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An Evidence-Based Clinical Textbook in Obstetrics & Gynaecology *for* MRCOG-2

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SECOND EDITION

JAYPEE

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Chapter 2

General Principles of Surgery

INTRODUCTION

For the success of any surgical process, besides the surgical procedure per se, the pre-operative preparation of the patient, administration of anaesthesia, techniques of surgery and post-operative care of the patient play an equally important role in contributing towards the overall success of surgery. All these parameters shall be discussed in details in this chapter. Surgeons also need to understand the principles related to the working of equipment they use during surgery to minimise the occurrence of complications. This especially applies to the use of diathermy at the time of surgery. Therefore, surgical equipment such as diathermy, hysteroscopy and laparoscopy are also discussed briefly in this chapter.

PRE-OPERATIVE PRINCIPLES IN SURGERY

The main aim of pre-operative assessment before anaesthesia and surgery is to help improve the final outcome. This is achieved by identifying potential anaesthetic difficulties, identifying existing medical conditions, improving safety by assessing and quantifying risk, planning of peri-operative care, providing the opportunity for explanation and discussion and allaying the patient's fear and anxiety. Proper pre-operative preparation helps in ensuring the optimal outcome of the operative gynaecological procedures. Good pre-operative preparation comprises adequate patient assessment through appropriate clinical history and examination, and pre-anaesthetic evaluation. The clinical examination must include a complete gynaecological examination as well as complete evaluation of the pulmonary, cardiovascular, gastrointestinal, urinary, musculoskeletal and neurological systems. Sometimes, the symptoms of gastrointestinal disease can resemble the symptoms related to the diseases of the reproductive tract. In these cases, a proper gastrointestinal tract history and investigations usually help in arriving at the correct diagnosis. At the time of pre-operative counselling, the surgeon must ensure that the patients have access to easily understood information. Such information may be conferred to the patient in the form of information booklets or sheets in an appropriate language. Adequate pre-operative patient preparation comprises the following components.

Confidentiality and Informed Consent

The principles of confidentiality and informed consent have already been discussed in Chapter 1 (Principles of Clinical Practice in the National Health System). Guidelines for obtaining consent are available on the General Medical Council (GMC) website.[1] The patient must be counselled regarding the various available treatment options, with the help of written information (booklets, leaflets, etc.) or visual aids. Prior to taking consent, the patient must be informed about the advantages, disadvantages, success and failure rates, and the complications and risks associated with various procedures. The adequacy of consent must be assessed by the concept of material risk.[2] The doctor is obliged to discuss all material risks with the patient implying that the clinician needs to address even the rare complications, which are serious or may have a significant impact over the patient's quality of life. The patients should be given appropriate time before taking an appropriate decision. While dealing with the foreign patients, interpreters can be used. According to the GMC's guidelines, the responsibility of taking informed consent from the patient lies in the hands of the person performing the procedure.

History

A concise, but accurate, history must be taken from the patient. Besides the history of presenting complaints, an accurate menstrual history must be taken from the patient. In case of discrepancy between the menstrual dates and the findings of pelvic examination, pregnancy must be ruled out. Additionally, a proper obstetric history, sexual history and complete urological history must also be taken. This must be followed by complete general physical, gynaecological and abdominal examination. The history must be taken in a non-judgemental, sensitive and thorough manner.[3] Detailed history and clinical vaginal examination form an important aspect of a normal gynaecological check-up.

Importance must be given towards maintenance of the patient–physician relationship. It is important for the

gynaecologist to maintain good communication with the patient in order to elicit proper history and to accurately be able to recognise her problems. The manner of speaking, the words used, the tone of speaking and the body language are important aspects of the patient–physician interaction.[4] Kindness and courtesy must be maintained at all times. These aspects are especially important in case of male gynaecologists because the gynaecological history entails asking some private and confidential questions from the female patients. Also, the women may be reluctant while telling the history regarding her menstrual cycles to a male gynaecologist. It is important for a male gynaecologist to take the history and perform the vaginal examination in the presence of a third party or a chaperone (a female nurse or the patient's female relative or friend).[5] The clinician must adopt both an empathetic and an analytical attitude towards the patient. The patient's privacy must be respected at all costs. The gynaecologist must refrain from asking personal questions until appropriate patient confidence has been established.[6] The gynaecologist needs to listen more and talk less while taking the patient's history.

If any serious condition (e.g., malignancy) is suspected, the diagnosis must not be disclosed to the patient until it has been confirmed by performing investigations. Bad news must be preferably told to the patient when she is being accompanied by someone (relative, friend or spouse). The seriousness and urgency of the situation must be explained without causing undue alarm and fright to the patient. The clinician must never give false reassurance to the patient. Honest advice and opinion must always be provided.[7] It is important to elicit the following history at the time of examination:

- *Past medical history*: History of medical illnesses such as hypertension, hepatitis, diabetes mellitus, cancer, heart disease, pulmonary disease and thyroid disease needs to be taken. A patient's previous medical and surgical problems may have a bearing on her present complaints. For example, a history of long-standing diabetes could be responsible for development of genital candidiasis and associated pruritus. A patient with a previous medical history of severe anaemia or cardiovascular heart disease may require special anaesthetic preparation (e.g., correction of anaemia or treatment of cardiovascular pathology) before undergoing a major gynaecological surgery (e.g., hysterectomy). If the woman gives history of a recent myocardial infraction, the surgery should be delayed for at least 6 months after the episode of myocardial infarction (MI) due to high risk of reinfarction during the first 6 months.[8]

  Triad of diabetes, hypertension and obesity is associated with an increased risk of endometrial carcinoma. A history of sexually transmitted disease (especially infection with Chlamydia) may have a direct bearing on future infertility. Previous history of pelvic inflammatory disease (PID) or puerperal sepsis could be responsible for producing gynaecological complaints such as menstrual disturbances, lower abdominal pain, congestive dysmenorrhoea and infertility. Presence of endocrinological disorders (e.g., thyroid dysfunction) could be responsible for menstrual irregularities. Patients with diabetes, thyroid dysfunction and increased body mass index (BMI) are also at an increased risk during the administration of anaesthesia. Therefore, such conditions are discussed below in details.

  - *History of diabetes*: History of diabetes can be associated with significant metabolic derangements in the patient. A proper management of diabetes in the pre-operative period helps in preventing complications such as metabolic aberrations, impaired wound healing and increased risk of post-operative infections. Stress of surgery is likely to release counter-regulatory hormones, such as glucagon, growth hormone, epinephrine, and cortical hormones, which are further likely to exacerbate hyperglycaemia. On the other hand, diabetic patients are particularly prone to hypoglycaemia because they may be fasting and may not receive certain medications in the perioperative period. Therefore, it becomes important for the surgeon to monitor the patient's blood glucose levels during the perioperative period in order to strike a balance between prevention of both hyperglycaemia and hypoglycaemia in the post-operative period. In the perioperative period, various medical agents such as insulin with or without oral hypoglycaemic agents may be used in order to achieve control of blood glucose levels. The aim of this treatment is to maintain blood glucose levels in the range of 120–200 mg/dL.
  - *Obesity*: Patients with an increased BMI are prone to develop complications such as hypertension, diabetes, atherosclerotic disease, obstructive sleep and apnoea syndrome. In these cases, apart from a routine pre-operative chest X-ray and electrocardiography (ECG), pulmonary function tests and a baseline arterial blood gas analysis may also be essential. Use of narcotics and sedatives must be avoided in these cases and regional anaesthesia be used wherever possible.
  - *Thyroid dysfunction*: Since disorders of thyroid function, particularly hyperthyroidism, are likely to affect the cardiovascular system (CVS), the thyroid levels must be controlled by the use of medicines in the pre-operative period.
  - *Haematopoietic dysfunction*: In the presence of complications such as easy bruising and episodes of prolonged or excessive bleeding (epistaxis, menorrhagia, bleeding from the gums, etc.), the coagulation profile must be determined. This must comprise the following tests: bleeding time, clotting time, prothrombin time, activated partial prothrombin time and a platelet count.
- *Past treatment history*: The patient should also be asked about the various medicines (including prescription drugs, over-the-counter drugs, herbal drugs and any therapy related to alternative medicine) she has been consuming. The details of various medicines including their dosage, route of administration, frequency and duration of use need to be asked. History of allergy to any medication also needs to be asked. If the woman has been using combined oral contraceptive pills, she must be advised to stop using them at least 1 month prior to the major surgery.

- *History of surgery*: History of an undergoing previous abdominal surgery, such as caesarean section, removal of appendix, excision of ovarian cyst, or myomectomy, may result in the development of pelvic adhesions. These may not only make any subsequent surgery difficult, but also may be the cause of common gynaecological problems such as pelvic and abdominal pain, infertility, menstrual disturbances and dyspareunia.
- *Family history*: Certain gynaecological cancers (e.g., cancer of ovary, uterus and breast) have a genetic predisposition. A woman may be at a high risk of development of such cancers in the future if there is a positive family history of such cancers in her first-degree relatives (especially mother and sister).
- *Marital and sexual history*: Details of the woman's marital life including her age at the time of marriage, how long she has been married and sexual history need to be asked. Details of the woman's sexual history are particularly important. Some such details include her age at the time of the first sexual intercourse; her current sexual activities (vaginal, oral, anal and manual); frequency of her sexual intercourses; is she currently seeking a pregnancy; is she presently using any method of contraception, if yes, the type of contraception used; is she or her partner experiencing any sexual dysfunction (frigidity in the woman or impotence or premature ejaculation in the male or problems with libido, arousal, lubrication or orgasm in both males and females); current frequency of her sexual activities; past sexual activities; number of sexual partners (currently and in the past); sexual preferences (heterosexual, homosexual or both); pain at the time of sexual intercourse (dyspareunia), etc.
- *Obstetric history*: Details of every pregnancy conceived, irrespective of its ultimate outcome, need to be recorded. Number of previous live births, stillbirths, deaths, miscarriages (both spontaneous and induced), history of recurrent miscarriages if any, medical termination of pregnancies and number of children living at present need to be noted.

Clinical Examination

General Physical Examination

General physical examination involves the observation of the patient's general appearance, orientation in time, place and person, nutritional status and patient's demeanour (calm, anxious or aggressive). The following features need to be observed at the time of general physical examination:[9,10]

Vital signs: A patient's vital signs such as temperature, blood pressure (BP), pulse, respiratory rate, height and weight need to be measured.

Height and weight: The height of the patient (in metres) and her weight (in kilograms) can be used for calculation of BMI. The classification of the woman as underweight, normal weight and obese has been described in **Table 2.1**. Calculation of BMI is especially important in women who appear underweight or overweight. Underweight women may commonly suffer from amenorrhoea and other menstrual irregularities, whereas overweight women are at an increased risk for endometrial cancer.

Table 2.1: Classification of weight according to body mass index.

Weight for height status	*Body mass index (kg/m²)*
Very low	<16.5
Low	16.5–19.8
Normal	19.8–25.9
High	26.0–29.9
Very high	>30.0

Anaemia and dehydration: Excessive blood loss may result in the development of anaemia. Excessive loss of body fluids may result in the development of dehydration, which causes dryness of mucous membranes and loss of skin turgor.

Signs suggestive of hyperandrogenaemia: Signs suggestive of hyperandrogenaemia such as hirsutism (presence of facial hair) and deepening of voice may be related to the presence of androgen-secreting tumours or chronic anovulatory states.

Blood pressure: BP that is persistently ≥140 mmHg (systolic) or ≥90 mmHg (diastolic) is considered as elevated.

Neck examination: Local examination of the neck may reveal enlargement of thyroid gland or lymph nodes of the neck. Neck examination should also involve palpation of cervical and supraclavicular lymph nodes.

Lymphadenopathy: Lymphadenopathy could be a sign of advanced metastatic disease associated with malignancy. The neck, axilla and groins must also be palpated for the presence of enlarged lymph nodes.

Thyroid examination: It is important to examine the thyroid gland because menstrual abnormalities may be commonly associated with thyroid dysfunction. While hypothyroidism is commonly associated with oligomenorrhoea, hyperthyroidism may be responsible for menorrhagia.

Breast examination: Examination of the breast should be carried out in three positions: (1) with the patient's hands on her hips (to accentuate the pectoral muscles), (2) with her arms raised and then (3) in supine position. Both the breasts must be inspected for symmetry, skin or nipple retraction, presence of any obvious growth or mass and skin changes such as dimpling, retraction, crusting or Peau d'orange appearance. Both the breasts must be then palpated bilaterally for the presence of lumps, masses and tenderness. The nipples are assessed for the presence of discharge.

Axillary and supraclavicular regions are palpated for the presence of any lymphadenopathy. The points which need to be particularly observed on examination of breast are described next.

- Breast examination may reveal changes indicative of early pregnancy. This is especially important in cases where pregnancy is not suspected, e.g., in young unmarried girls.
- *Staging of breast development*: This could be important in women who have yet not attained sexual maturity.

- In all women and especially those above the age of 30 years, breast must be routinely palpated to exclude tumour formation.
- Bilateral milk discharge from the nipples may indicate galactorrhoea due to hyperprolactinaemia. Ruling out the presence of galactorrhoea is especially important in cases that are infertile and suffer from oligomenorrhoea or amenorrhoea.
- Unilateral bloody nipple discharge could be associated with an intraductal papilloma.

Systemic Examination

Cardiovascular system examination: Routine examination of CVS involves palpation of cardiac impulse and auscultation of the heart at the apex for presence of any sounds, murmurs, clicks, etc. Detailed examination of the CVS is required in cases of history of cardiovascular disease or complaints suggestive of a possible cardiovascular pathology. Cardiovascular examination may be important in some patients, where they may be at a risk of myocardial hypoxia at the time of gynaecological surgery, especially in cases of previous history of cardiovascular diseases. The occurrence of cardiac risk increases in the presence of previous history of MI. In order to evaluate the patient's risk of developing cardiac complications during surgery, Goldman's cardiac risk index has been devised **(Table 2.2)**.[11] This is a point system, which classifies the patient's risk for perioperative cardiac morbidity and mortality in terms of points. If the total score is ≤5, the risk of cardiac complications is only 1%. If the total adds up to 12, the risk increases to 5%; with the counts up to 25, the risk increases to 11%.

Hypertension: Patients with mild-to-moderate hypertension (systolic BP = 140–150 mmHg and diastolic BP = 90–110 mmHg) can proceed to surgery without undergoing any treatment. However, in patients with severe hypertension (systolic BP > 150 mmHg and diastolic BP > 110 mmHg), the BP should be first controlled over a period of 6 months before proceeding for the surgery. The anti-hypertensive medication must be continued until the morning of surgery and started as soon as possible in the post-operative period.

Table 2.2: Goldman's index of cardiac risk.

Cardiovascular risk factor	*No. of points*
Jugular venous distension (evidence of congestive cardiac failure)	11
Recent myocardial infarction in 6 months	10
Premature ventricular contractions (5 or more per minute)	7
Rhythm other than sinus	7
Age >70 years	5
Emergency surgery, aortic valvular stenosis	4
Poor medical condition or surgery within the chest or abdomen	3

Pulmonary system: Examination of the pulmonary system may be required to detect the presence of wheezes, rales, rhonchi and bronchial breath sounds. Presence of a pulmonary pathology such as chronic obstructive pulmonary disease (COPD) in a patient predisposes her to develop pulmonary complications in the post-operative period.[12] Pulmonary function tests must be performed in the pre-operative period to help decide the ventilatory settings in the post-operative period. Use of sedatives and general anaesthesia (GA) may result in the development of hypoxia in these patients. Therefore, it is preferable to perform surgery under local or epidural anaesthesia in these patients. Application of strategies such as cessation of smoking, use of chest physiotherapy or bronchodilators may help in improving pulmonary function in these patients. This can be attributed to the fact that post-operative complications are more common in patients with history of chronic smoking and COPD.[13] Two most important pulmonary complications such as atelectasis and bronchitis can be prevented by instructing the patient to make use of deep breathing exercises post-operatively.

Pelvic examination: Pelvic examination forms an important aspect of the gynaecological check-up of a woman. If the patient is virginal, the opening of the hymen may be wide enough to allow only one finger or narrow speculum examination. As far as possible, a per vaginal examination must be avoided in virginal women.[14] The prerequisites before performing a pelvic examination are described below:

- The patient must be asked to empty her bladder before lying down on the table for the examination. In case of complaints of urinary incontinence, examination must be performed with a full bladder in the lithotomy and erect positions to demonstrate stress incontinence.
- Gloves and instruments, if not disposable, should be sterilised by autoclaving before reuse.
- Since this is an intimate examination, it requires patient's full cooperation. The patient must be described the procedure of pelvic examination and her informed consent be taken before proceeding with the examination.
- Both male and female examiners should be chaperoned by a female assistant.

Laboratory Investigations

Medical and anaesthetic problems are identified more efficiently by taking a detailed history and by the physical examination of patients. No special investigations are required prior to minor surgery in an otherwise healthy patient.[15] Routine investigations, which need to be performed even in otherwise healthy patients, are described next. An ECG should be performed on every patient with a cardiac disease or related history but is not indicated for asymptomatic males under the age of 40 years or asymptomatic females under the age of 50 years. All patients undergoing elective surgery must be screened for methicillin-resistant *Staphylococcus aureus* (MRSA).

Routine Investigations

The investigations which are routinely performed include the haemoglobin level, haematocrit, total leucocyte count (TLC), differential leucocyte count (DLC) and complete urine analysis. In the presence of underlying or suspected renal or hepatic diseases, kidney function test (KFT) or liver function test (LFT) must be ordered, respectively. Baseline electrolyte levels must be done for all patients who would be undergoing extensive pelvic surgery in order to decide post-operative fluid and electrolyte replacement therapy.[16] In case of women undergoing any pelvic procedure, screening for sexually transmitted infection (STI) and bacterial vaginosis should be performed prior to the surgery.

Other Investigations

Depending on the particular pathology, other pre-operative investigations can be ordered. For example, in case of patients with a gynaecological malignancy, a CT scan or MRI may be ordered to evaluate the spread of malignancy. If the renal system or the gastrointestinal system appears to be involved, investigations such as intravenous pyelography or barium enema, respectively, may help to evaluate the spread of malignancy.

Pre-operative Management Prior to Surgery[17]

One Day Prior to Surgery

Fasting: For safety reasons, patients should not eat or drink immediately prior to anaesthesia. The Association of Anaesthetists of Great Britain and Ireland (AAGBI) recommends the minimum fasting periods based on the American Society of Anesthesiologists (ASA) guidelines:

- 6 hours for solid food, infant formula or other milk
- 4 hours for breast milk
- *2 hours for clear non-particulate and non-carbonated fluids*: For all practical purposes, the patient may be allowed to have a light and easily digestible diet, the night before the morning of surgery. After midnight, the patient must be nil per orally (NPO) and must not eat or drink anything. It is important that the elderly women, who have undergone bowel preparation, children and breastfeeding mothers should not be left for long periods without hydration. They may require intravenous fluids prior to surgery.

Sedation: Mild sedative drugs may be administered on the night before the surgery to help allay the patient's anxiety.

Bowel preparation: In women undergoing abdominal surgery in which entry into the bowel is anticipated, complete bowel preparation must be performed by use of laxatives or pre-operative enema, either the evening before or on the morning of surgery. Before undertaking an elective major surgery, which is likely to involve the bowel, mechanical cleansing of the large intestines is required. In these cases, cleansing enemas may be given in the early morning to ensure emptying of bowel before the morning of surgery.

Advice related to smoking: The patient should be advised to stop smoking at least 24 hours prior to the surgery in order to reduce the levels of carboxyhaemoglobin in their bodies and to minimise the cardiovascular effects of nicotine in the body.[18]

Screening for MRSA: All patients undergoing elective surgery must be screened for MRSA.

Pre-operative antibiotics: Pre-operative prophylactic broad-spectrum antibiotics are frequently used prior to undertaking gynaecological surgery for preventing infection. A single dose of antibiotics immediately prior to the surgery is sufficient for most of the cases. A repeat dose may be required if the surgery is likely to last for longer than 8 hours.[19] The most optimal method of antibiotic administration appears to be IV administration of antibiotics. The antibiotics most commonly used include the new-generation cephalosporins [ceftazidime or cefotaxime 2 g intramuscularly/intravenously (IM/IV)], semisynthetic penicillin or β-lactamase antibiotics, which are usually prescribed 2 hours prior to the surgery.[20] Besides the use of antibiotics, principles such as maintenance of adequate haemostasis and gentle handling of the tissues must be followed. Previously, the patients were administered parenteral antibiotics 48–72 hours pre-operatively, followed by oral antibiotics for at least 5 days post-operatively. Nowadays, more emphasis is given towards maintenance of asepsis rather than antisepsis. Prophylactic antibiotics are now administered in one to four doses at 12-hourly intervals, starting 20 minutes prior to surgery.[21]

Thromboprophylaxis: Adequate prophylactic action must be taken for the prevention of thromboembolism because gynaecological surgery may be associated with a high incidence of deep vein thrombosis (DVT) and pulmonary embolism (PE). Venous thromboembolism (VTE) can be considered as one of the most serious complications of surgery. All units in various hospitals in the UK must have clear protocols for thromboprophylaxis. According to the recommendations by National Institute for Care and Health Excellence (NICE) (2010), all patients at the time of admission must be assessed to identify those who are at an increased risk of VTE.[22]

Medical patients are considered to be at an increased risk of VTE if they have had or are expected to have significantly reduced mobility for 3 days or more or are expected to have ongoing reduced mobility relative to their normal state and have one or more of the risk factors given in **Box 2.1**.[22] Surgical patients and patients with trauma are at an increased risk of VTE if they have undergone a surgical procedure with a total anaesthetic and surgical time of >90 minutes, or 60 minutes if the surgery involves the pelvis or lower limb or have one or more of the risk factors given in **Box 2.1**. Measures for reducing the risk of VTE include the following:

- Adequate hydration must be maintained.
- The patient must be encouraged to mobilise as soon as possible.
- Temporary inferior vena cava filters may be offered to the patients who are at a very high risk of VTE and for whom

mechanical and pharmacological VTE prophylaxes are contraindicated.

- Mechanical prophylaxis for VTE comprises one of the following: antiembolism stockings (thigh or knee length), foot impulse devices or intermittent pneumatic compression devices (thigh or knee length). Mechanical VTE prophylaxis must be continued until the patient no longer has significantly reduced mobility.
- Pharmacological VTE prophylaxis can be considered for patients who are at a low risk of major bleeding, taking into account the patient's clinical condition. Patients at risk of bleeding must be offered pharmacological VTE prophylaxis in situations where the risk of VTE outweighs the risk of bleeding. Clinicians can use either low-molecular-weight heparin (LMWH) or unfractionated heparin (UFH) for VTE prophylaxis. Pharmacological VTE prophylaxis must be continued until the patient no longer has significantly reduced mobility (generally 5–7 days). This can be extended to 28 days post-operatively for patients who have had major cancer surgery in the abdomen or pelvis.

Pre-operative showering or washing: The patient should be advised to have a shower or a bath using standard soap either the day before or on the day of surgery.

Box 2.1: Risk factors for venous thrombosis.

Age
- ❑ <40 years (major surgery)
- ❑ 60 years (non-major surgery)

Obesity
- ❑ *Moderate obesity*: 75–90 kg or >20% above the ideal weight
- ❑ *Morbid obesity*: 115 kg or >30% above the ideal weight with reduced fibrinolysin and immobility

Immobility
- ❑ *Pre-operative immobility*: Prolonged hospitalisation, dehydration, venous stasis
- ❑ *Intraoperative immobility*: Prolonged operative time, loss of pump action of the calf muscles, compression of vena cava
- ❑ *Post-operative immobility*: Prolonged periods of confinement to the bed, venous stasis, admission to the critical care unit

Trauma
- ❑ Damage to the walls of the pelvic veins
- ❑ *Radical pelvic surgery/malignancy*: Release of tissue thromboplastins

Activation of factor X
- ❑ Prior radiation therapy, diabetes mellitus
- ❑ *Reduced fibrinolysin*: Radiation, medical disease, cardiac disease, heart failure, severe varicose veins, previous venous thrombosis

Comorbid conditions
- ❑ Known thrombophilias
- ❑ One or more significant medical comorbidities (for example: heart disease; metabolic, endocrine or respiratory pathologies; acute infectious diseases; inflammatory conditions)
- ❑ Varicose veins with phlebitis

Family history
- ❑ Personal history or first-degree relative with a history of venous thromboembolism

Treatment history
- ❑ Use of hormone replacement therapy
- ❑ Use of oestrogen-containing contraceptive therapy

ROLE OF THE ANAESTHETIST

Ruling out the presence of pre-existing medical disease: This is important because the morbidity and mortality related to surgery and anaesthesia is increased in women with coexisting diseases, such as ischaemic heart disease, hypertension, chronic respiratory diseases and cardiac arrhythmias. In case there is a presence of concurrent illness, the surgeon must liaise with the anaesthetist and other specialists, in order to evaluate the complexity of the patient's situation.

Before selecting a particular anaesthetic technique or before performing surgery, the patients must be classified based on their physical state or the degree of sickness based on the classification system devised by the ASA **(Table 2.3)**.[23]

During the pre-anaesthetic check-up performed prior to the surgery, the anaesthetist gets the opportunity to discuss with the patient, the choice of the anaesthetic method in the light of the patient's preferences, his or her clinical state, the surgery itself and the anaesthetist's own preferences and special skills. This discussion also helps in highlighting various risks and benefits of different types of anaesthesia that can be used. The advantages and complications of each type of anaesthetic procedure must be explained to the patient. This is also the time during which the patient can clear all her doubts and even raise questions about any aspect of anaesthetic care. During this time, the anaesthetist must also gain the patient's consent for the anaesthetic procedure. The anaesthetists can make use of questionnaires for obtaining basic background information from the patients.

The pre-anaesthetic check-up is the perfect time for building the patient's trust and confidence. This trust is likely to play an important role in making the patient feel safe, reassured and relaxed when she sees the doctor again in the operation theatre. The discussion between the anaesthetist and the patient must involve the following details: how the patient will get to theatre (if inpatient) or when and where she should report on reaching the hospital (if outpatient), what are the things she is likely to experience in the anaesthetic room, what time the operation is scheduled, what will be experienced in the recovery room and how the post-operative and post-discharge pain be managed. The patient should be

Table 2.3: American Society of Anesthesiologists (ASA) Physical Status (PS) Classification System.[23]

ASA PS classification	*Definition*
ASA PS 1	Normal healthy patient
ASA PS 2	Patients with mild controlled systemic disease, which does not affect normal activity
ASA PS 3	Patients with severe systemic disease, which limits activity
ASA PS 4	Patients with severe systemic disease that is a constant threat to life
ASA PS 5	Moribund patients who are not expected to survive with or without the operation
ASA PS 6	A declared brain-dead patient whose organs are being removed for donor purposes

explained about the epidural or patient-controlled analgesia (PCA), intravenous lines, oxygen mask, urinary catheters, etc., if these things are likely to be used.

Types of Anaesthesia

There are a number of options available to women for pain relief during obstetric or gynaecologic surgery.[24] Various methods used for obtaining pain relief during labour are enumerated in **Table 2.4**. Pain medications given IV or IM help to decrease the amount of pain during childbirth or other obstetric procedures. The types of anaesthesia used most commonly for the obstetric and gynaecological surgeries include GA and regional anaesthesia (spinal, epidural or combined spinal and epidural).[25] Various types of anaesthetic agents and analgesia techniques used during labour have been described in details in Chapter 46 (Anaesthesia and Analgesia in Labour) and are summarised in **Table 2.4**. Local anaesthesia blocks (pudendal nerve block and paracervical blocks) are also commonly used for minor surgeries. Types of nerve blocks used in various obstetric and gynaecological procedures are illustrated in **Figure 2.1**.

Regional anaesthesia has currently become the most effective means of providing analgesia during labour.[26] In some instances, use of GA may be indicated.

Table 2.4: Methods for labour analgesia.

Non-pharmacological therapy	*Pharmacological therapy*	
	Systemic	*Regional*
• Transcutaneous electrical nerve stimulation (TENS) • Relaxation/ breathing techniques • Biofeedback and physical therapies • Hypnosis • Massage • Acupuncture • Hydrotherapy (use of hot or cold packs) • Use of birthing ball • (Swiss ball/Bobath ball) • Music therapy	• *Inhalational anaesthetic agents* • Nitrous oxide • Enflurane • Isoflurane • Desflurane • Sevoflurane • Systemic analgesics • Opioid analgesics – Pethidine – Morphine – Fentanyl – Sufentanil – Alfentanil – Remifentanil • Tranquilisers/ sedatives – Barbiturates – Phenothiazines – Benzodiaz-epines • Dissociative/ amnesic drugs – Ketamine – Scopolamine	• Lumbar epidural • Combined spinal epidural analgesia (CSEA) • Continuous spinal analgesia (CSA) • Alternative regional technique – Lumbar sympathetic block – Pudendal block – Paracervical block

General Anaesthesia

General anaesthesia can be more rapidly administered in the case of an emergency (e.g., severe foetal distress and cord prolapse). If the mother has a coagulation disorder or hypotension, GA would be the better alternative to use rather than regional anaesthesia. GA with endotracheal intubation and controlled ventilation helps in providing adequate relaxation of muscles and analgesia, thereby resulting in optimal operative outcomes. The advantage of using GA is that the patient's airways are secured and adequate oxygenation is ensured. The disadvantages include cardiovascular depression, reduced protective reflexes, prolonged psychomotor impairment, and nausea, vomiting and grogginess in the patient.[27] Patients given GA have a higher risk of hypoxia and pulmonary aspiration (in the event of a difficult/failed intubation), especially during an emergency caesarean section, when the patient is likely to be full stomach.

Due to the risk of aspiration when administered in 'full stomach', GA for caesarean section usually involves a crash induction. In these cases, an inducing agent along with a rapidly acting muscle relaxant is administered along with the application of cricoid pressure. Following this, the endotracheal tube is inserted and its cuff inflated. Anaesthesia is continued with oxygen, nitrous oxide and a low concentration of volatile agent such as isoflurane together with a longer acting muscle relaxant. Narcotics are not administered until after the delivery of the baby because of their potential for causing foetal distress. Various medications

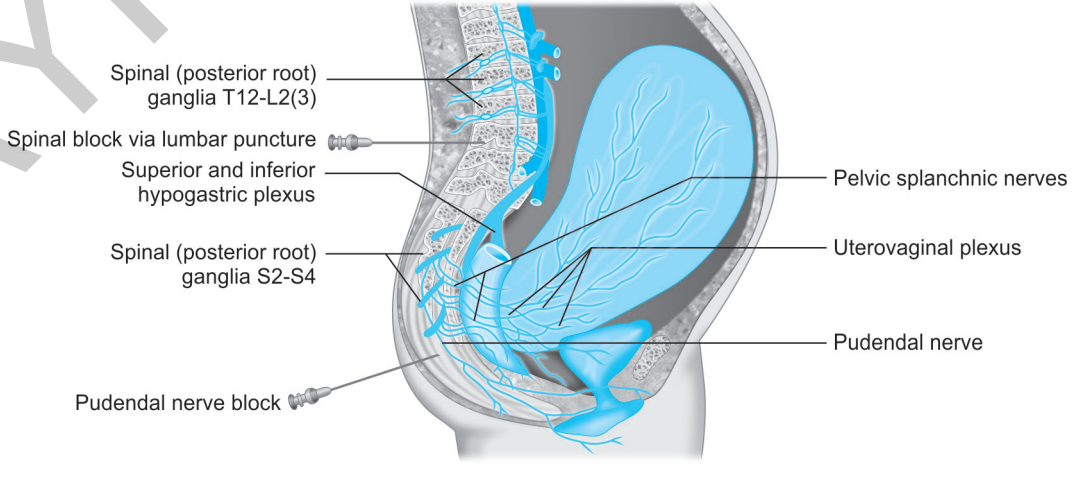


Fig. 2.1: Various types of nerve blocks.

given to the patient while administering GA include the following:

- *Pre-anaesthetic medications*: The drugs used for pre-anaesthetic medication commonly include an anxiolytic (to allay anxiety the night before surgery), antiemetic (to reduce nausea and vomiting), H2 blockers (to reduce the pH and volume of gastric secretions) and glycopyrrolate/atropine to reduce the amount of gastric secretions. Analgesic drugs, such as non-steroidal anti-inflammatory drugs (NSAIDs) and opioids, can also be used.
- *Inducing agent*: The most commonly used intravenous inducing agent for GA is thiopentone sodium. Lately, propofol has also gained popularity as an inducing agent. It is associated with reduced grogginess and has an inherent antiemetic property, which results in a reduced amount of nausea and vomiting. Ketamine is another agent, which can be used, but must be avoided in those with hypertension and cardiovascular disease.[28]
- *Muscle relaxants*: Succinylcholine is used as a muscle relaxant during endotracheal intubation. The main drawbacks associated with its use include myalgia and muscle fasciculations, which can cause a rise in serum potassium levels. The main advantage with its use is a quick onset of intubating conditions. The non-depolarising group of muscle relaxants such as pancuronium, vecuronium and atracurium can also be used for intubating the patients. They are free from the drawbacks of succinylcholine and also help in providing relaxation during the entire course of surgery.

Local Anaesthesia

Some common minor obstetrical and gynaecological procedures can be performed under local anaesthesia.[29] Local anaesthesia can be administered in the form of either a pudendal or a paracervical block. The two main complications associated with the use of local anaesthetics are systemic toxicity and delayed haemorrhage (especially if combined with adrenaline). The patient must be observed for at least 2 hours prior to discharge.

- *Pudendal block*: The pudendal nerve, which is derived from the 2nd, 3rd and 4th sacral nerves, is blocked with the local anaesthetic administered using a special needle introduced via a needle guide **(Fig. 2.2)**. Though the anaesthesia may prove excellent for minor surgical procedures, the failure rate of the procedure is high, approaching almost 50%.
- *Paracervical block*: Nowadays, paracervical block anaesthesia is being more often used in the practice of obstetrics and gynaecology. It has been accepted as a simple, safe and effective method for anaesthetic administration. This block helps in preventing transmission through the paracervical plexus bilaterally **(Fig. 2.3)**.[30] Though this block helps in providing complete relief against the pain of the first stage of labour, additional anaesthesia is required at the time of delivery. This is an ideal method of anaesthetic administration for dilatation and curettage. Paracervical block can also be used in other minor procedures such as cervical repair, conisation and Shirodkar or Wurm operations. However, the main disadvantage associated with its use is the high incidence of foetal bradycardia along with the several reports of foetal deaths. With the gaining popularity of epidural and spinal anaesthesia, the use of paracervical blocks has greatly declined.

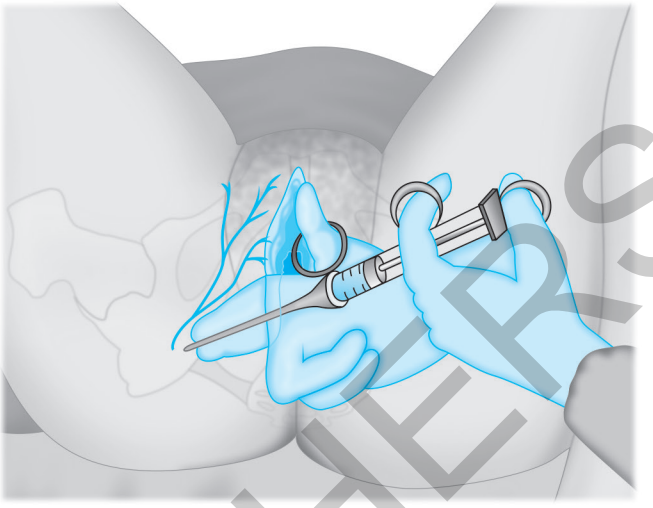


Fig. 2.2: Pudendal nerve block.

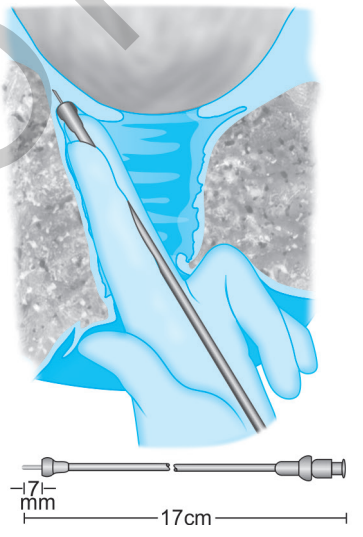
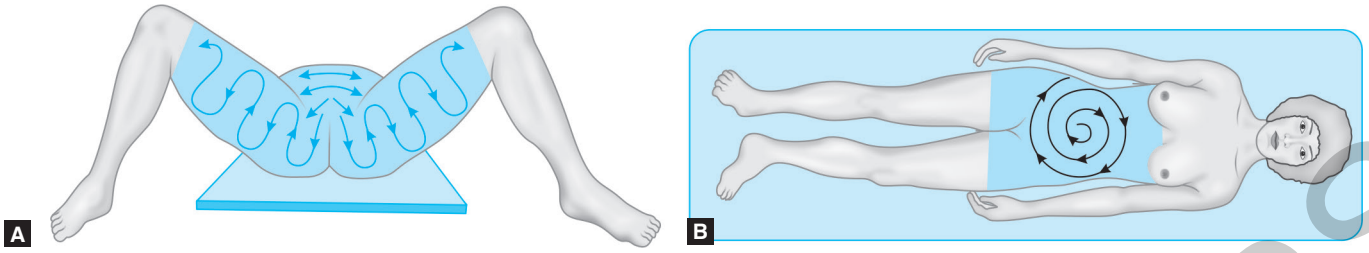


Fig. 2.3: Paracervical nerve block.

Conscious Sedation

The aim of conscious sedation is to produce a level of sedation at which the patient is calm and relaxed. She is not able to experience pain because she has also been administered an anaesthetic. The patient does not become unconscious, and verbal communication is possible. The patient must be monitored using a pulse oximeter while undergoing surgery under the effect of conscious sedation. The patient should be preferably observed for 2 hours prior to discharge.



Figs. 2.4A and B: Extent of abdominal and perineal site pre-operative preparation with antiseptic solution: (A) Perineum; (B) Abdomen.

Preparation Just Prior to Surgery

Before undertaking any gynaecological surgery, the surgeon must be well versed with the abdominal and pelvic anatomy. In case of distorted anatomy, all attempts must be made to restore the normal anatomy as far as possible. The pre-operative preparation just prior to the surgery comprises the following steps:

1. The bladder is catheterised.
2. The patient is anaesthetised.
3. A careful bimanual examination is performed under anaesthesia so that the surgeon can obtain valuable information, which may otherwise not be possible.
4. The vulva, vagina and perineum must then be cleaned and scrubbed with a sterile sponge soaked in non-alcohol-based antiseptic solution. The abdominal area to be surgically prepared extends superiorly from the inferior limit of the rib cage and inferiorly up to the mid thighs **(Figs 2.4A and B)**. The lateral margins of the skin preparation extend to the anterior iliac crest, inferiorly, and the anterior axillary line, superiorly. The umbilicus is prepared first using a sterile cotton-tipped applicator dipped in antiseptic solution. This should be discarded after use. A separate applicator should be used for applying antiseptic solution over the rest of the abdomen.
5. The most commonly used antiseptic solutions include povidone iodine or chlorhexidine solution. The antiseptic solution (alcohol-based or aqueous) should be applied using a painting technique from the proposed site of incision to the periphery using light pressure. It should not be blotted or wiped out but allowed to air-dry completely.

INTRAOPERATIVE CARE PRINCIPLES

Some of the important things, which must be kept in the mind at the time of surgery, include the following:

- Surgery must be done along the lines of tissue planes.
- Tissues must be handled gently.
- Adequate access to the operation field and good source of light are important prerequisites before undertaking any surgery. A senior surgeon may be called for a difficult surgery in order to obtain adequate access at the time of surgery.
- Use of appropriate retractors and bowel packing helps in obtaining adequate access.
- Maintenance of asepsis is an important principle, which must be kept in mind at the time of surgery.

Principles of Asepsis

Asepsis may be defined as prevention of the exposure of the incision site with microorganisms, thereby preventing the risk of development of infection. Three important principles, which are required for achieving asepsis, are reduction of time, trauma and trash.[26]

Time

The time duration during which the surgical procedure is performed is an important factor. The longer the procedure, the greater would be the possibility of infection and contamination.

Trauma

Trauma to the tissues as a result of rough handling, drying and desiccation of tissues upon exposure to room temperature, creation of excessive dead space, use of implants or foreign bodies or non-optimal temperature is likely to contribute to infection.

Trash

Trash refers to the contamination of tissues by bacteria or foreign bodies. Handwashing for 3–5 minutes prior to any surgical procedure is important for the maintenance of asepsis. Precautions to be taken at the time of surgery to minimise the tissue harm are as follows:[31]

Gentle handling of the tissues: Prolonged surgical time results in drying of the tissues and compromises blood flow through them. Tissues damaged by crushing, drying, excessive use of sutures or other surgical implants serve as a nidus of infection.

Surgeon must carry out meticulous dissection: Proper haemostasis must be obtained. If electrocautery is being used, it must be switched off immediately, when not in use. Use of toothed or crushing instruments must be avoided as far as possible.

Appropriate suturing techniques: The surgeon must make use of appropriate suturing techniques. Sutures must be placed as close to the tissue edge as possible. In order to prevent the obstruction of blood flow, the sutures must be placed no more than 1 cm from the edge. Sutures should be tightened enough to oppose the tissue edges. If the sutures are tighter, they are likely to further obstruct the blood supply, resulting in dehiscence. All the dead space between the tissues must be removed at the time of closure.

Among the various steps taken to maintain asepsis, use of pre-operative shaving has not been observed to alter the rate of wound infection.

Use of a single dose of antibiotics pre-operatively helps in preventing wound infection or septicaemia. Prolonged course of antibiotics or unnecessary use of antibiotics must be avoided to prevent the development of antibiotic resistance and an increased risk of infection with *Clostridium difficile*. According to the recommendations by NICE (2016), antimicrobial prophylaxis against infective endocarditis (IE) is not recommended in patients undergoing urological, gynaecological and obstetric procedures where infection is not already present.[32] If infection is present, patients at high risk of IE should receive antibiotics against the organisms responsible for causing IE. Patients at an increased risk of IE include the patients with acquired valvular heart disease, those who have undergone valve replacement in the past, those with structural congenital heart disease, patients with hypertrophic cardiomyopathy and those with a previous history of IE.

SURGICAL EQUIPMENT

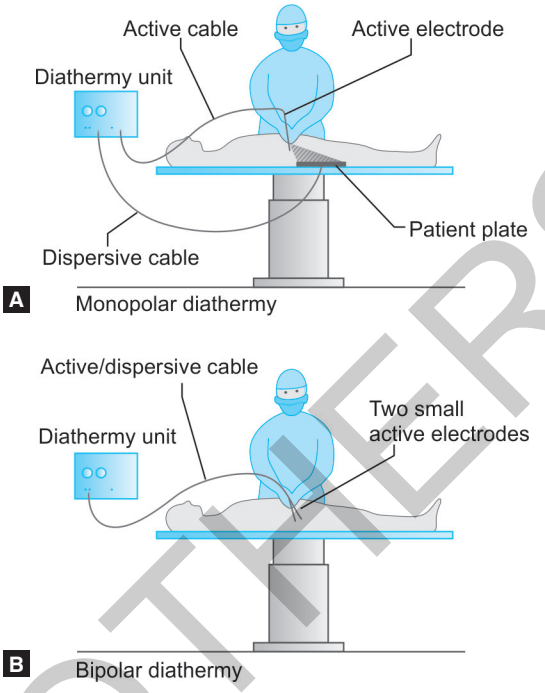
Diathermy

Diathermy/electrosurgery implies the use of electricity to generate heat in the tissues. It is used at the time of surgery to vaporise the tissues for cutting purposes or for coagulating the tissues to achieve haemostasis or for destroying the tissues. Diathermy (or Bovie) is a device used to pass an electric current through tissues, which causes coagulation, cutting and tissue destruction by heating effect. It uses alternating current with a frequency of 500 kHz to 10 MHz. This frequency is much higher than that of mains electricity, which in the UK is a low-frequency AC current of approximately 50 Hz. Low-frequency currents cause depolarisation and neuromuscular stimulation. On the other hand, the high-frequency current is too fast to stimulate nerve fibres. Therefore, it does not cause depolarisation. This prevents spasm or paralysis of muscles. However, the high-frequency current does cause excitation of ions, resulting in heat production.

Cutting with the help of diathermy is achieved using constantly flowing current having low voltage, but high frequency. On the other hand, coagulation is achieved using intermittently flowing current having both high voltage and frequency. Cutting current is associated with a lower risk of inadvertent current discharge as a result of lower voltage. Cutting current is therefore safer than the coagulation current.

Two types of diathermy are commonly used in gynaecological surgery: bipolar and unipolar **(Figs. 2.5A and B)**. The current density is higher in bipolar (e.g., bipolar diathermy forceps) in comparison to unipolar or monopolar diathermy.

1. *Bipolar diathermy*: Bipolar diathermy is a very safe form of diathermy. It is usually employed at the time of using forceps. The current only flows between the tips of the forceps, from the active electrode to the neutral electrode. So, there is less risk of stray currents damaging tissues other than those, which are being aimed at. Diathermy employs use of continuous current at low voltage: 500–1,000 volts. The water in the cells is turned to steam, so the cells vaporise giving a cutting effect. The best effect will occur when the current flows through the smallest tissue volume. This can be produced by using a clean needlepoint. The low voltage (500–1,000 volts) current flows continuously. Since the effect is relatively superficial and the tissues are vaporised, not coagulated, there is no great haemostasis. This is used in laparoscopic surgery for dividing adhesions, myomectomy, etc. The total tissue damage is less, so smoke production is less.
2. *Unipolar diathermy:* This is the type of diathermy that is most often used in surgery, including open, minimally invasive, colposcopic and hysteroscopic. In these cases, electrons are driven via a circuit, from the surgeon's handheld 'active electrode' (connected to the diathermy machine) through the patient and leave the patient via the return electrode attached to the patient. Once the device is applied to the patient, the current will flow from the point of contact and spreads out as it passes through the patient, heading for the 'return' pad, which is usually attached to the patient's thigh. From there, it runs back to the diathermy machine, thus completing the circuit. Tissues will be heated according to the amount of electric current running through them. The greatest current per cubic centimetre of tissue will be at the point of contact of the active electrode. The tissue in this area will usually be coagulated or vaporised. Away from the immediate point of contact of the active electrode, the current spreads out. So, the amount of current passing through any cubic centimetre will be small and the temperature rise will be insufficient to cause tissue damage.



Figs. 2.5A and B: Diathermy: (A) Monopolar diathermy; (B) Bipolar diathermy.

Precautions

Precautions to be taken while using diathermy include the following:

- The colon contains hydrogen and methane. Therefore, use of diathermy on the colon may be associated with an explosive risk.
- Only the surgeon wielding the active electrode should activate the machine. The dial setting should be checked by the surgeon operating before the operation starts.
- Placing the active electrode in an insulating quiver prevents inadvertent burns.
- If diathermy performance is poor, the plate and lead should be checked and replaced if necessary.

Complications of Diathermy

- *Risks of the surgical procedures per se*: Laparoscopy, hysteroscopy and open surgery have their own risks, to which are added the risks of diathermy. The same problems with the use of diathermy can occur during laparoscopic and hysteroscopic surgery as with open surgery. The risks are greater with the latter. The medium used to distend the abdomen at laparoscopy must be non-combustible. At hysteroscopy, the medium used should be non-conductive if diathermy is to be used, so the electric current is not dissipated. Normal saline is conductive. Therefore, it is best avoided.
- *Operator error*: The main problem associated with the use of diathermy is operator error. This could either involve treating the wrong tissue or allowing super-heated tissue after treatment to come into contact with other tissue, such as bowel, which may inflict thermal damage to the surrounding tissues. Precautions such as proper training/servicing and checking equipment can help prevent these errors. The following precautions may be required:
  - All staff requires proper training.
  - The equipment used must be modern and up to date (e.g., employing diathermy systems based on solid-state isolated generators greatly help in preventing thermal injury).
  - The equipment must be regularly serviced and thoroughly checked before each use.
- *Thermal injury*: With bipolar diathermy, the risks of thermal injury are minimal. The current only flows between the tips of the instrument, so heat is generated only at the tips. There is no risk of stray currents. There is a small risk of damage from heated tissue coming into contact with other tissues. Unipolar diathermy, on the other hand, is associated with considerable risk of inadvertent damage. Direct coupling is one of the major complications associated with unipolar diathermy and refers to the tissue damage caused by the electrode touching another nearby conducting instrument. This may be sometimes secondary to the insulation failure, which can occur due to damaged equipment or the use of excessive voltage with coagulation current. In order to minimise the occurrence of side effects, strict adherence to the safety protocols must be followed. The whole of the probe is not in the field of view, so faulty insulation out of the field of view might cause unseen damage. Therefore, most damage is not seen or appreciated at the time. There is a requirement for careful assessment if recovery from surgery does not occur as per the norm. Other causes of diathermy burns include careless technique, use of spirit-based skin antiseptic lotions, not checking the dial setting before use or someone other than the surgeon activating the current flow. Also, the thigh pad has to be applied over an area large enough to prevent burns.
- *Capacitance coupling*: Capacitance coupling is an important cause of thermal burns due to diathermy. A capacitor can be formed by two conductors separated by an insulator; for example, an insulated laparoscopic instrument passing through a metallic port forms a capacitor. The current stored in the capacitor can discharge to the tissues, resulting in thermal burns. The greater the amount of current passing through the instrument, the higher would be the capacitance current. Use of plastic laparoscopic ports also does not completely remove this risk because the patient's bowel or omentum may sometimes act as the second conductor. Capacitance coupling can be avoided by using active electrode monitoring systems.

Laparoscopy

This minimally invasive procedure has become a preferred method of choice for diagnosis and treatment of several gynaecological surgical conditions. Laparoscopic surgery is likely to be associated with several advantages over laparotomy such as reduced duration of hospital stay and earlier discharge from the hospital, reduced post-operative pain and reduced blood loss. Furthermore, the advent of robotic laparoscopic surgery appears to be changing the approach to many gynaecological surgery cases. The robotic system allows surgeons to perform procedures that previously would have been performed via laparotomy using modified laparoscopic procedures. However, presently there is no robust evidence in form of randomised trials supporting these previously mentioned advantages of laparotomy. Various complications likely to occur with laparoscopy include gas embolism, abdominal wall vessel injury, retroperitoneal vessel injury, intestinal injury, urologic injuries, incisional hernia, nerve injuries, anaesthetic complications, etc. The steps to be taken to reduce the complications related to laparoscopic surgery are as follows:[33]

- The patient should be lying flat at the time of surgery.
- The bladder must be empty.
- The abdomen must be palpated to rule out the presence of any abdominal mass.
- The primary incision should be either subumbilical or at the base of the umbilicus.
- Two distinct pops must be felt at the time of insertion of the Veress needle, if it enters the peritoneal cavity. The entry of the needle into the peritoneal cavity and its proper

Box 2.2: Complications due to hysteroscopy.

Instrument-related complications
- ❑ Cervical trauma
- ❑ Uterine perforation
- ❑ Bleeding
- ❑ Infection

Complications related to the use of distension media
- ❑ CO_2: Hypercarbia resulting in arrhythmias and shoulder pain
- ❑ *Glycine (1.5%)*: Dilutional hyponatraemia and pulmonary oedema
- ❑ *Dextran*: Anaphylactic shock, ascites
- ❑ *Dextrose (5%)*: Dilutional hyponatraemia and pulmonary oedema
- ❑ *Sorbitol*: Cerebral oedema

placement can be ascertained with the help of the signs described next.

- *Sound of air*: As the needle enters the peritoneal cavity, there would be a hissing sound of air being sucked inside.
- *Palmer's test*: A 20-mL syringe is half-filled with saline and is attached to the hub of Veress needle. The plunger is first drawn back. Aspiration of blood or bowel contents implies that the needle is in a major splanchnic structure such as bowel or blood vessel. If no blood or bowel contents are aspirated back, 10 mL of saline contained inside the syringe can be flushed back inside the peritoneal cavity. This can occur easily without resistance if the needle is positioned properly inside the peritoneal cavity. As the saline enters the peritoneal cavity, it cannot be aspirated back. The last phase of this test comprises withdrawing the plunger again. When the needle is positioned properly, no fluid would be sucked back into the syringe. However, if the needle tip is lying within the adhesions or in the abdominal wall, the saline is likely to have collected in the form of a pool and can be drawn back.
- *Hanging drop test*: This test is done by placing a drop of saline at the open end of the Veress needle. The abdominal wall is then elevated, while observing if the saline drop disappears into the shaft or not. The drop of saline instilled into the needle will be sucked in if the needle is inside the peritoneal cavity. However, if the needle is extraperitoneal, the saline drop would remain there.

Hysteroscopy

Hysteroscopy-guided surgery has now become an important tool for the gynaecological surgeon. A hysteroscope can be used for both diagnostic and therapeutic purposes. It is a form of minimally invasive surgery that helps in avoiding giving a scar on the patient's abdomen and sometimes also helps in preventing hysterectomy. With the help of a hysteroscope, the surgeon gains entry into the endometrial cavity via the cervix. Since the procedure does not require opening up of the patient's abdomen or peritoneal cavity, it is associated with minimal post-operative morbidity and mortality in comparison to that associated with laparotomy. The surgeon should be well versed in the technique of hysteroscopy before performing the procedure to reduce the rate of potential complications associated with it. Complications due to hysteroscopy are tabulated in **Box 2.2**.

POST-OPERATIVE CARE

Post-operative care begins immediately after the surgery when the patient is shifted from the operation theatre into the recovery room. Post-operative care continues throughout the recovery period, even after the patient is discharged home. Critical concerns during the post-operative period include airway clearance, pain control, mental status examination and wound healing. Other important concerns in this period include prevention of various surgery-related complications such as BP variability (hypotension or hypertension), urinary retention, constipation and DVT.[34] Various post-operative considerations are dependent on the presence of the underlying medical conditions. For example, in patients with diabetes, blood glucose levels need to be monitored every 1–4 hourly until patients become conscious and responsive. The patients in whom the surgery is performed under GA must be extubated before leaving the operating room. Patients should not be shifted from the operation theatre to the recovery room until they can clear and protect their airways.[35] The intubated patients with normal lungs and trachea may have a mild cough for 24 hours after extubation. In patients with a previous history of bronchitis or smoking, post-extubation coughing is likely to last longer. Hypoxic dyspnoea is treated with oxygen. Non-hypoxic dyspnoea may be treated with anxiolytics or analgesics. Controlling the pain is an important aspect of post-operative management. Opioids are typically the first-line choice and can be given orally or parenterally. The patients may be briefly confused when they come out of anaesthesia. The first 72 hours after the surgery is the most critical period for the patient. During this period, precise monitoring of the patient's cardiovascular, renal and respiratory systems provides valuable information regarding the patient's post-operative status.

No standard post-operative orders can be followed for each patient. They need to be customised according to the individual patient's needs and requirements. It is important that each patient be evaluated before being transferred to the recovery room. The frequency of checking a patient's vitals must be based on the severity of the patient's condition. All patients must be evaluated on the evening of surgery and appropriate documentation recorded in their chart. This should include thorough evaluation of the vital signs, catheter drainage (nasogastric, peritoneal and Foley's), evaluation of the pulmonary status and performance of an abdominal examination. Post-operative care can be divided into three phases, discussed in the following text:

Immediate Post-operative Care (Theatre Recovery)

This involves the period immediately following surgery when the patient is still in the operation theatre. The parameters such as airway, breathing and circulation (ABC) must be monitored soon after the surgery. All the healthcare professionals involved in the patient care at this stage must

An Evidence-Based Clinical Textbook in Obstetrics & Gynaecology *for* MRCOG-2

The book, *An Evidence-based Clinical Textbook in Obstetrics in Obstetrics and Gynaecology for MRCOG-2*, is an effort not only to help all aspirants, specialists and practitioners who are planning to appear for MRCOG-2 examination, but also for those healthcare professionals who are interested in learning more about evidence-based women's health care.

The second edition has been updated as per the latest evidence-based guidelines as recommended by the National Institute for Clinical Excellence (NICE), Royal College of Obstetricians and Gynaecologists (RCOG), Green Top Guidelines, etc. in the field of obstetrics and gynaecology. The book also covers the updated figures for maternal and perinatal mortality as described by MBRRACE UK (2019).

The previous categorisation of the book into three parts: general, obstetrics and gynaecology as well the pattern of previous sections have been retained in the new edition. Nevertheless, there has been an addition of several new chapters such as thromboembolism in pregnancy, genetic disorders, postpartum collapse, etc. COVID-19 and its management during pregnancy has also been discussed at length in this new edition.

Addition of online content is another new value-adding feature of this book. The book buyers would get access to nearly 250 questions (in form of EMQs and SBAs), which have been added in an interactive format on an online portal. Besides a detailed explanation, which is provided with each question, an around 9 hours-long video discussing these questions and other tips and tricks for clearing the part 2 examination has also been added. The references of the each chapter can also be accessed online by scanning a QR code. In case the reader wants to obtain more information related to a specific online reference, it can be clicked to access the actual journal article. This would also enable the reader to access the Green Top Guidelines available online and read them in their entirety.

The text in each chapter has been organised in form of a predefined template, including headings such as introduction, aetiology/indications, diagnosis, differential diagnosis, management, complications and evidence-based medicine. A new heading, titled 'key features' has been added to all the chapters in the new edition. This heading would help the reader in summarising the chapter. Important topics in each chapter have been delineated with help of a specific symbol so that the reader lays special emphasis on these topics. This style facilitates innovative learning and offers all the required information, which a specialist registrar or a senior house officer requires during his/her training, or for all overseas applicants preparing for MRCOG-2, as well as MRCOG-1 and MRCOG-3. In a nutshell, this book would serve as an invaluable companion not only for doctors aiming for higher training in Obstetrics and Gynaecology, it would also serve as a valuable source of reference for those who are in established practice.

Richa Saxena has been mentoring and directing 'cracking MRCOG', an online e-learning platform for all MRCOG aspirants (inclusive of all the three parts of the exam) since past 5 years. She has also authored bestselling books for all the three parts of the exam.

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She has a profound passion for writing. Other than authoring books for three parts of the MRCOG examination, she has authored several medical books related to Obstetrics and Gynaecology both for undergraduates and post-graduates. She is a co-author of "Jeffcoate's Principles of Gynaecology (9th edition)", considered as the Bible of gynaecology for the post-graduates. Besides academic writing, she also has a passion for creative writing and has authored a few biographies as well as a fictional novel. More details about the author and her works can be found at her website, www.drrichasaxena.com.

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