more vulnerable to the effects of persistent **HPV infection** than the mature epithelium found elsewhere on the cervix.

A colposcopy is only considered **adequate** or **satisfactory** when the entire transformation zone can be fully visualised, including its upper limit, or **squamocolumnar junction**, since disease extending up into the endocervical canal, out of direct view, cannot be properly assessed or safely excluded. In women where the transformation zone has receded into the canal, most often after the menopause, additional techniques such as gentle use of an **endocervical speculum** may be needed to bring the relevant area into view, and where this still cannot be achieved, the examination is recorded as inadequate and managed accordingly.

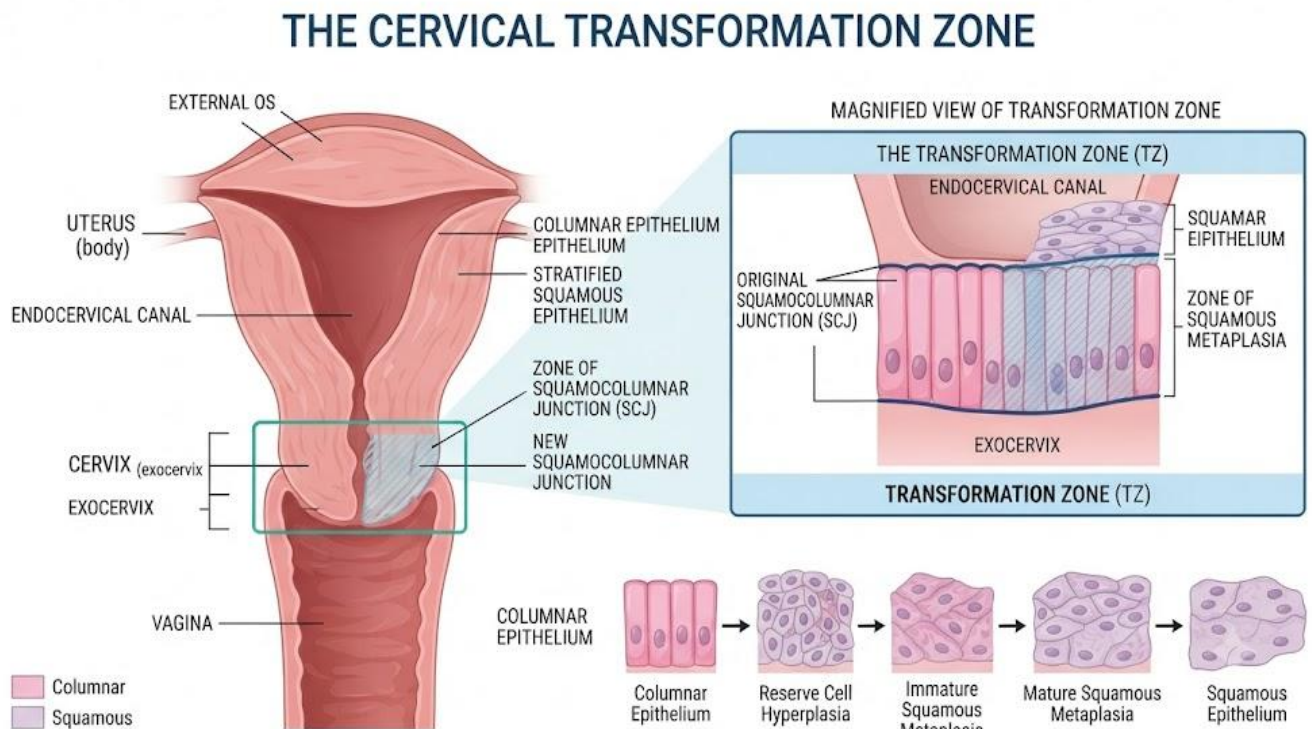


Figure 3.1: The cervical transformation zone and squamocolumnar junction.

Pilot questions 3.1

- Describe what colposcopy allows an examiner to see that is not visible to the naked eye. (Linked to SLO 3.1)



- Describe how colposcopy is performed, including the role of the speculum. (Linked to SLO 3.1)
- Explain the purpose of acetic acid application and describe acetowhitening. (Linked to SLO 3.1)
- Describe the principle behind Schiller's test using Lugol's iodine. (Linked to SLO 3.1)
- Explain why the transformation zone is the most important area assessed during colposcopy. (Linked to SLO 3.2)

3.2 Applying Colposcopy in Cervical Screening Abnormalities

3.2.1 colposcopy after an abnormal cervical screening result

From screening result to colposcopy referral

Cervical screening, whether by **cytology** looking for abnormal cells, or **primary HPV testing** looking for the virus responsible for almost all cervical cancer, is a population-level tool designed to identify women who need closer individual assessment, and colposcopy is that assessment. A woman is generally referred for colposcopy after a **high-grade cytological abnormality**, persistent **low-grade abnormality**, a positive **HPV test** combined with any degree of cytological change, or, regardless of screening result, when the cervix simply looks clinically suspicious to the examining clinician.

It is worth being clear with your patients from the outset that referral for colposcopy does not mean cancer has been found. In the great majority of cases, colposcopy either confirms that no significant abnormality is present, or identifies **pre-invasive disease**, changes that, left alone, might over years progress toward cancer, but which are themselves entirely treatable once properly characterised, precisely the point of catching them at this stage rather than later.

Why is it important to reassure a woman that a colposcopy referral does not itself mean she has cancer?

3.2.2 colposcopic appearances of normal and abnormal epithelium

Normal colposcopic findings include the original squamous epithelium, which appears smooth and pink, and the columnar epithelium, which has a characteristic grape-like or villous appearance and turns a deeper red once exposed. **Abnormal findings**, by contrast, are assessed using a structured set of features: the **density** of any acetowhite change, ranging from thin and translucent through to dense and opaque; the **margin** of the change, whether it is diffuse and feathered or sharply demarcated; the presence of **mosaicism**, a tile-like pattern of small blood vessels; **punctuation**, fine dot-like vessels; and **atypical vessels**, which have an irregular, corkscrew or comma-like course that is considerably more concerning.



As a general principle, **denser acetowhite change, sharper margins, coarser mosaicism or punctation**, and, in particular, **atypical vessels**, all correlate with more severe underlying disease, though colposcopic impression alone, however experienced the examiner, is never fully definitive and must always be confirmed histologically wherever biopsy is indicated, rather than treated purely on visual grounds.

Fill in the blank: A tile-like pattern of small blood vessels seen colposcopically is called _____.

3.2.3 colposcopically directed biopsy

Where an abnormal area is identified, a small **punch biopsy** is taken from the area showing the most severe-appearing change, guided directly by the colposcopic findings just described, rather than sampled blindly, ensuring the tissue sent for **histological examination** genuinely represents the worst area present rather than an unrepresentative, milder patch nearby.

In some services, where the colposcopic impression is of high-grade disease and the entire transformation zone is fully visible, a **see and treat** approach is used, proceeding directly to excisional treatment at the same visit rather than waiting for a separate biopsy result, an approach that reduces the number of visits required but depends heavily on the examiner's experience and confidence in the colposcopic impression being accurate.

<u>Feature</u>	<u>Typical Significance</u>
<u>Acetowhite epithelium</u>	Suggests low-grade squamous intraepithelial lesion (LSIL); may also be seen in inflammation
<u>Punctation</u>	Fine punctation → LSIL; coarse punctation → higher-grade lesion (HSIL)
<u>Mosaic pattern</u>	Fine mosaic → LSIL; coarse mosaic → HSIL, associated with greater severity
<u>Atypical vessels</u>	Strongly associated with invasive carcinoma
<u>Sharp lesion margins</u>	More typical of HSIL compared to indistinct margins in LSIL
<u>Dense acetowhite change</u>	Indicates higher-grade lesion (HSIL)
<u>Thin acetowhite change</u>	More consistent with LSIL or benign changes
<u>Papillary or exophytic surface</u>	May indicate condyloma or invasive carcinoma depending on vascular features

Table 3.2: Colposcopic features and their association with disease severity.



Pilot questions 3.2

1. List the indications for referral to colposcopy following cervical screening. (Linked to SLO 3.3)
2. Explain why it is important to reassure a woman that colposcopy referral does not itself mean cancer. (Linked to SLO 3.3)
3. Describe the colposcopic features used to assess an abnormal area of the cervix. (Linked to SLO 3.2)
4. Explain why colposcopic impression alone is not sufficient for a definitive diagnosis. (Linked to SLO 3.2)
5. Describe the purpose and technique of colposcopically directed biopsy, including the 'see and treat' approach. (Linked to SLO 3.4)

3.3 Colposcopy in Suspected Cervical, Vaginal, and Vulval Disease

3.3.1 colposcopy in suspected cervical intraepithelial neoplasia

Grading cervical intraepithelial neoplasia

Cervical intraepithelial neoplasia, generally abbreviated **CIN**, describes pre-invasive squamous abnormality confined to the epithelium, graded histologically as **CIN 1**, involving the lower third of the epithelium and often regressing spontaneously without treatment, **CIN 2**, involving up to two-thirds and carrying an intermediate risk, and **CIN 3**, involving the full thickness and considered the most direct precursor of invasive squamous cell carcinoma if left untreated over a period of years.

Colposcopy allows both the identification of the areas most likely to harbour higher-grade disease, guiding where biopsy is taken from, and, once histology confirms the grade, a central role in deciding on **surveillance** for lower-grade disease likely to regress, versus **treatment** for higher-grade disease unlikely to do so, meaning colposcopic and histological findings together, rather than either alone, genuinely drive the entire subsequent management pathway for the individual woman.

Why might CIN 1 often be managed with surveillance rather than immediate treatment, unlike CIN 3?

3.3.2 colposcopy of the vagina and vulva

Vaginal intraepithelial neoplasia, or **VAIN**, is considerably less common than its cervical counterpart, and is often found incidentally during colposcopy performed for an abnormal



cervical result, particularly at the **vaginal vault** in women who have previously had a hysterectomy, where the upper vagina should always be carefully inspected as part of a thorough examination rather than assumed to be uninvolved simply because attention is naturally drawn toward the cervix.

Vulval disease, including **vulval intraepithelial neoplasia**, or **VIN**, and conditions such as **lichen sclerosus**, is generally assessed by careful naked-eye and, where needed, magnified inspection under good lighting, sometimes assisted by acetic acid application, though the thicker, keratinised skin of the vulva means colposcopic acetowhite change here is considerably less reliable a marker than it is on the thinner epithelium of the cervix, and biopsy of any persistently abnormal or symptomatic area remains essential regardless of its colposcopic appearance.

Fill in the blank: Vaginal intraepithelial neoplasia is often found incidentally, particularly at the vaginal _____ in women who have had a hysterectomy.

3.3.3 colposcopy in suspected invasive disease

Certain colposcopic features, including **atypical vessels**, an **irregular contour**, **ulceration**, or friable tissue that **bleeds on contact**, raise genuine suspicion of **early invasive disease** rather than pre-invasive CIN alone, and warrant a generous, sufficiently deep biopsy, or, where invasion is strongly suspected, direct referral for formal assessment and staging rather than routine outpatient management within the colposcopy clinic itself.

Recognising when the appearances have moved beyond what colposcopy and outpatient biopsy alone can safely manage is one of the most important judgements a colposcopist makes, since proceeding with a standard excisional treatment in a woman with unrecognised early invasion risks incomplete treatment of a cancer that instead needed proper oncological staging and a multidisciplinary treatment plan from the outset.

Feature

Irregular, atypical vessels

Corkscrew or comma-shaped vessels

Abrupt margin between normal and abnormal epithelium

Fragile, easily bleeding surface

Papillary or exophytic growth

Necrotic or ulcerated areas

Dense acetowhite with atypical vascularity

Box 3.3: Colposcopic features suggestive of invasive disease.



Pilot questions 3.3

1. Describe the histological grading of cervical intraepithelial neoplasia. (Linked to SLO 3.5)
2. Explain how colposcopic and histological findings together guide management of CIN. (Linked to SLO 3.5)
3. Describe the role of colposcopy in assessing vaginal and vulval disease. (Linked to SLO 3.6)
4. Explain why colposcopic acetowhite change is less reliable on the vulva than on the cervix. (Linked to SLO 3.6)
5. Describe the colposcopic features that raise suspicion of invasive disease and the appropriate response. (Linked to SLO 3.5)

3.4 Treatment Guided by Colposcopy and Follow-up

3.4.1 excisional and ablative treatment of cervical intraepithelial neoplasia

Choosing between excision and ablation

Excisional treatment, most commonly **large loop excision of the transformation zone**, or **LLETZ**, uses a thin wire loop carrying an electrical current to remove the entire transformation zone in a single specimen, which is then sent for histological examination, offering the considerable advantage of confirming both the grade of disease present and, importantly, whether the margins of the excised tissue are clear, information that directly shapes what follow-up is subsequently needed.

Ablative treatment, such as **cold coagulation** or **laser vaporisation**, destroys the abnormal tissue in place without providing any specimen for histology, and is therefore only appropriate where the entire transformation zone has already been fully visualised, invasive disease has been confidently excluded on biopsy, and there is no suspicion of glandular abnormality, conditions that, in current practice, mean excisional treatment is now generally preferred as the default approach in most colposcopy services.

Why does ablative treatment require invasive disease to have already been confidently excluded on biopsy beforehand?

3.4.2 post-treatment follow-up

Following excisional treatment, most protocols recommend a **test of cure**, combining **cytology** and **HPV testing**, at around six months, since clearance of high-risk HPV following treatment is



strongly reassuring of successful eradication, while persistent HPV positivity, even with normal cytology, carries a meaningfully higher risk of residual or recurrent disease and warrants closer surveillance or, in some cases, a repeat colposcopic assessment.

Women with **incomplete excision margins**, particularly at the endocervical margin, require closer initial follow-up than those with clear margins, since residual disease is more likely, though many such women will still ultimately clear the abnormality without further treatment, meaning a further excisional procedure is not automatically required for margin involvement alone but is guided by the subsequent test of cure result.

Fill in the blank: A test of cure combining cytology and HPV testing is generally performed around _____ months after excisional treatment.

3.4.3 colposcopy in pregnancy and special circumstances

Colposcopy in pregnancy is generally reserved for women in whom invasive disease is suspected, since the cervix becomes more vascular and oedematous during pregnancy, making the examination technically more challenging and biopsy more likely to bleed, while treatment of confirmed pre-invasive CIN is almost always safely deferred until after delivery, given the low risk of progression over the relatively short interval involved and the desire to avoid any unnecessary intervention during pregnancy itself.

Other special circumstances include **immunosuppressed women**, such as those living with **HIV**, who have a higher incidence and faster progression of HPV-related disease and therefore warrant more frequent surveillance, and women who have undergone previous treatment, in whom a new colposcopic assessment is generally more technically demanding given scarring and distortion of the normal anatomy from the earlier procedure.



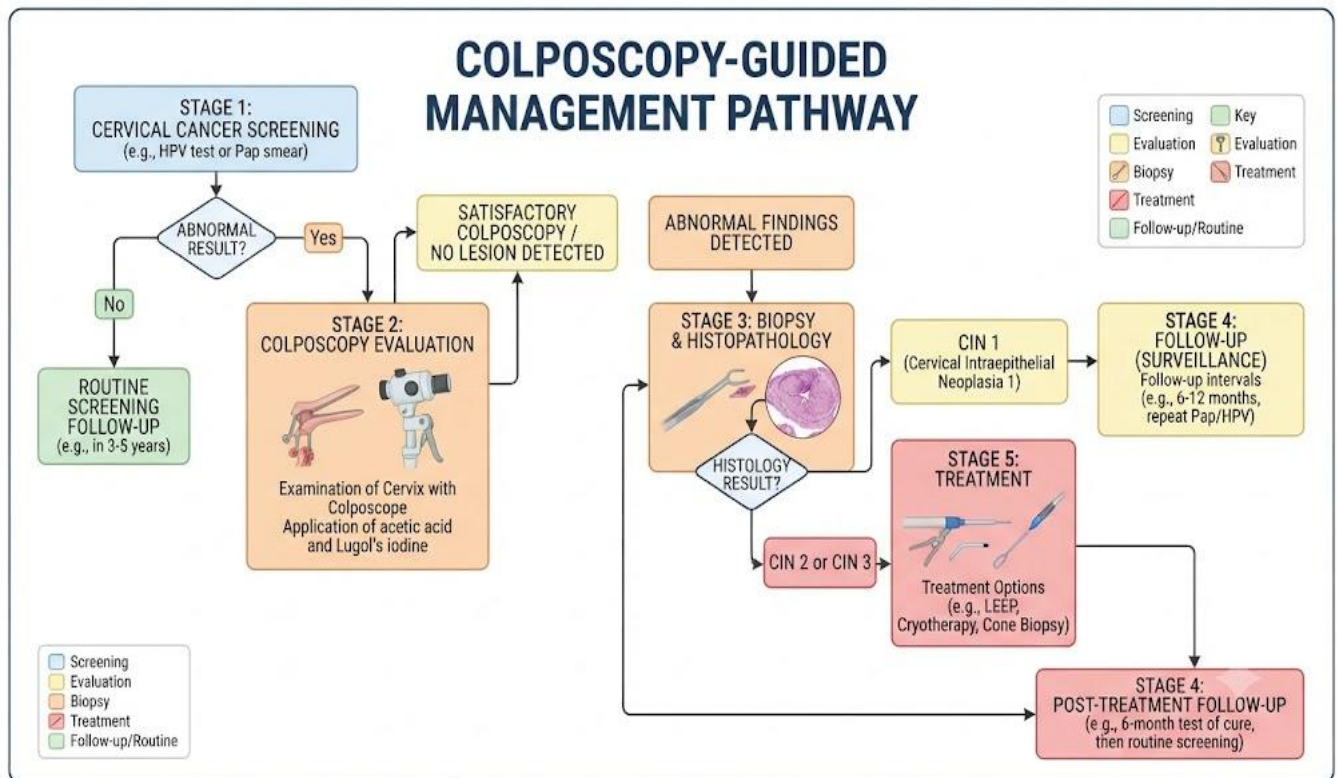


Figure 3.4: Colposcopy-guided management pathway from screening to follow-up.

Pilot questions 3.4

1. Distinguish excisional from ablative treatment of CIN and describe the conditions required for each. (Linked to SLO 3.7)
2. Explain why excisional treatment is now generally preferred as the default approach. (Linked to SLO 3.7)
3. Describe the test of cure and its significance following excisional treatment. (Linked to SLO 3.8)
4. Describe the approach to colposcopy and treatment of CIN during pregnancy. (Linked to SLO 3.8)
5. Discuss the special considerations relevant to colposcopy in immunosuppressed women. (Linked to SLO 3.8)



Series Summary

This Series introduced **colposcopy**, beginning with its **principles**, the use of **acetic acid** and **Lugol's iodine** to reveal abnormal tissue, and the central importance of identifying the **transformation zone**. We examined its role following an **abnormal cervical screening result**, the structured colposcopic features used to assess abnormal epithelium, and the purpose of **colposcopically directed biopsy**.

We then explored the role of colposcopy in **cervical intraepithelial neoplasia, vaginal and vulval disease**, and the important features that raise suspicion of **invasive disease**, before turning to the **excisional and ablative treatments** that colposcopy guides, along with the **follow-up** and **special circumstances**, including pregnancy and immunosuppression, relevant to its use. Having worked through this Series, you should now be able to describe when colposcopy is indicated, interpret its key findings, and outline the treatment and follow-up it guides. The next Series turns to the **complications of endoscopic procedures**, drawing together laparoscopy, hysteroscopy, and colposcopy.

Glossary of Terms

1. **Colposcopy:** magnified examination of the cervix, vagina, and vulva using a colposcope.
2. **Acetowhitening:** the temporary whitening of abnormal epithelium after application of acetic acid.
3. **Schiller's test:** application of Lugol's iodine to distinguish glycogen-containing normal epithelium from abnormal epithelium.
4. **Transformation zone:** the area of the cervix undergoing squamous metaplasia, where most cervical neoplasia arises.
5. **Squamocolumnar junction:** the border between squamous and columnar epithelium on the cervix.
6. **Mosaicism:** a tile-like colposcopic vessel pattern associated with abnormal epithelium.
7. **Punctation:** a fine dot-like colposcopic vessel pattern associated with abnormal epithelium.
8. **Cervical intraepithelial neoplasia:** pre-invasive squamous abnormality of the cervix, graded CIN 1 to CIN 3.
9. **Large loop excision of the transformation zone:** the most common excisional treatment for CIN, using a wire loop and electrical current.
10. **Test of cure:** combined cytology and HPV testing performed after treatment to confirm successful eradication.



11. **Vulval intraepithelial neoplasia:** pre-invasive squamous abnormality of the vulva.
12. **Lichen sclerosus:** a chronic inflammatory skin condition of the vulva assessed as part of vulval colposcopic examination.

Concept Check Questions [Series 3]

Objective questions

- Acetic acid causes abnormal cervical areas with increased nuclear protein to turn temporarily _____.
- A tile-like pattern of small blood vessels seen colposcopically is called _____.
- Vaginal intraepithelial neoplasia is often found incidentally at the vaginal _____ after hysterectomy.
- A test of cure is generally performed around _____ months after excisional treatment.
- _____ excision of the transformation zone is the most common excisional treatment for CIN.

Short-answer questions

1. Describe the colposcopic features used to assess an abnormal area of the cervix. (Linked to SLO 3.2)
2. List the indications for referral to colposcopy following cervical screening. (Linked to SLO 3.3)
3. Describe the histological grading of cervical intraepithelial neoplasia. (Linked to SLO 3.5)
4. Distinguish excisional from ablative treatment of CIN. (Linked to SLO 3.7)
5. Describe the test of cure and its significance following treatment. (Linked to SLO 3.8)

Long-answer questions

6. Describe the principles of colposcopy, including the use of acetic acid and Lugol's iodine. (Linked to SLO 3.1)



7. Describe the indications for colposcopy following cervical screening and the colposcopic assessment of abnormal epithelium. (Linked to SLO 3.2, SLO 3.3)
8. Describe the purpose of colposcopically directed biopsy and the grading and management of cervical intraepithelial neoplasia. (Linked to SLO 3.4, SLO 3.5)
9. Describe the role of colposcopy in vaginal and vulval disease and in suspected invasive disease. (Linked to SLO 3.6)
10. Discuss the excisional and ablative treatments guided by colposcopy and the subsequent follow-up, including special circumstances. (Linked to SLO 3.7, SLO 3.8)

Answers to Concept Check Questions [Series 3]

Objective questions

11. White.
12. Mosaicism.
13. Vault.
14. Six.
15. Large loop.

Short-answer questions

16. Acetowhite density, margin definition, mosaicism, punctation, and presence of atypical vessels.
17. High-grade cytology, persistent low-grade abnormality, positive HPV with cytological change, or clinically suspicious cervix.
18. CIN 1 involves the lower third, CIN 2 up to two-thirds, and CIN 3 the full thickness of the epithelium.
19. Excision removes tissue for histology and margin assessment; ablation destroys tissue in place without a specimen.
20. Combined cytology and HPV testing around six months post-treatment; HPV clearance is reassuring of successful eradication.



Long-answer questions

21. **Basic response:** Colposcopy uses magnification to inspect the cervix, applying acetic acid to reveal acetowhite change and Lugol's iodine to distinguish normal glycogenated epithelium from abnormal tissue.

Value-added response: Identifying the full transformation zone is essential, since most cervical neoplasia arises there and an incomplete view makes the examination inadequate.

22. **Basic response:** Colposcopy is indicated after high-grade or persistent low-grade cytology, positive HPV with cytological change, or a clinically suspicious cervix, with abnormal epithelium assessed by density, margin, mosaicism, punctation, and vessel pattern.

Value-added response: Denser change, sharper margins, and atypical vessels correlate with more severe disease, though findings must always be confirmed histologically.

23. **Basic response:** Directed biopsy samples the most severe-appearing area to confirm CIN grade, which ranges from CIN 1 to CIN 3 and determines whether surveillance or treatment is appropriate.

Value-added response: A 'see and treat' approach may be used for confidently high-grade impressions with a fully visible transformation zone, reducing the number of visits needed.

24. **Basic response:** Colposcopy assesses vaginal and vulval disease, though acetowhite change is less reliable on thicker vulval skin, and certain features such as atypical vessels or ulceration raise suspicion of invasion.

Value-added response: Recognising features suggestive of invasion is essential, since standard excisional treatment is inappropriate for an unrecognised early cancer.

25. **Basic response:** Excisional treatment such as LLETZ provides a specimen for histology and margin assessment, while ablative treatment destroys tissue without one and requires invasion to already be excluded.

Value-added response: Follow-up with a test of cure guides further management, and colposcopy in pregnancy or immunosuppression requires particular caution and adjusted surveillance.

Answers to Pilot Questions [Series 3]



Part 3.1

1. Magnified detail of colour, vessel pattern, and surface contour not visible to the naked eye.
2. A standard vaginal speculum exposes the cervix, exactly as for taking a cervical smear.
3. Acetic acid causes areas with increased nuclear protein to turn temporarily white, called acetowhitening.
4. Normal glycogen-rich epithelium stains deep brown with Lugol's iodine, while abnormal epithelium remains pale.
5. It is where most cervical intraepithelial neoplasia and cancer arise, given active cell division there.

Part 3.2

6. High-grade cytology, persistent low-grade abnormality, positive HPV with cytological change, or a suspicious cervix.
7. It reassures her that referral usually leads to confirmation of no significant disease or treatable pre-invasive change.
8. Density and margin of acetowhite change, mosaicism, punctation, and presence of atypical vessels.
9. Colposcopic impression is never fully definitive and must be confirmed histologically wherever biopsy is indicated.
10. A punch biopsy is taken from the most severe-appearing area; 'see and treat' proceeds directly to excision at the same visit.

Part 3.3

11. CIN 1 involves the lower third, CIN 2 up to two-thirds, and CIN 3 the full thickness of the epithelium.
12. Colposcopy guides biopsy site, and histology then determines whether surveillance or treatment is appropriate.
13. Colposcopy identifies VAIN, often incidentally, and assesses vulval disease such as VIN and lichen sclerosus.
14. The thicker, keratinised vulval skin makes acetowhite change a less reliable marker than on thin cervical epithelium.



15. Atypical vessels, irregular contour, ulceration, and contact bleeding; these warrant deep biopsy or urgent referral.

Part 3.4

1. Excision removes a specimen for histology and margin assessment; ablation destroys tissue in place without one, requiring prior exclusion of invasion.
2. It confirms disease grade and margin status, information ablation cannot provide.
3. Combined cytology and HPV testing around six months; HPV clearance is strongly reassuring of eradication.
4. Treatment is generally deferred until after delivery given low progression risk, while suspected invasive disease still requires assessment.
5. Immunosuppressed women, such as those with HIV, have faster disease progression and need more frequent surveillance.

References and Attributions [Series 3]

1. Hoffman, B. L., Schorge, J. O., Halvorson, L. M. et al. (2020). Williams Gynecology (4th ed.). McGraw-Hill Education.
2. British Society for Colposcopy and Cervical Pathology (2016). Colposcopy and Programme Management: NHSCSP Publication No. 20.
3. American Society for Colposcopy and Cervical Pathology (2019). Risk-Based Management Consensus Guidelines.
4. Berek, J. S. and Berek, D. L. (2019). Berek and Novak's Gynecology (16th ed.). Wolters Kluwer.

Figures, Plates, Tables, and Boxes

1. Figure 3.1: The cervical transformation zone and squamocolumnar junction. AI-generated using the prompt: "Create a clean anatomical diagram titled The Cervical Transformation



Zone, showing the squamocolumnar junction and the zone of squamous metaplasia. Clinical educational diagram style."

2. Table 3.2: Colposcopic features and their association with disease severity. AI-generated using the prompt: "Create a clean reference table titled Colposcopic Features and Their Association with Disease Severity, listing feature and typical significance. Simple clinical reference table style with outside border."
3. Box 3.3: Colposcopic features suggestive of invasive disease. AI-generated using the prompt: "Create a simple single-column reference box titled Colposcopic Features Suggestive of Invasive Disease. Clean clinical reference box style."
4. Figure 3.4: Colposcopy-guided management pathway from screening to follow-up. AI-generated using the prompt: "Create a professional medical flowchart titled Colposcopy-Guided Management Pathway, showing screening, colposcopy, biopsy, treatment, and follow-up stages. Clean clinical educational diagram style."



Course code: OBG 518

Course title: Gynaecological Endoscopy

Course credit load: 2 Units

Series 4: Complications of Endoscopic Procedures

- **Part 4.1: Complications Common to Endoscopic Procedures**
 - Sub Part 4.1.1: Anaesthetic and entry-related complications
 - Sub Part 4.1.2: Vascular and visceral injury
 - Sub Part 4.1.3: Complications related to distension media and insufflation
- **Part 4.2: Complications Specific to Laparoscopy**
 - Sub Part 4.2.1: Laparoscopic entry complications
 - Sub Part 4.2.2: Thermal and instrument injury during laparoscopy
 - Sub Part 4.2.3: Gas embolism and other rare laparoscopic complications
- **Part 4.3: Complications Specific to Hysteroscopy and Colposcopy**
 - Sub Part 4.3.1: Uterine perforation and fluid overload in hysteroscopy
 - Sub Part 4.3.2: Infection and cervical trauma in hysteroscopy
 - Sub Part 4.3.3: Complications of colposcopy and cervical biopsy
- **Part 4.4: Prevention, Recognition, and Management of Complications**
 - Sub Part 4.4.1: Preventing endoscopic complications
 - Sub Part 4.4.2: Recognising complications early
 - Sub Part 4.4.3: Principles of managing endoscopic complications

Introduction

Across the last three Series, we have built up a genuinely broad picture of what **laparoscopy**, **hysteroscopy**, and **colposcopy** can achieve, from diagnosing subtle pelvic pathology to treating



cervical disease before it ever becomes cancer. No honest account of these techniques would be complete, though, without turning to their **complications**, since every procedure that offers real benefit also carries some degree of risk, and understanding that risk properly is just as much a part of good practice as knowing when a procedure is indicated in the first place.

You will find that many complications are **shared across all three techniques**, arising from the general principles of anaesthesia, entry, and instrumentation common to endoscopic surgery, while others are genuinely **specific** to a particular technique, reflecting the unique anatomy and equipment each one involves. Building a clear mental map of which is which will help you counsel patients honestly, recognise problems early when they do occur, and respond to them with confidence rather than panic.

This Series covers **complications common to all endoscopic procedures**, those **specific to laparoscopy**, those **specific to hysteroscopy and colposcopy**, and, finally, the broader principles of **prevention, recognition, and management** that tie the whole picture together.

Series Learning Outcomes

At the end of this Series, you should be able to:

- **SLO 4.1:** describe the complications common to endoscopic gynaecological procedures,
- **SLO 4.2:** describe the complications specific to laparoscopy,
- **SLO 4.3:** describe the recognition and management of laparoscopic entry and thermal injury,
- **SLO 4.4:** describe the complications specific to hysteroscopy,
- **SLO 4.5:** describe the complications specific to colposcopy and cervical biopsy,
- **SLO 4.6:** describe measures used to prevent endoscopic complications,
- **SLO 4.7:** describe how endoscopic complications are recognised early, and
- **SLO 4.8:** describe the general principles of managing endoscopic complications.

4.1 Complications Common to Endoscopic Procedures

4.1.1 anaesthetic and entry-related complications



Risks shared with any surgical anaesthetic

Because most **operative endoscopic procedures** are performed under **general** or **regional anaesthesia**, they carry the same underlying **anaesthetic risks** as any other surgery, including **cardiorespiratory compromise**, **allergic reaction** to anaesthetic agents, and, rarely, more serious events such as **aspiration**, meaning a thorough **pre-operative anaesthetic assessment** is every bit as important for a seemingly minor laparoscopic procedure as it would be for open surgery, rather than something that can reasonably be rushed simply because the incisions themselves are small.

Entry-related complications, occurring at the very first step of gaining access to the abdomen or pelvis, are disproportionately responsible for the more serious injuries seen in endoscopic surgery, largely because the initial instrument, whether a **Veress needle** or the first trocar, is introduced somewhat blindly, before the surgeon has any direct view of what lies immediately beneath the abdominal wall at that particular point, making this the single moment in the entire procedure where the greatest caution is generally required.

Fill in the blank: Entry-related complications occur at the moment of introducing the first instrument, generally the Veress needle or _____.

4.1.2 vascular and visceral injury

Vascular injury, most seriously involving the **great vessels** such as the **aorta** or **iliac vessels**, is a rare but potentially catastrophic complication of endoscopic entry, particularly in very thin patients where the distance between the abdominal wall and these vessels is considerably shorter than the operator might otherwise assume, underlining why careful technique and an appreciation of individual patient anatomy matter even in what is, for the great majority of women, a genuinely routine and safe procedure.

Visceral injury, involving structures such as the **bowel**, **bladder**, or **ureter**, can occur during entry or later in the procedure while dissecting adhesions or performing operative steps, and is considerably more likely in women with **previous abdominal surgery**, where adhesions may fix loops of bowel directly beneath the usual entry point, which is precisely why a careful surgical history is taken before every procedure and why entry technique is sometimes deliberately adjusted, for instance moving the entry point away from a previous scar, in women considered at higher risk.

Fill in the blank: Visceral injury during endoscopic entry is considerably more likely in women with previous abdominal _____.

4.1.3 complications related to distension media and insufflation

Whether the working space is created with **carbon dioxide gas**, as in laparoscopy, or a **liquid distension medium** such as normal saline, as in hysteroscopy, both approaches carry some risk of **overdistension** or **excess absorption**. In laparoscopy, excessive **intra-abdominal pressure** can impair **venous return** to the heart and reduce **lung compliance**, particularly in women with



underlying cardiorespiratory disease, which is why insufflation pressure is carefully monitored and kept within a recognised safe range throughout the procedure rather than simply maximised for surgical convenience.

In hysteroscopy, **excess fluid absorption** into the circulation can, in prolonged operative procedures, lead to **dilutional hyponatraemia** and **fluid overload**, occasionally serious enough to cause **pulmonary oedema** or **cerebral oedema** if not recognised and acted upon promptly, which is precisely why **fluid deficit** is calculated continuously throughout any operative hysteroscopy and the procedure is stopped once a predetermined safety threshold is reached, regardless of how much of the planned surgery remains to be completed.

Fill in the blank: Excess fluid absorption during hysteroscopy can lead to dilutional _____ and fluid overload.

<u>Category</u>	Examples
<u>Anaesthetic-Related</u>	Airway compromise, aspiration, adverse drug reactions
<u>Vascular Injury</u>	Hemorrhage, vessel laceration, hematoma formation
<u>Visceral Injury</u>	Bowel perforation, bladder injury, ureteric damage
<u>Infective</u>	Pelvic infection, wound infection, sepsis
<u>Metabolic/Fluid</u>	Fluid overload, electrolyte imbalance, gas embolism
<u>Postoperative</u>	Adhesion formation, chronic pelvic pain, delayed bleeding

Table 4.1: Complications common to endoscopic gynaecological procedures.

Pilot questions 4.1

- Describe why pre-operative anaesthetic assessment matters even for minor endoscopic procedures. (Linked to SLO 4.1)
- Explain why entry-related complications are disproportionately responsible for serious endoscopic injury. (Linked to SLO 4.1)
- Describe the vascular and visceral structures at risk during endoscopic entry. (Linked to SLO 4.1)
- Explain why previous abdominal surgery increases the risk of visceral injury during entry. (Linked to SLO 4.1)
- Describe the risks associated with insufflation and fluid distension media. (Linked to SLO 4.1)



4.2 Complications Specific to Laparoscopy

4.2.1 laparoscopic entry complications

Closed versus open entry techniques

Laparoscopic entry can be achieved through a **closed technique**, using a **Veress needle** to establish pneumoperitoneum before blindly inserting the first trocar, or an **open technique**, such as the **Hasson technique**, in which the peritoneal cavity is opened directly under vision before the first port is placed, with each approach carrying a somewhat different, though broadly comparable, overall risk profile for the serious complications that concern us most, meaning the choice between them is often guided as much by surgeon training and preference as by strong evidence favouring one over the other.

Regardless of technique, a number of simple safety checks reduce risk considerably, including confirming **correct needle placement** before insufflation through pressure and volume checks, using an **adequate insufflation pressure** before first trocar insertion, and directing the initial trocar toward the **hollow of the sacrum** rather than perpendicular to the abdominal wall, all small, well-established habits that meaningfully reduce the likelihood of the rare but serious injuries associated with this step of the procedure.

Fill in the blank: The _____ technique involves opening the peritoneal cavity directly under vision before placing the first port.

4.2.2 thermal and instrument injury during laparoscopy

Thermal injury, most often from **diathermy** or other energy devices used for dissection and haemostasis, can occur not only at the intended surgical site but also, less obviously, through **inadvertent contact** or **capacitive coupling** affecting adjacent structures outside the direct field of view, meaning bowel injury from thermal spread can present with a delay of several days after surgery, once a damaged but not immediately perforated segment of bowel eventually breaks down, well after the patient has already been discharged home.

This delayed presentation makes thermal bowel injury a genuinely important one to keep in mind clinically, since a woman presenting several days after an apparently straightforward laparoscopic procedure with worsening abdominal pain, fever, or signs of **peritonitis** should always prompt consideration of this possibility, rather than being too quickly reassured simply because the original operation itself appeared uneventful at the time.

Fill in the blank: Thermal bowel injury from diathermy can present with a delay of several _____ after surgery.

4.2.3 gas embolism and other rare laparoscopic complications

Gas embolism, the entry of carbon dioxide directly into the venous circulation, most often through inadvertent placement of the Veress needle within a blood vessel before insufflation



begins, is rare but potentially rapidly fatal, presenting with sudden **cardiovascular collapse**, a characteristic '**mill wheel**' **murmur** on auscultation, and a sharp fall in **end-tidal carbon dioxide**, requiring immediate cessation of insufflation and resuscitation, including positioning the patient to trap gas away from the right ventricular outflow tract while further emergency measures are organised.

Other genuinely rare but recognised complications include **subcutaneous emphysema**, from gas tracking into the tissue planes rather than the peritoneal cavity, and **port site hernia**, occurring later during recovery at a trocar site, particularly with larger ports, both of which, while uncommon, are worth being able to recognise and explain confidently to a concerned patient rather than dismissing outright as impossible after what was, after all, only a minimally invasive procedure.

Fill in the blank: Gas embolism during laparoscopy presents with sudden cardiovascular collapse and a characteristic _____ murmur.

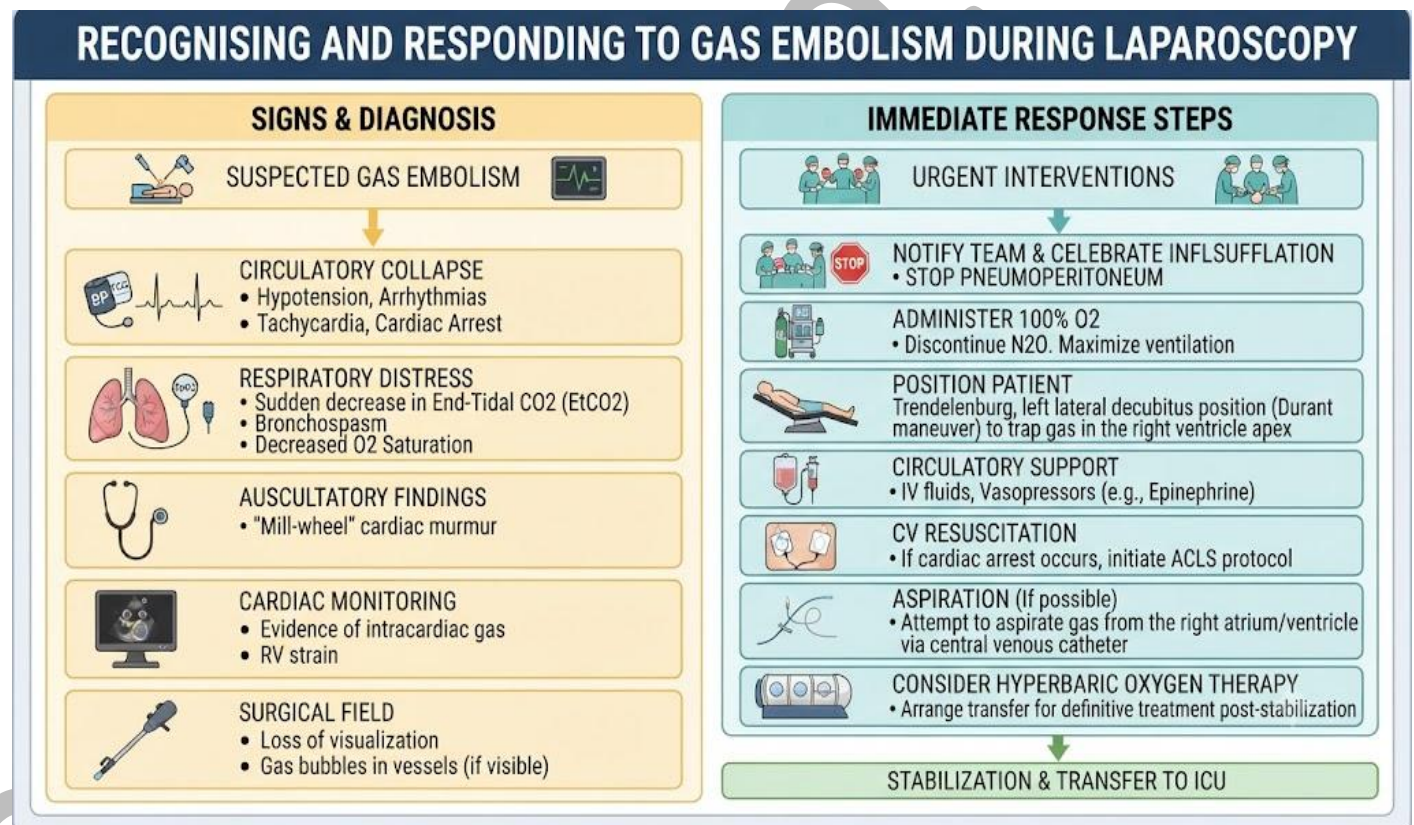


Figure 4.2: Recognition and immediate management of laparoscopic gas embolism.

Pilot questions 4.2

1. Distinguish closed from open laparoscopic entry techniques. (Linked to SLO 4.2)
2. Describe the safety checks that reduce risk during laparoscopic entry. (Linked to SLO 4.2)



3. Explain why thermal bowel injury can present with a delay after laparoscopic surgery. (Linked to SLO 4.3)
4. Describe the presentation and immediate management of gas embolism during laparoscopy. (Linked to SLO 4.3)
5. Describe subcutaneous emphysema and port site hernia as recognised laparoscopic complications. (Linked to SLO 4.3)

4.3 Complications Specific to Hysteroscopy and Colposcopy

4.3.1 uterine perforation and fluid overload in hysteroscopy

Recognising perforation during the procedure

Uterine perforation, discussed already in our earlier Series on hysteroscopy, deserves revisiting here alongside its close companion, **fluid overload**, since together these two complications account for the great majority of significant hysteroscopic morbidity. Perforation is typically recognised at the time it occurs, either through a sudden **loss of distension**, the instrument passing an unexpected distance beyond the expected cavity depth, or direct visualisation of **omental fat** or **bowel** unexpectedly appearing in the field of view, any of which should prompt immediate cessation of the procedure.

Once perforation is recognised, further management depends heavily on **mechanism** and **instrument involved**: a simple perforation from a blunt dilator, with no ongoing bleeding and no instrument that could have caused thermal or sharp visceral injury, can often be managed conservatively with observation alone, while perforation involving an active energy device or occurring during resection generally warrants **laparoscopic assessment** to actively exclude visceral or vascular injury rather than simply hoping for the best.

Fill in the blank: Uterine perforation may be recognised through sudden loss of distension or unexpected visualisation of omental fat or _____.

4.3.2 infection and cervical trauma in hysteroscopy

Post-procedure infection after hysteroscopy is relatively uncommon given the naturally clean field involved, though **endometritis** can occasionally occur, presenting with fever, pelvic pain, and abnormal discharge in the days following the procedure, and generally responding well to **antibiotic treatment** once recognised, provided it is not mistaken for simple, self-limiting post-procedure discomfort and left unaddressed.

Cervical trauma, including simple **laceration** from the tenaculum used to steady the cervix, or, more significantly, **cervical stenosis** developing after resection close to the internal os, is a further recognised complication, with stenosis in particular capable of causing troublesome



symptoms of its own, including **haematometra**, the accumulation of blood within an obstructed uterine cavity, well after the original hysteroscopic procedure has been forgotten by the patient herself.

Fill in the blank: Accumulation of blood within an obstructed uterine cavity following cervical stenosis is called _____.

4.3.3 complications of colposcopy and cervical biopsy

Colposcopy itself is a genuinely low-risk outpatient examination, with **discomfort** and mild **vasovagal reaction** to the speculum or biopsy being the most commonly encountered issues, both generally managed simply with reassurance, appropriate positioning, and, where needed, a short period of rest before the woman leaves the clinic, rather than requiring any specific medical treatment.

Bleeding following **cervical punch biopsy** or, more significantly, **excisional treatment** such as LLETZ, is the complication most likely to actually require intervention, ranging from simple application of **Monsel's solution** or **silver nitrate** at the time of the procedure for minor ooze, through to **secondary hospital attendance** for more significant bleeding occurring some days later, alongside less common but recognised longer-term concerns such as **cervical stenosis** or, in women planning future pregnancy, a possible modest increase in **preterm birth risk** following larger excisional procedures, information that is always discussed as part of proper informed consent before treatment.

Fill in the blank: _____ solution or silver nitrate may be applied at the time of cervical biopsy to control minor bleeding.

Complication Category
Anaesthetic Risks
Hemorrhage
Uterine or Cervical Perforation
Infection
Fluid Overload
Postoperative Pain
Adhesion Formation

Box 4.3: Key complications of hysteroscopy and colposcopy at a glance.

Pilot questions 4.3

1. Describe how uterine perforation is recognised during hysteroscopy. (Linked to SLO 4.4)



2. Explain how the management of a recognised perforation depends on mechanism and instrument involved. (Linked to SLO 4.4)
3. Describe post-procedure infection and cervical trauma as complications of hysteroscopy. (Linked to SLO 4.4)
4. Describe the complications most likely to occur during colposcopy and cervical biopsy. (Linked to SLO 4.5)
5. Discuss the longer-term concerns associated with larger excisional treatment of the cervix. (Linked to SLO 4.5)

4.4 Prevention, Recognition, and Management of Complications

4.4.1 preventing endoscopic complications

Building safety into every step

Prevention begins well before the procedure itself, with thorough **pre-operative assessment**, including a careful surgical and medical history, appropriate **counselling** about the specific risks relevant to that individual woman, and, where relevant, involving a **more experienced surgeon** for cases anticipated to carry higher risk, such as extensive previous surgery or a large adnexal mass, rather than proceeding routinely and hoping the case turns out to be straightforward after all.

During the procedure itself, adherence to **established safety checks**, careful **anatomical orientation** before any dissection or resection, and a genuine willingness to **convert to open surgery** or seek **intra-operative assistance** the moment anything looks uncertain, rather than persisting out of reluctance to abandon a minimally invasive approach, all meaningfully reduce the likelihood that a manageable difficulty progresses into a serious complication.

Fill in the blank: A genuine willingness to convert to open surgery when uncertain is an important part of preventing complications from _____ into serious harm.

4.4.2 recognising complications early

Early recognition depends on maintaining a **high index of suspicion** both during and after the procedure, watching for **intra-operative signs**, such as unexpected bleeding, altered vital signs, or an anatomical view that simply does not match expectations, and **post-operative signs**, such as increasing pain out of proportion to what would normally be expected, fever, or delayed return of normal bowel or bladder function, any of which should prompt active reassessment rather than reassurance offered by default.



This is precisely why every woman undergoing an operative endoscopic procedure should be given **clear, specific advice** on what symptoms should prompt her to seek urgent review after discharge, since many serious complications, including delayed thermal bowel injury, present only once she has already left the hospital, meaning early recognition genuinely depends as much on adequately informing the patient herself as it does on the vigilance of the clinical team while she remains an inpatient.

Fill in the blank: Post-operative pain that is out of proportion to what would normally be expected should prompt active _____ rather than default reassurance.

4.4.3 principles of managing endoscopic complications

Once a complication is recognised, the general principles of management follow a consistent pattern: **stabilise the patient** first, addressing any immediate threat to life such as haemorrhage or cardiovascular compromise, **identify the extent of injury** through appropriate further assessment, **involve the right specialists** promptly, whether that means a general surgeon for suspected bowel injury or a urologist for suspected ureteric injury, and **communicate honestly** with the patient and her family throughout, since clear, timely communication about what has happened and what is being done about it matters enormously to how a complication is ultimately experienced and remembered.

Finally, every significant complication deserves proper **documentation** and, in most training and clinical governance settings, formal **review and reflection**, not to assign blame, but genuinely to understand whether anything in technique, judgement, or system could reasonably have been different, since this consistent, structured learning from complications, rather than simply moving past them, is exactly how endoscopic surgery has become progressively safer over the decades since these techniques were first introduced.

Fill in the blank: Formal review and reflection after a significant complication exists to support learning, not to assign _____.



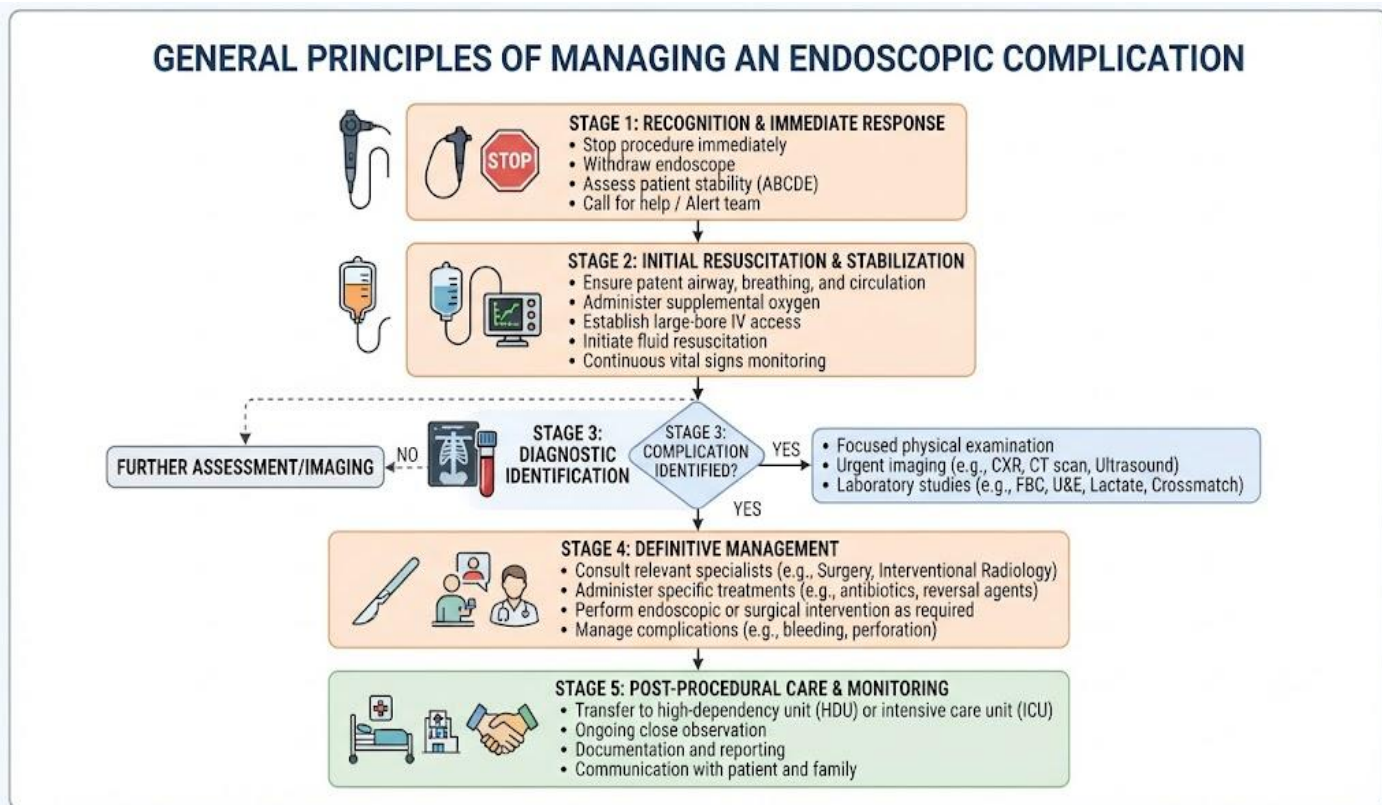


Figure 4.4: General principles of managing an endoscopic complication.

Pilot questions 4.4

1. Describe the pre-operative measures that help prevent endoscopic complications. (Linked to SLO 4.6)
2. Describe the intra-operative practices that help prevent complications from progressing. (Linked to SLO 4.6)
3. Describe the intra-operative and post-operative signs that should prompt suspicion of a complication. (Linked to SLO 4.7)
4. Explain why patients should be given clear advice on symptoms warranting urgent review after discharge. (Linked to SLO 4.7)
5. Describe the general principles followed in managing a recognised endoscopic complication. (Linked to SLO 4.8)



Series Summary

This Series examined the **complications of endoscopic gynaecological procedures**, beginning with those **common to all techniques**, including **anaesthetic risk**, **entry-related injury**, and complications linked to **distension media**. We then explored complications **specific to laparoscopy**, including **entry technique**, **thermal injury**, and the rare but serious risk of **gas embolism**, before turning to those specific to **hysteroscopy and colposcopy**, including **uterine perforation**, **fluid overload**, and **bleeding** following cervical biopsy or excisional treatment.

Finally, we drew these threads together through the broader principles of **prevention**, **early recognition**, and **management**, emphasising honest communication and structured learning from every significant complication. Having worked through this Series, you should now be able to describe the risks associated with each endoscopic technique and respond to them with the same confidence you already bring to recognising when these procedures are indicated. The final Series in this course draws together the **diagnostic applications** of laparoscopy, hysteroscopy, and colposcopy in gynaecology as a whole.

Glossary of Terms

1. **Veress needle:** a spring-loaded needle used to establish pneumoperitoneum before laparoscopic entry.
2. **Hasson technique:** an open laparoscopic entry technique performed directly under vision.
3. **Capacitive coupling:** inadvertent transmission of electrical current to adjacent tissue during diathermy use.
4. **Gas embolism:** entry of insufflation gas directly into the venous circulation, a rare but potentially fatal complication.
5. **Subcutaneous emphysema:** gas tracking into the tissue planes of the abdominal wall rather than the peritoneal cavity.
6. **Port site hernia:** a hernia developing at a laparoscopic trocar site.
7. **Haematometra:** accumulation of blood within an obstructed uterine cavity, a recognised consequence of cervical stenosis.
8. **Endometritis:** infection of the endometrium, an uncommon complication of hysteroscopy.
9. **Monsel's solution:** a topical haemostatic agent used to control minor bleeding after cervical biopsy.



10. **Fluid deficit:** the calculated difference between fluid instilled and fluid recovered during operative hysteroscopy, monitored to detect overload.
11. **Peritonitis:** inflammation of the peritoneum, a sign that may indicate delayed bowel injury after laparoscopy.
12. **Clinical governance:** the framework through which complications are documented, reviewed, and learned from.

Concept Check Questions [Series 4]

Objective questions

- Entry-related complications occur at the moment of introducing the Veress needle or first _____.
- The _____ technique involves opening the peritoneal cavity directly under vision.
- Gas embolism presents with sudden cardiovascular collapse and a characteristic _____ murmur.
- Accumulation of blood within an obstructed uterine cavity following cervical stenosis is called _____.
- _____ solution or silver nitrate may be applied to control minor bleeding after cervical biopsy.

Short-answer questions

1. Describe the vascular and visceral structures at risk during endoscopic entry. (Linked to SLO 4.1)
2. Describe the presentation and immediate management of gas embolism during laparoscopy. (Linked to SLO 4.3)
3. Describe how uterine perforation is recognised during hysteroscopy. (Linked to SLO 4.4)
4. Describe the complications most likely to occur during colposcopy and cervical biopsy. (Linked to SLO 4.5)
5. Describe the general principles followed in managing a recognised endoscopic complication. (Linked to SLO 4.8)



Long-answer questions

6. Describe the complications common to endoscopic gynaecological procedures, including anaesthetic, entry, and distension-related risks. (Linked to SLO 4.1)
7. Describe the complications specific to laparoscopy, including entry, thermal injury, and gas embolism. (Linked to SLO 4.2, SLO 4.3)
8. Describe the complications specific to hysteroscopy, including perforation, fluid overload, and infection. (Linked to SLO 4.4)
9. Describe the complications of colposcopy and cervical biopsy. (Linked to SLO 4.5)
10. Discuss the principles of preventing, recognising, and managing endoscopic complications. (Linked to SLO 4.6, SLO 4.7, SLO 4.8)

Answers to Concept Check Questions [Series 4]

Objective questions

11. Trocar.
12. Hasson.
13. Mill wheel.
14. Haematometra.
15. Monsel's.

Short-answer questions

16. Great vessels such as the aorta and iliac vessels, and viscera including bowel, bladder, and ureter.
17. Sudden cardiovascular collapse with a mill wheel murmur; managed by stopping insufflation and resuscitation.
18. Sudden loss of distension, unexpected instrument depth, or visualisation of omental fat or bowel.
19. Discomfort and vasovagal reaction most commonly, with bleeding the complication most likely to need intervention.



20. Stabilise the patient, identify the extent of injury, involve the right specialists, and communicate honestly.

Long-answer questions

21. **Basic response:** Common complications include anaesthetic risk, entry-related vascular or visceral injury, and complications from carbon dioxide insufflation or fluid distension media.

Value-added response: Entry-related injury is disproportionately serious because the first instrument is introduced without direct vision of what lies beneath.

22. **Basic response:** Laparoscopy-specific complications include entry technique-related injury, thermal injury which can present with delay, and rare gas embolism presenting with collapse and a mill wheel murmur.

Value-added response: Delayed thermal bowel injury underlines the importance of giving patients clear advice on symptoms warranting urgent review after discharge.

23. **Basic response:** Hysteroscopy-specific complications include uterine perforation, recognised by loss of distension or unexpected findings, fluid overload from excess absorption, and infrequent infection or cervical trauma.

Value-added response: Management of perforation depends on mechanism and instrument, with energy device or resection-related injury warranting laparoscopic assessment.

24. **Basic response:** Colposcopy is low-risk, with discomfort and vasovagal reaction most common, while bleeding after biopsy or excisional treatment is the complication most likely to need intervention.

Value-added response: Larger excisional procedures carry a modest increase in preterm birth risk, information discussed as part of informed consent.

25. **Basic response:** Prevention relies on thorough pre-operative assessment and intra-operative safety checks; recognition depends on vigilance for intra- and post-operative signs; management follows stabilisation, assessment, specialist involvement, and honest communication.

Value-added response: Structured documentation and review after complications supports learning rather than blame, and is central to how endoscopic surgery has become progressively safer.



Answers to Pilot Questions [Series 4]

Part 4.1

1. It carries the same underlying anaesthetic risks as any other surgery, regardless of how minimally invasive the procedure appears.
2. The first instrument is introduced blindly, before the surgeon has any direct view of what lies beneath the abdominal wall.
3. Great vessels such as the aorta and iliac vessels, and viscera including bowel, bladder, and ureter.
4. Adhesions from previous surgery may fix loops of bowel directly beneath the usual entry point.
5. Excessive intra-abdominal pressure can impair venous return and lung compliance; excess fluid absorption can cause hyponatraemia and overload.

Part 4.2

6. Closed technique uses a Veress needle before blind trocar insertion; open technique opens the cavity directly under vision.
7. Confirming correct needle placement, adequate insufflation pressure before trocar insertion, and directing the trocar toward the sacral hollow.
8. Thermal spread can damage but not immediately perforate bowel, which breaks down only several days later.
9. Sudden cardiovascular collapse with a mill wheel murmur and falling end-tidal carbon dioxide, managed by stopping insufflation and resuscitating.
10. Subcutaneous emphysema from gas tracking into tissue planes, and port site hernia developing later during recovery.

Part 4.3

11. Sudden loss of distension, unexpected instrument depth, or unexpected visualisation of omental fat or bowel.
12. Simple perforation from a blunt instrument may be observed conservatively; perforation from an energy device or during resection warrants laparoscopic assessment.
13. Endometritis presenting with fever and discharge, and cervical trauma including laceration or stenosis.



14. Discomfort and vasovagal reaction are most common; bleeding after biopsy or excisional treatment is most likely to need intervention.
15. A modest increase in preterm birth risk with larger excisional procedures, alongside possible cervical stenosis.

Part 4.4

1. Careful history, appropriate counselling, and involving a more experienced surgeon for anticipated higher-risk cases.
2. Adherence to safety checks, careful anatomical orientation, and willingness to convert or seek assistance when uncertain.
3. Intra-operative signs such as unexpected bleeding or altered vital signs, and post-operative signs such as disproportionate pain or fever.
4. Many serious complications, including delayed thermal bowel injury, present only after the patient has left hospital.
5. Stabilise the patient, identify the extent of injury, involve the right specialists, and communicate honestly, followed by documentation and review.

References and Attributions [Series 4]

1. Hoffman, B. L., Schorge, J. O., Halvorson, L. M. et al. (2020). Williams Gynecology (4th ed.). McGraw-Hill Education.
2. Royal College of Obstetricians and Gynaecologists (2008). Preventing Entry-Related Gynaecological Laparoscopic Injuries: Green-top Guideline No. 49.
3. American Association of Gynecologic Laparoscopists (2020). AAGL Practice Report: Management of Hysteroscopic Distension Fluid Deficit.
4. Berek, J. S. and Berek, D. L. (2019). Berek and Novak's Gynecology (16th ed.). Wolters Kluwer.

Figures, Plates, Tables, and Boxes

1. Table 4.1: Complications common to endoscopic gynaecological procedures. AI-generated using the prompt: "Create a clean reference table titled Complications Common to Endoscopic Gynaecological Procedures, organised by category. Simple clinical reference table style with outside border."



2. Figure 4.2: Recognition and immediate management of laparoscopic gas embolism. AI-generated using the prompt: "Create a professional medical flowchart titled Recognising and Responding to Gas Embolism During Laparoscopy, showing signs and immediate response steps. Clean clinical educational diagram style."
3. Box 4.3: Key complications of hysteroscopy and colposcopy at a glance. AI-generated using the prompt: "Create a simple single-column reference box titled Key Complications of Hysteroscopy and Colposcopy at a Glance. Clean clinical reference box style."
4. Figure 4.4: General principles of managing an endoscopic complication. AI-generated using the prompt: "Create a professional medical flowchart titled General Principles of Managing an Endoscopic Complication, showing a stepwise management sequence. Clean clinical educational diagram style."



Course code: OBG 518

Course title: Gynaecological Endoscopy

Course credit load: 2 Units

Series 5: Diagnostic Applications in Gynaecology

- **Part 5.1: Comparing Diagnostic Endoscopic Techniques**
 - Sub Part 5.1.1: Choosing between laparoscopy, hysteroscopy, and colposcopy
 - Sub Part 5.1.2: Combining endoscopic techniques in a single patient
 - Sub Part 5.1.3: Comparing endoscopy with non-invasive imaging
- **Part 5.2: Applying Endoscopy in Infertility Diagnosis**
 - Sub Part 5.2.1: The endoscopic infertility workup
 - Sub Part 5.2.2: Diagnostic laparoscopy and hysteroscopy in unexplained infertility
 - Sub Part 5.2.3: Sequencing endoscopic investigation in the infertile couple
- **Part 5.3: Applying Endoscopy in Abnormal Bleeding and Pelvic Pain**
 - Sub Part 5.3.1: Endoscopic diagnosis of abnormal uterine bleeding
 - Sub Part 5.3.2: Endoscopic diagnosis of chronic pelvic pain
 - Sub Part 5.3.3: Endoscopy in suspected gynaecological malignancy
- **Part 5.4: Consolidating Diagnostic Endoscopy in Gynaecological Practice**
 - Sub Part 5.4.1: Training and competency in diagnostic endoscopy
 - Sub Part 5.4.2: Documentation and reporting of endoscopic findings
 - Sub Part 5.4.3: The future of diagnostic endoscopy in gynaecology

Introduction

Over the last four Series, we have worked through **laparoscopy**, **hysteroscopy**, and **colposcopy** one technique at a time, exploring what each allows us to see, what each allows us to treat, and



what can go wrong along the way. In this final Series of the course, we bring these three threads together, standing back to ask a more integrative set of questions: how do you actually choose between these techniques in a given clinical situation, how do they work together rather than in isolation, and how does a good clinician document, report, and continue learning from what endoscopy reveals?

You will find that real clinical practice rarely presents itself as neatly as our earlier, technique-by-technique Series might have suggested. A woman with **infertility** may need both **hysteroscopy** and **laparoscopy** in the same visit; a woman with **abnormal bleeding** may move from **colposcopy** to **hysteroscopy** depending on where the suspicious finding actually lies; and every one of these decisions depends on a clinician who can weigh diagnostic yield, invasiveness, and the patient's own preferences against one another, rather than reaching reflexively for a single favourite tool.

This Series covers how to **choose and combine diagnostic endoscopic techniques**, their **application in infertility diagnosis**, their **application in abnormal bleeding, pelvic pain, and suspected malignancy**, and, finally, the broader professional context of **training, documentation, and the future direction** of diagnostic endoscopy in gynaecology.

Series Learning Outcomes

At the end of this Series, you should be able to:

- **SLO 5.1:** describe the factors guiding the choice between diagnostic endoscopic techniques,
- **SLO 5.2:** describe circumstances in which endoscopic techniques are appropriately combined,
- **SLO 5.3:** compare diagnostic endoscopy with non-invasive imaging,
- **SLO 5.4:** describe the role of endoscopy in the infertility workup,
- **SLO 5.5:** describe the endoscopic diagnosis of abnormal uterine bleeding and chronic pelvic pain,
- **SLO 5.6:** describe the role of endoscopy in suspected gynaecological malignancy,
- **SLO 5.7:** describe the principles of training, competency, and documentation in diagnostic endoscopy, and
- **SLO 5.8:** discuss emerging directions in diagnostic endoscopy in gynaecology.



5.1 Comparing Diagnostic Endoscopic Techniques

5.1.1 choosing between laparoscopy, hysteroscopy, and colposcopy

Matching the technique to the anatomical question

The most fundamental question guiding the choice of endoscopic technique is a straightforward one: **where, anatomically, does the suspected problem actually lie?** **Laparoscopy** gives access to the **peritoneal cavity**, viewing the outer surface of the uterus, tubes, and ovaries, and the peritoneum lining the pelvis; **hysteroscopy** gives access to the **inside of the uterine cavity**, an entirely different vantage point that laparoscopy cannot reach; and **colposcopy** examines the **surface of the cervix, vagina, and vulva**, structures that neither of the other two techniques visualises at all. Getting this basic anatomical matching right before anything else considerably narrows down which technique, or combination of techniques, is actually appropriate for a given woman's presentation.

Beyond simple anatomical location, the choice is further shaped by whether the primary aim is **purely diagnostic** or likely to require **immediate treatment**, the woman's **fitness for anaesthesia**, since colposcopy needs none while operative laparoscopy and hysteroscopy generally do, and practical factors such as **equipment availability** and **operator experience**, which, in many Nigerian health facilities, can meaningfully influence which technique is realistically on offer regardless of which might, in principle, be the theoretically ideal choice for that particular presentation.

Fill in the blank: Laparoscopy accesses the peritoneal cavity, while hysteroscopy accesses the inside of the uterine _____.

5.1.2 combining endoscopic techniques in a single patient

Many clinical presentations genuinely warrant **more than one endoscopic technique**, either performed together in the same session or in a planned, staged sequence. A woman undergoing investigation for **infertility**, for instance, very commonly has **diagnostic laparoscopy** and **hysteroscopy** performed together under the same anaesthetic, since this allows simultaneous assessment of both the outer pelvic anatomy and tubal patency, and the inner uterine cavity, in a single visit rather than putting the woman through two entirely separate procedures and two separate periods of recovery.

A woman with an abnormal cervical screening result and coexisting **abnormal uterine bleeding** might similarly need both **colposcopy**, to assess the cervix itself, and **hysteroscopy**, to assess the uterine cavity for a separate cause of her bleeding such as a polyp, since an abnormal screening result and abnormal bleeding, though they might seem related, do not automatically share the same underlying cause and each genuinely deserves its own dedicated assessment.

Why might a woman with both an abnormal cervical screening result and abnormal uterine bleeding need two separate endoscopic assessments rather than one?



Fill in the blank: Combining hysteroscopy and laparoscopy in the same session spares the woman a second _____ and a second period of recovery.

5.1.3 comparing endoscopy with non-invasive imaging

Non-invasive imaging, principally **transvaginal ultrasound**, remains the appropriate **first-line investigation** for the great majority of gynaecological presentations, and endoscopy is generally reserved for situations where imaging has been inconclusive, where a finding needs direct confirmation or biopsy, or where the clinical suspicion remains high despite apparently reassuring imaging, rather than being offered as a routine first step for every woman regardless of what a simpler, cheaper, and less invasive test might already have shown.

The genuine advantage endoscopy offers over imaging is **direct visualisation** and, very often, the opportunity for **simultaneous treatment** or **histological confirmation**, neither of which any imaging modality, however sophisticated, can currently provide, though this advantage always needs to be weighed against the cost, resource demands, and, for operative procedures, the anaesthetic and surgical risk that imaging alone simply does not carry, meaning the two approaches are properly seen as complementary rather than competing steps along the same diagnostic pathway.

Fill in the blank: _____ ultrasound remains the appropriate first-line investigation for the great majority of gynaecological presentations.

Procedure	<u>Anatomical Access</u>	<u>Indications</u>	<u>Anaesthesia Requirement</u>	<u>Capability</u>
<u>Laparoscopy</u>	Abdominal cavity via small trocar incisions	Diagnosis and treatment of pelvic pathology (e.g., endometriosis, adhesions, ovarian cysts)	General anaesthesia usually required	Both diagnostic and therapeutic (biopsy, excision, adhesiolysis)
<u>Hysteroscopy</u>	Uterine cavity via cervical canal	Evaluation of abnormal uterine bleeding, intrauterine pathology (polyps, fibroids, adhesions)	Local, regional, or general depending on complexity	Diagnostic and therapeutic (polyp removal, adhesiolysis, biopsy)
<u>Colposcopy</u>	Cervix and lower genital tract via speculum visualization	Assessment of abnormal cervical cytology, HPV-related lesions	No anaesthesia required (outpatient procedure)	Diagnostic only (visualization, biopsy, guided sampling)

Table 5.1: Comparison of laparoscopy, hysteroscopy, and colposcopy.



Pilot questions 5.1

- Describe the anatomical structures accessed by laparoscopy, hysteroscopy, and colposcopy respectively. (Linked to SLO 5.1)
- Discuss the factors, beyond anatomical location, that guide the choice of endoscopic technique. (Linked to SLO 5.1)
- Describe a clinical situation in which laparoscopy and hysteroscopy are appropriately combined. (Linked to SLO 5.2)
- Explain why an abnormal screening result and abnormal bleeding may each need separate endoscopic assessment. (Linked to SLO 5.2)
- Compare the roles of non-invasive imaging and endoscopy in gynaecological diagnosis. (Linked to SLO 5.3)

5.2 Applying Endoscopy in Infertility Diagnosis

5.2.1 the endoscopic infertility workup

Where endoscopy fits within a broader workup

As we touched on in our earlier Series on laparoscopy and hysteroscopy individually, **endoscopy** occupies a specific, later position within the broader **infertility workup**, coming after simpler, non-invasive first-line investigations such as **hormonal profile**, **semen analysis**, and **transvaginal ultrasound**, rather than being the very first test offered to every couple presenting with difficulty conceiving, since many causes of infertility can be identified, and indeed some corrected, without ever needing to proceed to an invasive procedure at all.

Where these first-line investigations raise suspicion of **tubal disease**, **endometriosis**, or a **structural uterine abnormality**, or where the couple's infertility remains genuinely **unexplained** despite thorough initial assessment, **diagnostic laparoscopy**, often combined with **hysteroscopy**, becomes the appropriate next step, offering both a definitive answer and, frequently, the opportunity for immediate corrective treatment within the very same procedure.

Fill in the blank: Endoscopy is generally offered after first-line investigations such as hormonal profile, semen analysis, and _____ ultrasound.

5.2.2 diagnostic laparoscopy and hysteroscopy in unexplained infertility

Unexplained infertility, where standard investigations of both partners return entirely normal results, is a genuinely frustrating diagnosis for couples to receive, and diagnostic laparoscopy in this group identifies previously unsuspected pathology, most often **mild endometriosis** or **subtle**



peritubal adhesions, in a meaningful proportion of women, findings that would otherwise have remained entirely hidden from standard non-invasive assessment and that can, in many cases, be corrected within the same laparoscopic procedure that first revealed them.

The decision to proceed to laparoscopy for genuinely unexplained infertility, rather than moving directly toward **assisted reproductive technology**, depends considerably on the woman's age, the duration of infertility already elapsed, and local availability and cost of both options, since laparoscopy offers the possibility of natural conception afterward while assisted reproduction bypasses the need for a fully functioning pelvis altogether, meaning the two approaches are not strictly competing but rather represent different strategies suited to somewhat different clinical circumstances.

Why might a woman's age influence whether laparoscopy or assisted reproductive technology is offered first for unexplained infertility?

Fill in the blank: Diagnostic laparoscopy in unexplained infertility most often identifies previously unsuspected mild _____ or subtle peritubal adhesions.

5.2.3 sequencing endoscopic investigation in the infertile couple

When endoscopic investigation is indicated, **hysteroscopy** and **laparoscopy** are generally performed **together under a single general anaesthetic**, since both procedures are relatively brief individually and combining them spares the woman a second anaesthetic and a second period away from work or family responsibilities, with hysteroscopy typically performed first to assess the cavity before proceeding to laparoscopic assessment of the pelvis and, where indicated, a dye test of the fallopian tubes.

Careful **pre-procedure counselling** should always cover the possibility that operative correction, such as division of adhesions or removal of a polyp, may be performed during the same anaesthetic if findings warrant it, so that appropriate consent is obtained in advance rather than the couple facing an unexpected decision about extending the procedure while the woman is already under anaesthesia and unable to be consulted directly herself.

Fill in the blank: Hysteroscopy and laparoscopy for infertility investigation are generally performed together under a single general _____.



SEQUENCING ENDOSCOPIC INVESTIGATION IN THE INFERTILE COUPLE

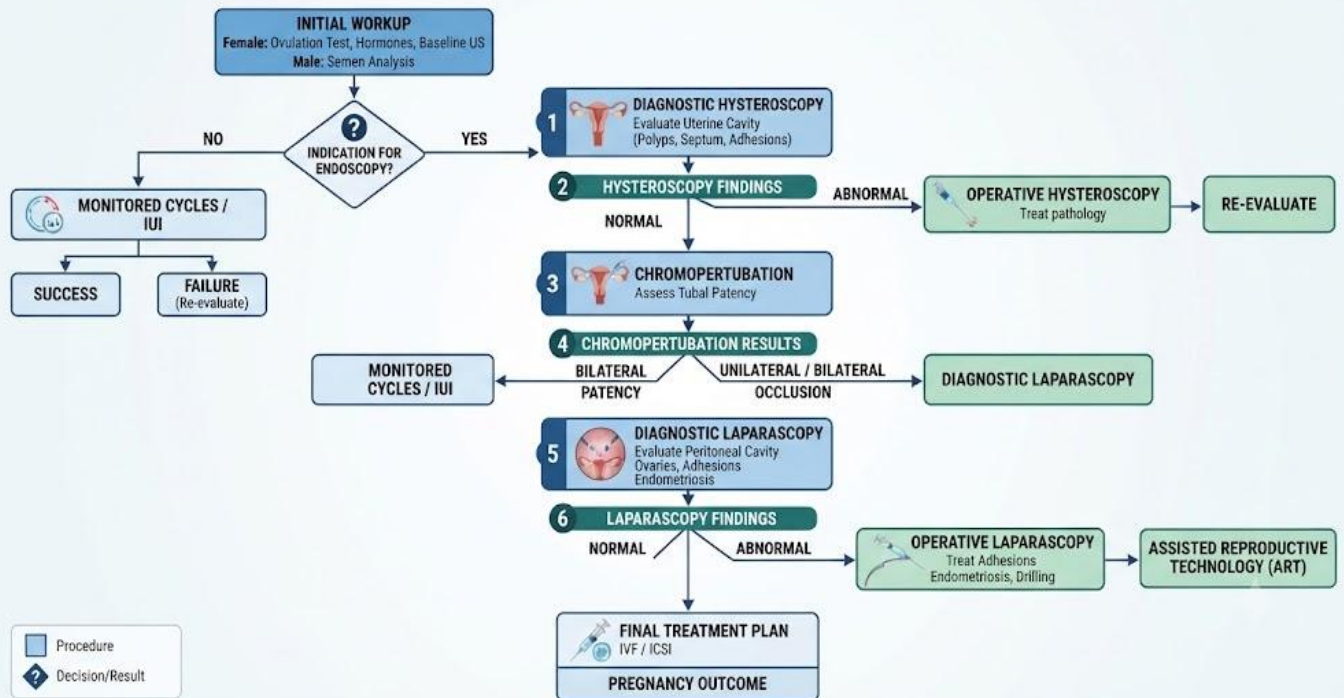


Figure 5.2: Sequencing endoscopic investigation in the infertile couple.

Pilot questions 5.2

1. Describe where endoscopy fits within the broader infertility workup. (Linked to SLO 5.4)
2. List the findings on first-line investigation that would prompt referral for diagnostic laparoscopy. (Linked to SLO 5.4)
3. Describe the value of diagnostic laparoscopy in genuinely unexplained infertility. (Linked to SLO 5.4)
4. Discuss the factors that influence whether laparoscopy or assisted reproductive technology is offered first. (Linked to SLO 5.4)
5. Describe how hysteroscopy and laparoscopy are typically sequenced when investigating the infertile couple. (Linked to SLO 5.4)

5.3 Applying Endoscopy in Abnormal Bleeding and Pelvic Pain

5.3.1 endoscopic diagnosis of abnormal uterine bleeding



Choosing the right endoscopic tool for bleeding

Abnormal uterine bleeding can arise from problems visible on **hysteroscopy**, such as a **polyp** or **submucous fibroid**, from problems visible on **colposcopy**, such as a **cervical lesion**, or, less commonly, from a problem better characterised by **laparoscopy**, such as **endometriosis** affecting adjacent structures, meaning a careful history and examination, considered alongside first-line ultrasound findings, should always guide which specific endoscopic technique, or combination, is genuinely most likely to identify the cause in a given woman, rather than an automatic default to whichever technique happens to be most readily available on a given clinic day.

As we explored in detail in our earlier Series, **postmenopausal bleeding** deserves particular urgency regardless of which endoscopic technique is ultimately used, since the overriding clinical priority in this age group is always to exclude **endometrial** or **cervical malignancy** before anything else, meaning investigation should never be delayed simply because bleeding has settled spontaneously by the time the woman is actually seen in clinic.

Fill in the blank: Postmenopausal bleeding always requires prompt investigation to exclude endometrial or cervical _____.

5.3.2 endoscopic diagnosis of chronic pelvic pain

Chronic pelvic pain is a genuinely challenging presentation precisely because so many possible causes, spanning gynaecological, gastrointestinal, urological, and musculoskeletal systems, can all produce a broadly similar clinical picture, and **diagnostic laparoscopy** remains the definitive investigation for excluding or confirming intra-pelvic gynaecological causes such as **endometriosis** or **adhesions** once simpler, non-invasive assessment has failed to provide a clear answer.

It is worth remembering, and worth explaining honestly to your patients, that a **normal laparoscopy** in chronic pelvic pain, while it can feel like an unsatisfying outcome to both clinician and woman alike, is still a genuinely valuable result, since it reliably excludes significant intra-pelvic pathology and can appropriately redirect further investigation toward non-gynaecological causes that might otherwise have been overlooked entirely while attention remained focused on the pelvis.

Why is a 'normal' laparoscopy result in chronic pelvic pain still clinically valuable, even though it does not explain the pain itself?

Fill in the blank: Diagnostic laparoscopy remains the definitive investigation for excluding or confirming intra-pelvic _____ causes of chronic pelvic pain.

5.3.3 endoscopy in suspected gynaecological malignancy

Where **gynaecological malignancy** is genuinely suspected, endoscopy plays a carefully defined and generally more cautious role than in benign presentations: **colposcopy** with directed biopsy



for suspected cervical cancer, **hysteroscopy** with directed biopsy for suspected endometrial cancer, and, in selected **early-stage** disease only, **laparoscopic staging** to assess disease extent, always performed within an appropriately experienced **gynaecological oncology** setting rather than as a routine, general outpatient procedure.

The overriding principle throughout suspected malignancy is that **endoscopy should confirm and characterise, never delay, definitive management**, meaning any woman with strongly suspicious findings should move promptly toward proper **oncological staging** and **multidisciplinary team review** rather than a protracted, step-wise series of outpatient endoscopic assessments that, however well-intentioned, risk delaying the timely, coordinated treatment this diagnosis genuinely demands.

Fill in the blank: In suspected gynaecological malignancy, endoscopy should confirm and characterise findings but never _____ definitive management.

<u>Clinical Scenario</u>	<u>Endoscopic Role</u>
<u>Abnormal Uterine Bleeding</u>	Hysteroscopy allows direct visualization of endometrium, detection of polyps, fibroids, and intrauterine pathology; biopsy for histology.
<u>Pelvic Pain</u>	Laparoscopy enables evaluation of pelvic organs, diagnosis of endometriosis, adhesions, ovarian cysts, and chronic pelvic pathology.
<u>Suspected Malignancy</u>	Colposcopy and hysteroscopy provide targeted visualization and biopsy of suspicious cervical, endometrial, or intrauterine lesions.

Table 5.3: Endoscopic diagnostic role across abnormal bleeding, pelvic pain, and suspected malignancy.

Pilot questions 5.3

1. Discuss how the cause of abnormal uterine bleeding guides the choice of endoscopic technique. (Linked to SLO 5.5)
2. Explain why postmenopausal bleeding always requires prompt investigation regardless of technique chosen. (Linked to SLO 5.5)
3. Describe the role of diagnostic laparoscopy in chronic pelvic pain. (Linked to SLO 5.5)
4. Explain why a normal laparoscopy result in chronic pelvic pain is still clinically valuable. (Linked to SLO 5.5)
5. Describe the role of endoscopy in suspected gynaecological malignancy and the principle guiding its use. (Linked to SLO 5.6)



5.4 Consolidating Diagnostic Endoscopy in Gynaecological Practice

5.4.1 training and competency in diagnostic endoscopy

Building endoscopic skill safely

Endoscopic skill, unlike much of the rest of clinical medicine, depends heavily on **hands-on, supervised practice**, since the two-dimensional view, altered depth perception, and instrument handling involved in laparoscopy and hysteroscopy in particular require a genuinely different set of skills from open surgery, meaning structured **training programmes**, often incorporating **simulation** before real patient contact, have become an increasingly important part of how gynaecologists safely acquire and demonstrate **competency** in these techniques.

Competency assessment in modern training typically moves beyond simply counting the number of procedures a trainee has performed, instead using structured tools that directly assess the quality of technique, judgement, and outcomes achieved, recognising that two trainees who have each performed the same number of procedures may nonetheless have developed rather different levels of genuine, safe independent competence, information that matters considerably when decisions are being made about a trainee's readiness for independent practice.

Fill in the blank: Modern competency assessment moves beyond simply counting the number of _____ a trainee has performed.

5.4.2 documentation and reporting of endoscopic findings

Clear, structured **documentation** of every endoscopic procedure serves several genuinely important purposes at once: it provides an accurate clinical record for future reference, supports appropriate **continuity of care** when a woman is subsequently seen by a different clinician, and, where relevant, forms part of the **medico-legal record** should questions later arise about what was found or done during the procedure, meaning documentation is never merely an administrative afterthought to be completed hurriedly once the more interesting clinical work is already finished.

A good endoscopic report should include the **indication** for the procedure, the **technique** used, a clear description of **findings**, including both normal and abnormal structures encountered, any **treatment** performed during the same procedure, and **complications**, if any occurred, described honestly and completely rather than minimised, alongside clear **follow-up recommendations** so that the next steps in a woman's care are genuinely obvious to anyone reading the report afterward, including the woman herself where she is given a copy or summary of her own results.

Fill in the blank: A good endoscopic report should always include the indication, technique, findings, treatment, complications, and _____ recommendations.



5.4.3 the future of diagnostic endoscopy in gynaecology

Diagnostic endoscopy continues to evolve, with ongoing developments including **office-based hysteroscopy** using increasingly narrow, better-tolerated instruments that reduce the need for anaesthesia altogether, **enhanced imaging technologies** such as **narrow-band imaging** that improve the visual detection of subtle abnormalities during colposcopy, and growing interest in **artificial intelligence-assisted image interpretation**, which may, in time, help support less experienced examiners in recognising concerning colposcopic or hysteroscopic appearances more reliably and consistently.

In resource-limited settings, including much of Nigeria, the future of diagnostic endoscopy also depends considerably on **expanding equipment availability**, **sustained investment in training**, and **maintenance capacity** for the specialised equipment these techniques require, since the clinical value of these procedures, however well established internationally, can only be realised for the women who need them where the necessary infrastructure and locally trained personnel genuinely exist to deliver them safely and reliably, day in and day out.

Fill in the blank: Office-based hysteroscopy uses increasingly narrow, better-tolerated instruments that reduce the need for _____ altogether.

Report Element
Patient Identification
Indication for Procedure
Type of Endoscopy Performed
Anaesthesia/Analgesia Used
Findings
Interventions Performed
Complications Noted
Post-Procedure Plan
Operator and Assistant Details
Date and Time

Box 5.4: Essential elements of a good endoscopic procedure report.

Pilot questions 5.4

1. Explain why endoscopic skill depends heavily on hands-on, supervised practice. (Linked to SLO 5.7)
2. Describe how modern competency assessment differs from simply counting procedures performed. (Linked to SLO 5.7)
3. List the essential elements of a good endoscopic procedure report. (Linked to SLO 5.7)



4. Discuss emerging developments in diagnostic endoscopy, including office-based hysteroscopy and enhanced imaging. (Linked to SLO 5.8)
5. Discuss the infrastructure challenges affecting diagnostic endoscopy in resource-limited settings. (Linked to SLO 5.8)

Series Summary

This final Series of the course brought together everything covered across laparoscopy, hysteroscopy, and colposcopy, beginning with how to **choose and combine** these techniques based on anatomical location, diagnostic versus therapeutic aim, and practical considerations, and how endoscopy relates to **non-invasive imaging** as part of a broader, complementary diagnostic pathway. We then examined the practical application of endoscopy in the **infertility workup**, in **abnormal uterine bleeding** and **chronic pelvic pain**, and, with appropriate caution, in **suspected gynaecological malignancy**.

Finally, we considered the broader professional context within which diagnostic endoscopy is practised, including **training and competency**, thorough **documentation and reporting**, and emerging **future directions**, including office-based techniques and the infrastructure challenges relevant to resource-limited settings such as Nigeria. Having worked through this entire course, you should now be able to describe the indications, findings, complications, and integrated diagnostic application of laparoscopy, hysteroscopy, and colposcopy across the full range of gynaecological practice.

Glossary of Terms

1. **Unexplained infertility:** infertility in which standard investigations of both partners return entirely normal results.
2. **Assisted reproductive technology:** fertility treatments, including in vitro fertilisation, that bypass the need for a fully functioning pelvis.
3. **Diagnostic yield:** the likelihood that an investigation will identify a clinically relevant finding.
4. **Gynaecological oncology:** the subspecialty managing gynaecological cancers, within which endoscopic staging is performed.
5. **Multidisciplinary team review:** coordinated review of a cancer diagnosis by relevant specialists to plan treatment.



6. **Simulation training:** practice of endoscopic technique on models or virtual platforms before real patient contact.
7. **Competency assessment:** structured evaluation of a trainee's technique, judgement, and outcomes, beyond simple procedure counts.
8. **Medico-legal record:** clinical documentation that may be referred to in legal or regulatory review.
9. **Office-based hysteroscopy:** hysteroscopy performed with narrow instruments in an outpatient setting, generally without anaesthesia.
10. **Narrow-band imaging:** an enhanced imaging technology that improves visual detection of subtle mucosal abnormalities.
11. **Continuity of care:** consistent, well-informed care as a patient moves between clinicians or visits.
12. **Resource-limited setting:** a healthcare environment where equipment, training, or maintenance capacity constrain service delivery.

Concept Check Questions [Series 5]

Objective questions

- Laparoscopy accesses the peritoneal cavity, while hysteroscopy accesses the inside of the uterine _____.
- _____ ultrasound remains the first-line investigation for most gynaecological presentations.
- Hysteroscopy and laparoscopy for infertility investigation are generally performed together under a single general _____.
- Postmenopausal bleeding always requires prompt investigation to exclude endometrial or cervical _____.
- In suspected malignancy, endoscopy should confirm findings but never _____ definitive management.



Short-answer questions

1. Describe the anatomical structures accessed by laparoscopy, hysteroscopy, and colposcopy respectively. (Linked to SLO 5.1)
2. Describe where endoscopy fits within the broader infertility workup. (Linked to SLO 5.4)
3. Explain why a normal laparoscopy result in chronic pelvic pain is still clinically valuable. (Linked to SLO 5.5)
4. List the essential elements of a good endoscopic procedure report. (Linked to SLO 5.7)
5. Discuss emerging developments in diagnostic endoscopy in gynaecology. (Linked to SLO 5.8)

Long-answer questions

6. Discuss the factors that guide the choice and combination of diagnostic endoscopic techniques, and compare endoscopy with non-invasive imaging. (Linked to SLO 5.1, SLO 5.2, SLO 5.3)
7. Describe the role of endoscopy in the infertility workup, including its use in unexplained infertility. (Linked to SLO 5.4)
8. Discuss the endoscopic diagnosis of abnormal uterine bleeding and chronic pelvic pain. (Linked to SLO 5.5)
9. Describe the role of endoscopy in suspected gynaecological malignancy and the principle guiding its use. (Linked to SLO 5.6)
10. Discuss training, competency, and documentation in diagnostic endoscopy, including emerging future directions. (Linked to SLO 5.7, SLO 5.8)

Answers to Concept Check Questions [Series 5]

Objective questions

11. Cavity.
12. Transvaginal.
13. Anaesthetic.
14. Malignancy.



15. Delay.

Short-answer questions

16. Laparoscopy accesses the peritoneal cavity, hysteroscopy the uterine cavity, and colposcopy the cervix, vagina, and vulva surface.
17. Endoscopy follows first-line investigations such as hormonal profile, semen analysis, and ultrasound, once these raise suspicion or infertility remains unexplained.
18. It reliably excludes significant intra-pelvic pathology and can redirect investigation toward non-gynaecological causes.
19. Indication, technique, findings, treatment performed, complications, and follow-up recommendations.
20. Office-based hysteroscopy, enhanced imaging such as narrow-band imaging, and artificial intelligence-assisted interpretation.

Long-answer questions

21. **Basic response:** Technique choice depends on anatomical location, diagnostic versus therapeutic aim, and practical factors, with endoscopy complementing rather than replacing non-invasive imaging as first-line assessment.

Value-added response: Endoscopy's advantage lies in direct visualisation and simultaneous treatment or biopsy, weighed against its greater cost and risk compared with imaging.

22. **Basic response:** Endoscopy follows first-line infertility investigations, with diagnostic laparoscopy and hysteroscopy identifying previously unsuspected pathology even in unexplained infertility.

Value-added response: The decision to pursue laparoscopy versus assisted reproduction depends on age, duration of infertility, and local availability and cost.

23. **Basic response:** Abnormal bleeding and pelvic pain are investigated with the technique matched to suspected cause, with laparoscopy remaining definitive for excluding intra-pelvic gynaecological causes of chronic pain.

Value-added response: A normal result, while not explaining the pain, still carries genuine value by redirecting investigation toward other systems.



24. Basic response: In suspected malignancy, colposcopy, hysteroscopy, or laparoscopic staging confirm and characterise disease within an oncology setting, without delaying definitive treatment.

Value-added response: The overriding principle is prompt progression to proper staging and multidisciplinary review once malignancy is strongly suspected.

25. Basic response: Endoscopic competency depends on supervised, often simulation-based training and structured assessment, alongside thorough documentation covering indication, technique, findings, treatment, and follow-up.

Value-added response: Future directions, including office-based techniques and enhanced imaging, depend considerably on sustained investment in equipment and training in resource-limited settings.

Answers to Pilot Questions [Series 5]

Part 5.1

1. Laparoscopy accesses the peritoneal cavity, hysteroscopy the uterine cavity, and colposcopy the cervix, vagina, and vulva surface.
2. Diagnostic versus therapeutic aim, fitness for anaesthesia, and practical factors such as equipment availability and operator experience.
3. Combined diagnostic laparoscopy and hysteroscopy during infertility investigation, performed together under one anaesthetic.
4. An abnormal screening result and abnormal bleeding do not automatically share the same underlying cause and each deserves dedicated assessment.
5. Imaging is the appropriate first-line test; endoscopy is reserved for inconclusive imaging, confirmation, biopsy, or persistent suspicion.

Part 5.2

6. Endoscopy follows first-line investigations such as hormonal profile, semen analysis, and ultrasound, rather than being offered first.
7. Suspected tubal disease, endometriosis, structural uterine abnormality, or genuinely unexplained infertility.



8. It identifies previously unsuspected pathology, most often mild endometriosis or subtle adhesions, in a meaningful proportion of women.
9. Age, duration of infertility, and local availability and cost of laparoscopy versus assisted reproductive technology.
10. Hysteroscopy is typically performed first, followed by laparoscopic pelvic assessment and dye test under the same anaesthetic.

Part 5.3

11. History, examination, and ultrasound findings guide whether hysteroscopy, colposcopy, or laparoscopy is most likely to identify the cause.
12. The overriding priority in this age group is always excluding endometrial or cervical malignancy.
13. Diagnostic laparoscopy remains the definitive investigation for excluding or confirming intra-pelvic gynaecological causes of pain.
14. It reliably excludes significant pathology and redirects investigation toward non-gynaecological causes.
15. Colposcopy, hysteroscopy, or laparoscopic staging confirm and characterise suspected malignancy within an oncology setting without delaying treatment.

Part 5.4

1. The altered depth perception and instrument handling involved require a genuinely different skill set from open surgery.
2. It uses structured tools assessing technique, judgement, and outcomes rather than simply counting procedures performed.
3. Indication, technique, findings, treatment performed, complications, and follow-up recommendations.
4. Office-based hysteroscopy, narrow-band imaging, and artificial intelligence-assisted image interpretation.
5. Expanding equipment availability, sustained training investment, and maintenance capacity in resource-limited settings.



References and Attributions [Series 5]

1. Hoffman, B. L., Schorge, J. O., Halvorson, L. M. et al. (2020). Williams Gynecology (4th ed.). McGraw-Hill Education.
2. Royal College of Obstetricians and Gynaecologists (2015). The Investigation and Management of Endometriosis: Green-top Guideline No. 24.
3. National Institute for Health and Care Excellence (2013). Fertility Problems: Assessment and Treatment. Clinical Guideline CG156.
4. Berek, J. S. and Berek, D. L. (2019). Berek and Novak's Gynecology (16th ed.). Wolters Kluwer.

Figures, Plates, Tables, and Boxes

1. Table 5.1: Comparison of laparoscopy, hysteroscopy, and colposcopy. AI-generated using the prompt: "Create a clean comparison table titled Comparison of Laparoscopy, Hysteroscopy, and Colposcopy, listing anatomical access, indications, anaesthesia requirement, and capability. Simple clinical reference table style with outside border."
2. Figure 5.2: Sequencing endoscopic investigation in the infertile couple. AI-generated using the prompt: "Create a professional medical flowchart titled Sequencing Endoscopic Investigation in the Infertile Couple, showing the pathway from initial workup to combined endoscopy. Clean clinical educational diagram style."
3. Table 5.3: Endoscopic diagnostic role across abnormal bleeding, pelvic pain, and suspected malignancy. AI-generated using the prompt: "Create a clean reference table titled Endoscopic Diagnostic Role Across Abnormal Bleeding, Pelvic Pain, and Suspected Malignancy. Simple clinical reference table style with outside border."
4. Box 5.4: Essential elements of a good endoscopic procedure report. AI-generated using the prompt: "Create a simple single-column reference box titled Essential Elements of a Good Endoscopic Procedure Report. Clean clinical reference box style."

