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Volume 5, Issue 5: Gynaecology

Contents

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Foundation Years Journal

Foundation Years Journal is an international peer-viewed journal which seeks to be the pre-eminent journal in the field of patient safety and clinical practice for Foundation Years' doctors and educators. The Journal welcomes papers on any aspect of health care and medical education which will be of benefit to doctors in the Foundation training grade in the UK or international equivalents.

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Volume 5, Issue 5: Gynaecology

Foundation Years Journal is the ONLY journal for Foundation Years doctors and educators, specifically written according to the MMC curriculum. It focuses on one or two medical specialties per month, each issue delivers practical and informative articles tailored to the needs of junior doctors. The Journal closely follows the Foundation Years syllabus to provide the best educational value for junior doctors. In addition to good clinical and acute care articles, assessment questions give junior doctors the chance to gauge their learning.The answers will be published in the next issue, but 123Doc will advance answers to clinical tutor subscribers so they can engage their students in the learning process. Each issue provides comprehensive clinical cases for trainees as well as practical teaching assessments for educators. Readers will benefit from:

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Editorial for Gynaecology Issue of Foundation Years Journal 2011

Many persons like to hold a book or journal in the hand. The ability to browse by turning pages, for those to annotate who are prepared to deface paper copies to read without needing to find electronic apparatus to enable viewing (whether by computer, by Kindle device or otherwise), all are powerful stimuli to keep to conventional hard copy, paper publications. The feel of a book, the smell of the paper (maybe the binding), the colourful printing and the variations in font and style all contribute to this sensual experience. However, paper copies become dated and cannot easily be amended except in loose-leaf form where they lose much of their aesthetic appeal. They are more expensive to produce at the point of the user. They decay with use, whether aided by fingers, thumbs or by mice, and they are bulky for publishers and readers to transportance, this trend towards electronic publishing. Electronic journals have many advantages and can be accessed from computers worldwide. This journal offers all of these advantages and on this occasion brings to readers aspects of important neurological topics relevant to Foundation Years practitioners.

The neurosciences, of which everyday clinical neurology forms a part have made miraculous progress over the last couple of decades. The interactions between laboratory and clinical research and with clinical medicine that deals with illness in patients at its most elementary level, have contrib-

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uted to these advances. However, sometimes research and cutting edge thinking from the laboratory is difficult to apply to some of the immediate clinical problems exhibited by patients. Common sense (whatever that is) and thinking is needed with acute problems and so is rapid decision making. Some of the topics covered in this issue deal with acute medicine, and neurology is now very much part of this since nearly one-fifth of those admitted acutely has neurological problems, and others with less acute matters still get admitted to hospital. Papers published here express some of the most important points that Foundation Years doctors experience during their everyday duties, lessons they wish to share with others in order to help prevent mishaps.

Indeed, such practitioners are encouraged to submit to this journal. There is so much to be learned from our everyday activities and our patients are in many ways our best teachers, using their symptoms and signs to make us think. It is in many ways a moral imperative to share this information with others and to publish for the widest circulation. Specific lessons that may be drawn from the papers in this issue of the Foundation Years Journal include epilepsy and the causes of blackouts together with some useful tips on the use of the EEG in diagnosis, an important supportive test in some patients. Stroke is now an emergency in more ways than previously (since more can be done), a brain attack that needs handling acutely and which can result from venous sinus thrombosis, two more areas covered in this journal. The techniques of lumbar puncture are still important although much that was investigated previously by this technique now is revealed by the increasingly complicated imaging processes that have become available.

Acute neuromuscular weakness is a further presenting feature that has many causes and this condition may be quite puzzling in many patients. Increasingly complicated drugs and drug regimes may lead to toxicity, an important cause of disability that can easily be overlooked; baclofen is a useful drug for spasticity and intoxication is disabling. Trigeminal neuralgia can be treated in many ways; not all being effective and a paper on this topic should help guide those who deal with its early manifestations.

And what of that imperative to publish? Here we are guided in the values of clinic letters and of the role of the doctor as educator. All very important stuff, hopefully interesting, certainly enlightening, and without doubt we hope a stimulus for readers to provide further papers dealing with the many topics in neurology that may perplex all of us including those working in the Foundation Years.

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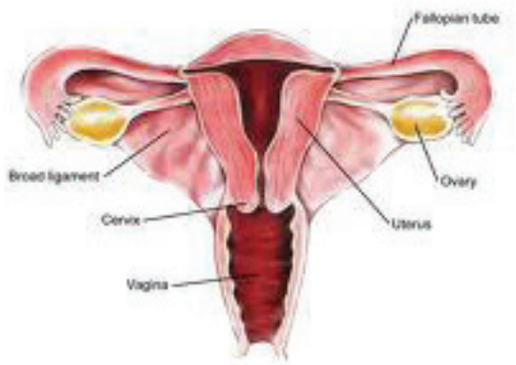
PALLIATIVE CARE IN GYNAECOLOGICAL MALIGNANCY

Dr. Shamsul Shah, Professor Khaled

Fig 1: Gynaecological tract.



Palliative Care in Gynaecological Malignancy
Good Clinical Care

Abstract

Gynaecological malignancies account for approximately 15% of all female cancers and have significant impact on physical and psychological wellbeing. (Fig 1) Palliative care is defined as 'the active total care of patients whose disease is not responsive to curative treatment' and encompasses the following principles:

1. Providing holistic care alongside all other active treatments, addressing physical, psychosocial and spiritual needs
2. Enabling patients to live as actively as possible and supporting families before and after death
3. Affirming life and regarding dying as a normal process, neither hastening nor prolonging death

Palliative care in gynaecological malignancies can pose particular challenges in managing distressing symptoms and the effects of the cancer and treatment on psychological and psychosexual functioning that requires a multi-disciplinary approach as illustrated by the following case.

Case Study

Denise is a teacher married to Danny who is currently unemployed with two children, Janie aged 4 years and Josh aged 7 years who live in a flat. She has parents who live in the Midlands and four siblings, two of which live abroad.

She was diagnosed with Stage III cervical carcinoma and completed chemo-radiotherapy 8 months ago. She presents with severe pain in her legs that has not responded to increase in her MST dose. She has bilateral leg swelling affecting her mobility, abdominal distension associated with colicky abdominal pain, nausea and vomiting, constipation and poor appetite. She is passing profuse brown malodorous vaginal discharge causing sore perineum. She feels fatigued and breathless on exertion. On examination, she is anxious, drowsy, pale and cachectic. Abdomen is distended with multiple palpable nodules and increased bowel sounds. Chest is clear, and there is pitting oedema to mid-trunk. Blood tests show estimated glomerular filtration rate of 74 ml per minute, haemoglobin 8.2 and albumin 26. Abdominal X-ray confirms multiple dilated lops of small bowel and CT scan confirms widespread disease, involving the peritoneum and pelvis with bilateral ureteric obstruction and colo-vaginal fistula. Denise is commenced on a syringe driver on the advice of the palliative care team of oxynorm, octreotide and haloperidol, transfused two units of blood and started on high-dose dexamethasone. When Denise and her husband are told of the scan results, Denise decides not to have any further treatment, wanting to go home to die and so care, equipment, anticipatory medication, referrals to the district nurse and community palliative care team are made and a preferred priorities of care document completed. Denise is discharged home and dies at home as she wished a few weeks later with her family present.

Table 1: Common Symptoms of Recurrent Pelvic Disease in Gynaecological Malignancy

• Pelvic and perineal pain due to nerve compression or bony metastases
• Leg oedema resulting from lymphatic or venous obstruction
• Bilateral ureteric obstruction causing renal failure
• Hypercoagulability and thrombocytosis with increased risk of venous thrombo-embolism
• Bowel obstruction from intrinsic or extrinsic pressure or motility disorder
• Malignant ascites associated with peritoneal carcinomatosis or liver metastases
• Discharge from local fungating tumour causing recurrent infections
• Entero-vaginal or vesico-vaginal fistulae due to disease or treatment
• Pelvic or vaginal bleeding secondary to tumour erosion into uterine or pelvic vessels
• Psychosexual problems related to surgery, chemotherapy, radiotherapy, reaction to diagnosis

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PALLIATIVE CARE IN GYNAECOLOGICAL MALIGNANCY

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Discussion

This case illustrates some of the common symptoms and psychosocial issues (Table 1) that patients, families and health care professionals face and the need for a holistic, multi-professional and collaborative approach in order to achieve the best possible outcomes as determined by the patient.

It also emphasises the importance of early involvement of the palliative care team where possible in the disease process to help support patients, carers and professionals on symptom management and facilitate important 'end of life', discussions (Fig 2).

With any symptom, the key to effective management is to:

1. Take a detailed history and examination
2. Determine the cause of the symptom
3. Treat any reversible causes where possible and when appropriate to do so, taking into account the patient's wishes, the stage of their disease, performance status and prognosis
4. Give medication via the most appropriate route, constantly assess its efficacy, and monitor and treat any side effects

Pelvic and Perineal Pain

Many patients with advanced gynaecological malignancy develop neuropathic pain due to direct invasion or pressure on the nerves. Most commonly lumbosacral plexopathies present as dull, aching, burning pain associated with sensory changes e.g. numbness in relevant dermatomes[1]. These pains can be difficult to control requiring adjuvant analgesics, e.g., gabapentin, pregabalin or amitriptyline in addition to strong opioids (Fig. 3).

Other treatment strategies include use of high-dose steroids, methadone, ketamine, anti-arrhythmics and spinal interventions that require specialist pain input. Although morphine remains the gold standard, there are some patients who develop intolerable opioid related side effects (nausea and vomiting, constipation, confusion, drowsiness, itch, hallucinations) when an alternative opioid can be given, e.g., oxycodone or fentanyl. In renal failure where morphine metabolites accumulate and cause opioid toxicity fentanyl or alfentanil is recommended[2].

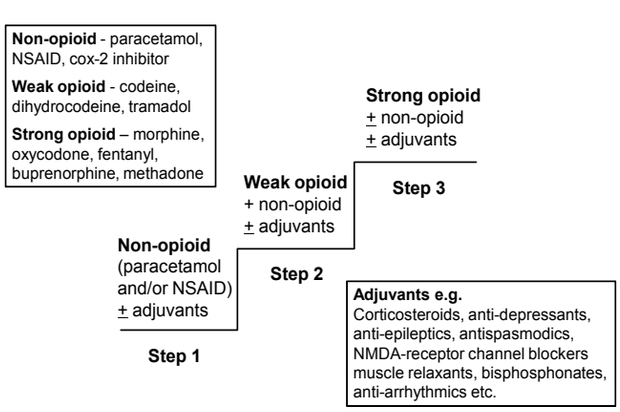
It is important to remember that since pain is multi-dimensional, it is paramount to address psychological, social and spiritual aspects including patient fears and expectations[1]. (Fig 4.) Non-pharmacological measures and cognitive behavioural approaches including TENS, heat, massage, distraction techniques, visualisation and relaxation can also be useful.

Bowel Obstruction

Bowel obstruction is a common complication of advanced gynaecological malignancy with an average length of survival of 13.4 to 45 days for inoperable disease[3,4]. Except for those with good performance status and a single site of obstruction on CT imaging where surgery or colonic stenting may be considered, in the majority of cases the aim of care is palliation. A combination of opioid, anti-emetic and anti-secretory subcutaneous medication administered via a syringe driver is the mainstay of symptom control (Table 2).

High-dose dexamethasone 6–16 mg may aid resolution of bowel obstruction and so consider as a therapeutic trial for five days to be stopped if there is no response[6]. A nasogatric tube is often poorly tolerated and should be avoided where possible. If drug therapy is not successful in reducing vomiting, a venting gastrostomy tube can be considered[5]. The inability to eat and drink can be a social and emotional loss and for this reason, patients are not kept 'nil by mouth' but encouraged to eat and drink as tolerated and symptoms allow[7]. There is no evidence that parenteral nutrition is beneficial in advanced cancer, and so like surgery, should only be considered in selected patients. Patients who are symptomatic of dehydration should be offered artificial hydration. In view of the poor prognosis associated with inoperable bowel obstruction, sensitive communication with the patient and family is vital to enable plans about future care to be made[5].

Fig 3: WHO Three Step Analgesic Ladder



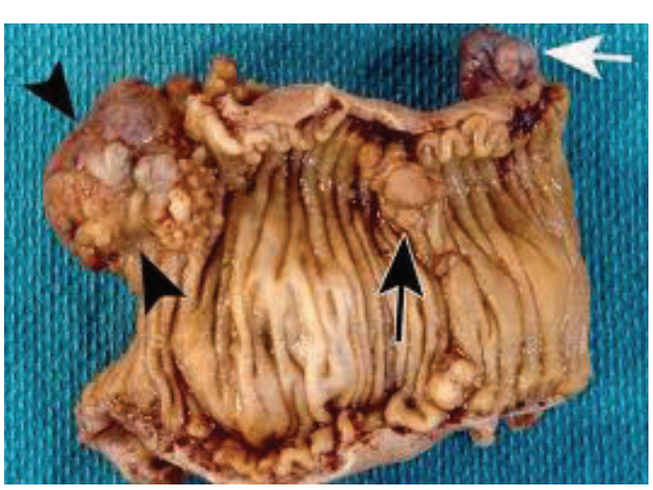


Table 2: Subcutaneous Medication in Bowel Obstruction

Drug	Mechanism of Action	Dose	Comments
Analgesic Strong opioid, e.g. diamorphine If not tolerated or renal failure, use alternative e.g. oxycodone or alfentanil (seek specialist advice)	Acts on mu opioid receptor	**If opioid naïve:** Diamorphine 10 mg/24 h continuous subcutaneous infusion (csci) and titrate upwards no greater than in 33%–50% dose increments according to response and side effects **If on regular oral opioid:** Convert to corresponding dose of subcutaneous opioid using local opioid conversion chart Prescribe subcutaneous prn opioid as one sixth of 24 h dose	Be aware of side effects including drowsiness, confusion, hallucinations, nausea and vomiting, constipation and itch
Anti-emetic Metoclopromide	Prokinetic D_2 + $5HT_4$ antagonist	30–60 mg/24 h csci Useful in partial obstruction. If patient develops abdominal colic, stop and use other anti-emetic below	Effect blocked by anti-muscarinic drugs, e.g. cyclizine
Haloperidol	D_2 antagonist. Acts on chemoreceptor trigger zone	2.5–5 mg/24 h csci	Combines with cyclizine. Useful in patients with hallucinations, hiccups. Can be sedating.
Cyclizine	Antihistaminic + anti-muscarinic. Acts on vomiting centre.	150 mg/24 h csci	Can cause irritation at injection site. Sedating. Incompatible with hyoscine butylbromide.
Levomepromazine	Broad spectrum anti-emetic: D_2, H_1, ACh, $5HT_2$ antagonist	6.25–25 mg/24 h csci	Second or third line after other anti-emetics failed. Sedating at higher doses
Anti-secretory Hyoscine butylbromide 'Buscopan'	Antimuscarinic with antispasmodic and antisecretory action	20 mg sc stat then 60–120 mg/24 h csci	Useful for bowel colic. Not sedating
Octreotide	Somatostatin analogue Reduces bowel secretions and increases fluid absorption	250–600 mcg/24 h csci	Useful in large volume vomiting and high output fistulae

Adapted from D. Oneschuk. Palliative Care Consultations in Gynaeoncology[5]

Renal Failure

Renal failure due to ureteric compression, like bowel obstruction, requires a multi-professional approach. Patients most likely to benefit from nephrostomy or ureteric stenting are those who have good quality of life and where further oncological treatments are available[8]. Median survival after urinary diversion is reported as 4 months and so for those patients who have progressive disease, or poor perceived quality of life, sensitive discussion should be had with the patient as treatment of their renal failure may not be their wish nor in their best interest[9].

Fistulae, Discharge and Bleeding

Cervical carcinoma is the most common gynaecological malignancy resulting in fistula formation and has significant impact on quality of life causing social isolation and embarassment. Urinary diversion or colostomy formation may be considered for patients fit for surgery. Otherwise the use of barrier creams, anti-motility agents e.g.

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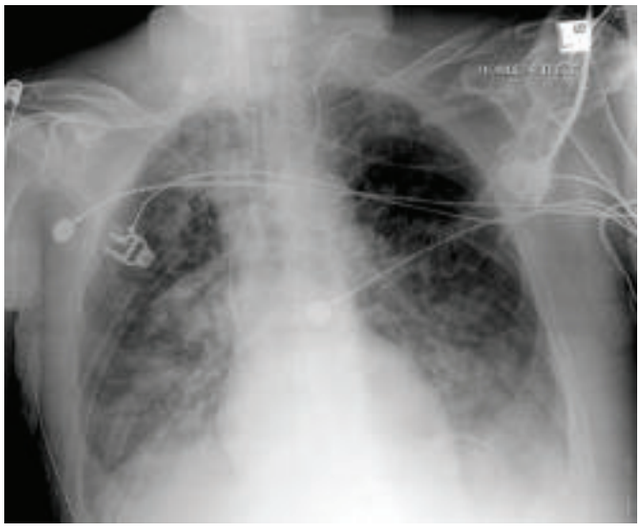

loperamide or codeine phosphate or anti-secretory agents, e.g. octreotide or buscopan for high output fistulae can help[10]. Fungating lesions require regular irrigation, dressing changes, and topical metronidazole gel 0.8% and charcoal impregnated dressings can help reduce odour[11]. Haemostatic dressings and oral tranexamic acid 1g up to four times daily help control vaginal bleeding as well as palliative radiotherapy for patients whose life expectancy is measured in months. For patients who have persistent bleeding, midazolam 5–10 mg should be prescribed to be administered in the event of massive haemorrhage[12,13].

Psychosocial and Psychosexual Issues

As suffering is multi-dimensional a holistic approach addressing psychological (e.g., fear, anger, guilt), social, financial and spiritual concerns are crucial. Gynaecological malignancies can also have a profound effect on sexual function, and therefore intimate relationships of women due to treatment which can be both physically (e.g., vaginal dryness, dyspareunia) and psychologically mutilating (reduced sexual arousal and attractiveness) as well as reactions to the cancer itself including mood disturbance, loss of roles, identity and body image[14]. It is important to provide the patient with opportunities to discuss their concerns, information and refer to specialist services, e.g. palliative care, psychosocial and chaplaincy services to support the patient and family, including children who are at risk of being excluded at this sensitive time[15].

End of Life Care

'Diagnosing dying' is an essential skill for all health care professionals and care of the dying is a duty for all doctors as stated by recent GMC guidance[16]. It requires a shift in thinking from investigation and treatment to symptom control and early recognition of signs. Death

Table 3: Anticipatory Medication in the Last Few Days of Life

Symptom	Medication and Dose
Pain	If opioid naïve, prescribe diamorphine 2.5–5 mg sc prn. If >3 doses given in 24h, commence syringe driver 10–20 mg/24 h csci. Titrate to response. If on regular opioid, convert to corresponding 24 h subcutaneous dose csci. Titrate to response. Prescribe subcutaneous prn opioid as one sixth of 24 h sc dose.
Nausea and vomiting	Cyclizine 50 mg sc prn. If >3 doses given in 24 h, add to syringe driver 150 mg/24 h csci. Levomepromazine 6.25 mg sc prn. If >3 doses given in 24 h, add to syringe driver 6.25–25 mg/24 h csci.
Restlessness and agitation	Midazolam 2.5 mg sc prn. If > 3 doses given in 24 h, add to syringe driver 5–10 mg/24 h csci. Titrate to response to maximum dose 60 mg/24 h csci. Levomepromazine 6.25–12.5 mg sc prn. If >3 doses given in 24h, add to syringe driver 25 mg/24 h. Titrate to response – seek advice.
Breathlessness	Opioid, e.g., diamorphine 2.5–5 mg sc prn. If >3 doses given in 24 h, add to syringe driver 10 mg/24 h csci. Titrate to response. Midazolam for associated anxiety 2.5 mg sc prn. If >3 doses given in 24 h, add to syringe driver 5–10 mg/24 h csci. Titrate to response as above.
Respiratory secretions	Hyoscine hydrobromide 200–400 mcg sc prn (crosses blood brain barrier) If >3 doses given in 24 h, add to syringe driver 1.2–2.4 mg/24 h csci. Glycopyrronium 200 mcg sc prn (does not cross blood–brain barrier) If >3 doses given in 24 h, add to syringe driver 1.2 mg/24 h csci.

sc = subcutaneous; prn = as required; csci = continuous subcutaneous infusion

is usually preceded by gradual deterioration in functional status accompanied by reduced intake of food and fluid. In addition the patient may become bed-bound, semi-comatose, no longer able to take oral medication and only able to take sips of fluid. In accordance with the Liverpool Care Pathway, a national document to ensure all aspects of a patient's care (physical, spiritual, psychological, cultural) are assessed, communicated and addressed effectively, diagnosing dying is a team decision and one that should be reviewed every 3 days[17].

In order to pre-empt and quickly treat symptoms in the last few days of life (pain, nausea and vomiting, agitation, breathlessness and respiratory secretions), it is good practice to prescribe parenteral medication, known as 'anticipatory prescribing', to be administered subcutaneously by the nurse as and when symptoms arise (Table 3). If effective, the medication can be added to a syringe driver to maintain good symptom control.

Open sensitive communication is paramount at this stage to inform the patient and family of what is happening and to address any concerns so that decisions can be made, including preferred place of care, reconnecting with family or friends, making will or funeral plans, care for children, finding spiritual support and so on. For patients who wish to die at home, early referral to the palliative care team, discharge team, district nurse and informing the GP are essential. It is a time when a real difference can be made to a patient's life in allowing them to achieve their wishes. Ongoing bereavement support after death is equally important and can be provided by hospice services.

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DIABETES IN PREGNANCY

Sudeep Singh Rai, S O Anifowoshe, Fadi Alfhaily, MA Khaled

Diabetes in Pregnancy
Good Clinical Care

Introduction

In England and Wales, around 2%–5% of women will be affected by diabetes during prgnancy[1]. Diabetes affects carbohydrate metabolism which necessitates immediate lifestyle modifications. In pregnancy, diabetes can play a huge impact on the wellbeing of both the foetus and the mother. The National Institute of Clinical Excellence (NICE) estimated that approximately 87.5% of pregnancies complicated by diabetes are as a result of gestational diabetes, with 7.5% attributed to type 1 diabetes and 5% to type 2 diabetes[1].

Learning Objective

This article follows an interactive case scenario in order to look at the significance of diabetes in terms of physiology, its management and the risks of complications to both the mother and the foetus.

Case Scenario Part 1-Discussion

1) The World Health Organisation (WHO) criteria to diagnose diabetes is either a raised fasting blood glucose level >7.8 mmol/L or a raised level of >11.1 mmol/L 2 hours after giving a 75 g bolus load of oral glucose[2].

Case Scenario Part 1 – Initial Presentation

You are an F2 doctor at a GP practice. A patient presents to your clinic 10 weeks into her pregnancy with a few questions. The patient has had a one previous pregnancy with a baby born at 40 weeks with a forceps delivery weighing 4.6 kg. The patient herself has a BMI of 33 but is otherwise well. She has a friend who had diabetes during her last pregnancy and is worried that she might be at risk. She would like to know how to test for it.

1. What is diabetes mellitus?
2. What causes gestational diabetes?
3. What are the risk factors for gestational diabetes?

This definition has been adopted by NICE who therefore recommend that the 2 hour 75g oral glucose tolerance test (OGTT) ought to be used to test for gestational diabetes.

2) Normal pregnancy is characterized by mild fasting hypoglycaemias, postprandial hyperglycaemia, hyperinsulinaemia and peripheral insulin resistance, which ensures an adequate supply of glucose for the baby.

During pregnancy, there are several important hormonal changes that affect carbohydarate metabolism. The insulin antagonistic hormones, human placental lactogen and cortisol are increased in pregnancy. This will lead to maternal insulin resistance, which in turn leads to a decrease in glucose tolerance. This is particularly prominent in the third trimester of pregnancy. In those with pre-existing insulin-dependent diabetes, it may be necessary to increase their insulin doses in order to maintain a glucose value within normal ranges[3].

Table 1: Prevalence of diabetes in pregnancy in England

	Prevalence	Number of pregnancies in England
Total singleton pregnancies		600,200
Type 1 diabetes	0.3%	1,800
Type 2 diabetes	0.2%	1,200
Gestational diabetes	3.5%	20,400
Total diabetes in pregnancy		23,400

*Adapted from NICE clinical guideline: Diabetes in pregnancy: Management of diabetes and its complications from pre-conception to the postnatal period. Quick reference guide; CG63.[1]

DIABETES IN PREGNANCY

Sudeep Singh Rai, S O Anifowoshe, Fadi Alfhaily, MA Khaled

Case Scenario Part 2 – Antenatal Care

The patient undergoes an oral glucose tolerance test, and her plasma glucose at 2 hours is 12.0 mmol/L. You explain the diagnosis of gestational diabetes. The patient would like to know the impact of this disorder to both her and the foetus. She enquires on how the condition will be managed throughout the pregnancy.

1. What are the foetal and neonatal complications associated with gestational diabetes?
2. What are the maternal complications associated with gestational diabetes?
3. How is diabetes in pregnancy managed: antenatally, intrapartum and postpartum?

Moreover, normally in a non-pregnant woman, the kidneys will begin to excrete glucose at an upper limit of approximately 11 mmol/L. However in pregnancy, there is a lowered renal threshold for glucose excretion and this in turn causes a degree of maternal glycosuria[4].

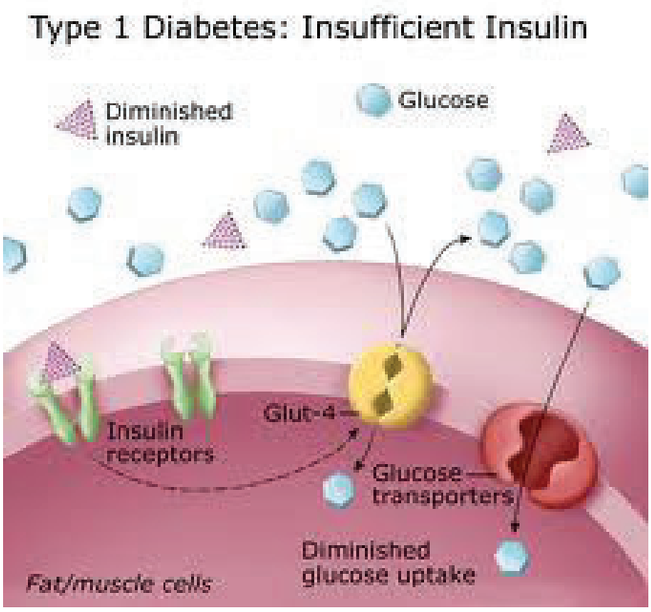
3) The National Institute of Clinical Excellence (NICE) in the UK has published guidelines on the need for screening for gestational diabetes if any of the following risk factors are present[1]:

- Body Mass Index (BMI) >30 kg/m^2
- Previous gestational diabetes
- Family history of diabetes (First-degree relative)
- Previous macrosomic baby weighing >4.5 kg
- Ethnic Origin from a country with an increased incidence of diabetes:
  - South Asian (In particular India, Pakistan or Bangladesh)
  - Black Caribbean
  - Middle East[1]

Case Scenario Part 2 – Antenatal Care: Discussion

1) In pregnancy, glucose will pass across the placenta by facilitated diffusion; therefore, the foetal plasma glucose level remains similar to that of the maternal levels. As a result, maternal hyperglycaemia will lead to foetal hyperglycaemia. However, maternal insulin is unable to cross the placental barrier and as a result the foetus has to produce its own insulin in order to regulate its plasma glucose levels causing foetal hyperinsulinaemia.

Foetal+ hyperinsulinaemia encourages foetal fat deposition and macrosomia (excessive growth). Polyhydramnios is also a feature associated with gestational diabetes. Macrosomia increases the risk of shoulder dystocia and birth trauma[4].



In diabetic pregnancies, there is an increased risk of congenital abnormalities, which are the leading causes of foetal mortality and morbidity. Malformations presently account for two-fifths of perinatal deaths. However, at present, the pathophysiology behind the mechanisms that causes these is currently unclear[3].

Preterm labour and delivery is more common in diabetic pregnancies. As a result, there may be a degree of foetal lung immaturity. Subsequently, the neonate is more prone to developing respiratory distress syndrome. Moreover, due

Table 2: Risk of diabetes in pregnancy*

Pre-Existing Diabetes	Gestational
Miscarriage	Neonatal hypoglycaemia
Congenital malformation	Perinatal death
Stillbirth	
Neonatal death	
Foetal macrosomia	
Birth trauma (to mother and baby)	
Induction of labour or caesarean section	
Transient neonatal morbidity	
Obesity and/or diabetes developing later in the baby's life	

*Adapted from NICE clinical guideline: Diabetes in pregnancy: Management of diabetes and its complications from pre-conception to the postnatal period. Quick reference guide; CG63[1].

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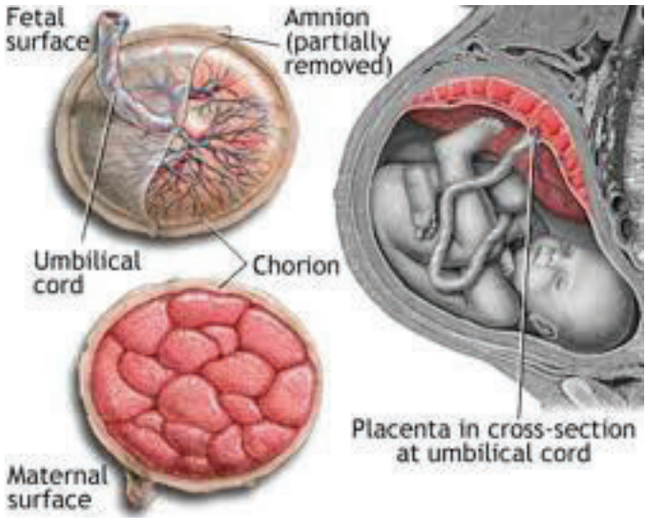
DIABETES IN PREGNANCY

Sudeep Singh Rai, S O Anifowoshe, Fadi Alfhaily, MA Khaled



to maternal hyperglycaemia there is a degree of hypertrophy of the Islets of Langerhans in the baby. Hence, neonatal hyperinsulinaemia which causes neonatal hypoglycaemia as the maternal glucose supply is removed at birth[5].

2) Diabetes in pregnancy (pre-existing/gestational) is associated with serious maternal problems. Poor glycaemic control can often causes hyperglycaemic episodes. This can sometimes lead to diabetic ketoacidosis or even diabetic coma. This can lead to both maternal and foetal death. A diabetic pregnant woman has a higher risk of developing pre-eclampsia, which is worse in those with poor blood sugar control[3, 5].

   Babies of diabetic mothers are at increased risk of neonatal hypocalcaemia, hypomagnesaemia, hyperbilirubinaemia and polycythaemia.

Management Recommendations

Antenatal care

Diabetic pregnancies (pre-existing/gestational) should be managed with a multidisciplinary team, including an obstetrician, diabetologist, diabetes midwife and nurse specialists and dietician. Women with diabetes should aim to keep fasting blood glucose between 3.5 and 5.9 mmol/L and 1-hour postprandial blood glucose below 7.8 mmol/L during pregnancy[1]. It is necessary to ensure that these patients are aware of the importance of maintaining good glycaemic control throughout the pregnancy in order to reduce the risk of miscarriages, foetal macrosomia, neonatal hypoglycaemia and trauma during delivery of the baby.

Given the risk of developing a diabetic nephropathy or retinopathy, it is important to regularly assess the patient's renal function and retinas respectively to observe any pathological changes.

The NICE guidelines on diabetes in pregnancy advise that all pregnant women with diabetes should have serial growth and amniotic fluid volume monitoring by ultrasound every 4 weeks between 28 and 36 weeks gestation[1].

For the specific routine antenatal care please see: NICE clinical guideline: Diabetes in pregnancy: Management of diabetes and its complications from pre-conception to the postnatal period. Quick reference guide; CG63: http://guidance.nice.org.uk/CG63/QuickRefGuide/pdf/English

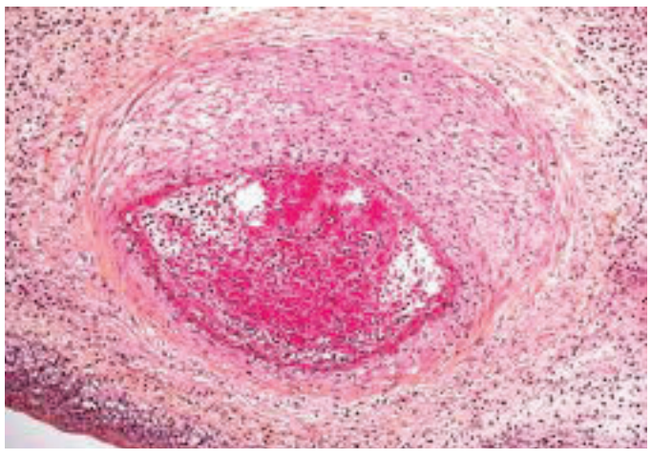
Intrapartum care

Women should be given full information on the risks and benefits of vaginal birth, induction of labour and caesarean section if the baby has macrosomia identified by ultrasound. The possibility of vaginal birth in women with diabetic retinopathy and the possibility of vaginal birth after previous caesarean section should be explained.

Antenatal steroids for foetal lung maturation in preterm labour should be considered or if early elective birth is planned by considering tocolytic medication (but not beta mimetic drugs) to suppress labour if indicated.

Full and close advice on monitoring glucose levels of women taking steroids for foetal lung maturation should be offered.

Induction of labour, or caesarean section if indicated, after 38 weeks if the baby has grown normally should be offered to pregnant women with diabetes.



DIABETES IN PREGNANCY

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During labour and birth, the aim is to monitor:

- Blood glucose hourly and aim to maintain it between 4 and 7 mmol/L
- Blood glucose every 30 minutes if a general anaesthetic is used

Intravenous dextrose and insulin may be considered in:

- women with type 1 diabetes
- women whose blood glucose is not maintained between 4 and 7 mmol/L.

For the specific intrapartum care, please see: NICE clinical guideline: Diabetes in pregnancy: Management of diabetes and its complications from pre-conception to the postnatal period. Quick reference guide; CG63: http://guidance.nice.org.uk/CG63/QuickRefGuide/pdf/English

Postnatal care

NICE currently recommends that all postnatal women with gestational diabetes should be provided with lifestyle educational advice that focuses on issues such as weight management, diet and exercise. Additionally, the guidelines at present advocate a fasting plasma glucose level to be performed at a 6-week postnatal check-up and annually after that[1]. At present, half of gestational diabetes will go on to develop diabetes mellitus over the next 10 years[4].

Women with diabetes who are breastfeeding should be advised to continue to avoid drugs for complications that were discontinued for safety reasons. Advice on the importance of contraception and pre-conception care when planning future pregnancies should be discussed.

Women with insulin-treated pre-existing diabetes should be advised on:

- Reducing insulin immediately after birth and self-monitor blood glucose to establish correct dose
- Risks of hypoglycaemia, especially while breastfeeding
- Having food available before or during breastfeeding.

Whereas women with type 2 diabetes should be advised on:

- Resuming or continuing taking metformin and glibenclamide while breastfeeding
- Not taking any other oral hypoglycaemic agents while breastfeeding.

And women with gestational diabetes should be advised on:

- Stop taking hypoglycaemic medication immediately after birth
- Weight control, diet and exercise
- The symptoms of hyperglycaemia
- The risks of gestational diabetes in subsequent pregnancies and screening for diabetes when planning pregnancy.

Women with gestational diabetes should be offered:

- A blood glucose test before transfer into community care
- A fasting plasma glucose test at the 6-week postnatal appointment, then annually.

Women with pre-existing diabetes should be referred back to routine diabetes care with ophthalmological follow-up for women who have preproliferative diabetic retinopathy diagnosed in pregnancy, for at least 6 months after the birth.

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OBESITY IN PREGNANCY

Dr E. T. selos, Fadi Alfhaily, MA Khaled

Abstract

Obesity during pregnancy is an increasing problem in current obstetrics and general practice that takes the dimensions of an epidemic. Optimal management of obese patients and use of resourses is of paramount importance. Education of the public regarding the risks of obesity during pregnancy is essential part of preventive medicine, as weight loss before conception results in significant risk reduction (1,3). It is the duty of all health professionals involved with the care of women of childbearing age, to assess, inform and advice them regarding the risks of obesity and strategies to overcome the problem, with dietary and physical exercise being the most important aspects. During pregnancy, specialist care and close monitoring for complications is essential. This should take place in all levels of care.

Introduction

Obesity is one of the commonest risk factors in modern obstetrics. The incidence of maternal obesity has been almost doubled since in recent years, rising from 9%–10% in early 1990s to 16%–19% in recent years.

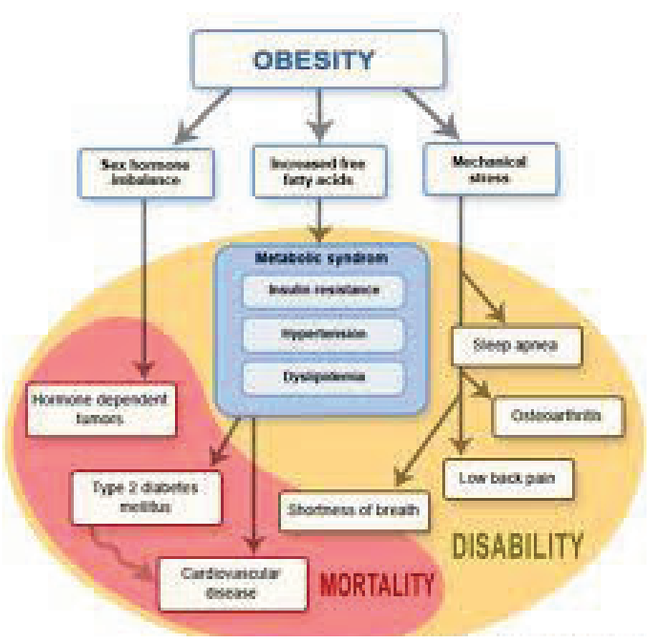
Obesity is defined as BMI (body mass index) of 30 or more. WHO has defined three classes of obesity: class 1 (mild) BMI 30 to 34.9, class 2 (moderate) BMI 35 to 39.9 and class 3 BMI 40 or more (morbid obesity)(1). Implications of obesity in pregnancy are significant for both the mother and the foetus, increasing the risk of complication such as gestational diabetes, preeclampsia, thromboembolism during pregnancy as well as dysfunctional labour, caesarean section, post-partum haemorrhage, during labour and foetal complications such as miscarriage, stillbirth and foetal congenital anomalies are also incresed.

Case Scenario Part 1

A 22-year-old nulliparous woman presents at the GP surgery to discuss the discontinuation of her contraception as she wishes to start a family. Her BMI is 37.7 and she is otherwise healthy. She has a family history of thromboembolism as her mother had a pulmonary embolism in pregnancy, so she is very concerned. She is currently using only the progestogen pill for contraception.

What information we should give to this woman, and what will be our advice?

What will be our initial management plan?



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Initial Presentation—Discussion

This setting is an excellent opportunity to inform the woman regarding the increased risks of pregnancy with obesity. It is important to explain the definition of class II obesity and explain what would be her ideal weight giving her an example (a target number). The consultation should be non-judgemental, and time to answer questions should be allowed. Pregnancy is a very good opportunity for lifestyle changes, as women seem to be very motivated. The associated risks should be presented in an educational atmosphere and not trying to frighten the patient. Risks for mother and foetus are shown in Table 1.

Maternal Increased Risks with Obesity	Foetal Increased Risks with Maternal Obesity
Gestational diabetes	*Miscarriage*
Thromboembolism	*Foetal congenital anomaly*
Postpartum haemorrhage	*Stillbirth*
Pre-eclampsia	*Neonatal death*
Dysfunctional labour	
Wound infections	
Caesarean section	

Table1: Modified from CMACE/RCOG joint guideline

If the patient insists in trying straight for pregnancy, then high dose folic acid (5 mg instead of the standard dose of 0.4 mg) should be prescribed to be started before conception and continue for the first 12 weeks, as well as vitamin D 10 mcg daily throughout pregnancy and breastfeeding (1).

Case Scenario Part 2

After 4 months, the patient returns to the surgery, as she is 8 weeks pregnant for her booking visit.

What will be the care plan?

Antenatal Care

At the booking the actual BMI of the patient should be measured, and this should be repeated in all antenatal visits(3).” and be monitored Discussion about the risks of obesity in pregnancy should be repeated, as well as dietary advice given according to the Royal College of Obstetricians and Gynaecologist recommendations (4). A plan should be agreed with the woman regarding diet and physical activity, as well as a target weight gain range. This should not exceed 7 kg (3). Moderate physical exercise is advisable in conjunction with a low glucemic index diet as this reduces the risk of gestational diabetes and hypertensive disorders of pregnancy (3). A glucose tolerance test should be

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	BMI range	Suggested weight gain (kg)
Underweight	<18.5	12.5 to 18
Normal Weight	18.5 to 24.9	11.5 to 16
Overweight	25 to 29.9	7 to 15
Obese Class I	30 to 34.9	7
Obese Class II	35 to 39.9	7
Obese Class III	≥40	7

Table2: Modified from SOGC practice guideline (Obesity in Pregnancy)

arranged for 28 weeks gestation (5). Blood pressure should be monitored with an appropriate size cuff (1) as a smaller blood pressure cuff is associated with incorrectly higher measurements (7), and aspirin 75 mg once daily should be started from 12 weeks gestation (6). Folic acid should be continued for the first 12 weeks, but vitamin D for the rest of pregnancy and lactation period. An anomaly ultrasound scan should be arranged at 20–22 weeks (rather than 18–20) as it seems to provide better visualization of foetal structures. But the woman should be aware that some foetal structures will be suboptimaly seen due to the high BMI (3). The patient should be referred to a consultant Obstetrician and Gynaecologist for antenatal care (1).

Case Scenario Part 3

The woman is now 32 weeks pregnant and has being referred to consultant's antenatal clinic, as she was measuring large for dates on clinical examination by her midwife. Her GTT was normal at 28 weeks and her blood pressure remains within normal limits. Urine dipstick is negative for protein, glucose, ketones or nitrates.

On clinical examination the fundal height is 36 cm, and an ultrasound scan showed the abdominal circumference of the baby to be on the 95th centile with normal liquor volume.

What will be the further advice?

Mode of Delivery—Discussion

Clinical evaluation of foetal size may not be as accurate in obese women as in normal BMI women, and even ultrasound scan estimation of foetal weight is not as reliable as in normal BMI women (3). The woman should already be aware of the increased risk of needing a caesarean section as an emergency, and the associated increased risks of postpartum haemorrhage, wound infections, and technical difficulties. In addition there are increased anaesthetic risks and difficulties with venous access and foetal monitoring during labour. These issues should be discussed with the patient and management strategies should be set (e.g. need for foetal scalp electrode, early epidural, etc.) (1). Despite the increased risk of needing a caesarean section, the results of clinical and sonographic examinations are not an indication for an elective caesarean section, and the indications are the same for obese women as for any other pregnant woman currently (7). In this case clinical surveillance of foetal growth is advisable and a repeat scan at 36 weeks for foetal growth and liquor would be appropriate. The increased risk of foetal macrossomia and shoulder dystocia should be discussed as well as possible manoeuvres to overcome this complication (3). A repeat discussion about diet would be advisable.

Case Scenario Part 4

The woman was admitted in labour at 38+4 weeks gestation. She had an uncomplicated normal vaginal delivery of a 4130 g male infant. She had a 2nd degree perineal tear which was sutured in theatre and an estimated blood loss of 800 ml. Her post delivery haemoglobin was 9.3 g/dL. She receives enoxaparin 40 mg subcutaneously once daily. The obstetric SHO was asked to see her before discharge.

What will be the discharge plan and advise?

Postpartum Care—Discussion

As this patient is at increased risk for venous thromboembolism, early mobilization, good hydration and continuation of enoxaparin

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for 7 days postpartum should be advised (2). If there are no sings of perineal infection there is no need for prophylactic antibiotics. Iron sulphate 200 mg twice or three times a day should be prescribed for 4 weeks, and advice to recheck full blood count by the GP in 4 weeks time. Breastfeeding should be discussed and encouraged as this seems to help with reduction of extra weight gained during pregnancy (7). As obese women have difficulties establishing and maintaining breastfeeding, may benefit from appropriate specialist advice and support (1).

MCQs

1. Every pregnant woman with a BMI of 42 should receive during the 1st trimester:

A. 10 mcg vitamin D per day
B. 400 mcg folic acid per day
C. 75 mg aspirin per day
D. 40 mg enoxaparin per day
E. 200 mg ferrous sulphate per day

Answers:

1. A=True, B=False, C=False, D=False, E=False

Every woman with a BMI >30 should receive vitamin D 10 mcg and high dose folic acid, 5 mg, preconception as they have increased risk of deficiency and foetal anomalies. Obese women with further risk factors for hypertension should receive 75 mg aspirin daily from 12 weeks till delivery. Antenatal enoxaparin is recommended for women with three or more risk factors for venous thromboembolism, and the dose is weight related. Iron supplementation is necessary only if there is evidence of anaemia.

2. Obese pregnant women have increased risk of:

A. Venous thromboembolism
B. Preterm labour
C. Postpartum haemorrhage
D. Pre-eclampsia
E. Shoulder dystocia

Answer

2. A=True, B=False, C=True, D=True, E=True

Length of pregnancy increases with increasing BMI as does the risk of failed induction and stillbirth. Obese mothers have increased risk to have macrosomic babies even with no clinical gestational diabetes and therefore have an increased risk of shoulder dystocia.

3. Risks to the babies of obese mothers include:

A. Miscarriage
B. Stillbirth
C. Congenital anomalies
D. Childhood obesity
E. Intrauterine growth restriction

Answer

A=True, B= True, C= True, D= True, E=False

Risk of miscarriage, stillbirth and neonatal death is increased for babies of obese mothers. Congenital anomalies are more common and more difficult to detect, as the ultrasound scan images are suboptimal in obese mothers. It seems that intrauterine foetal hyperglycaemia, which is common in obese pregnant women, leads to foetal macrosomia and obesity in later life. Macrosomia is associated with maternal obesity and not intrauterine growth restriction.

4. Women with a BMI more than 40 (morbidly obese) should:

A. Induced at 40 weeks
B. Have IV access in labour
C. Receive 40 mg enoxaparin thomboprophylaxis for 4 days after caesarean section.
D. Receive prophylactic antibiotics if they have episiotomy
E. Have active management of 3rd stage of labour

Answer

4. A=False, B=true, C=False, D=False, E=True

Obesity alone is not an indication for induction of labour in the absence of other maternal or foetal indications and normal labour should be encouraged. As there is an increased risk of postpartum haemorrhage and difficulty to establish venous access, early canulation and active management of third stage is recommended. Prophylactic antibiotics are recommended during caesarean section and enoxaparin for 7 days with doses related to weight (40 mg once daily for up to 90 kg body weight)

5. Obese women with gestational diabetes should:

A. Should be screened 6 weeks post delivery for diabetes mellitus
B. Should be screened annually for diabetes mellitus
C. Have elective caesarean section at 39 weeks
D. Receive insulin treatment
E. Will have macrosomic babies

Answers

5. A=True, B=True, C=False, D= False, E= False

Obese women who develop gestational diabetes are at increased risk to develop type II diabetes later in their life, therefore should be screened. Gestational diabetes is not an indication for caesarean section. Gestational diabetes can be controlled with diet and exercise in many cases and therefore not requiring insulin treatment. When it is controlled foetal weight should be normal.

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Patient Management

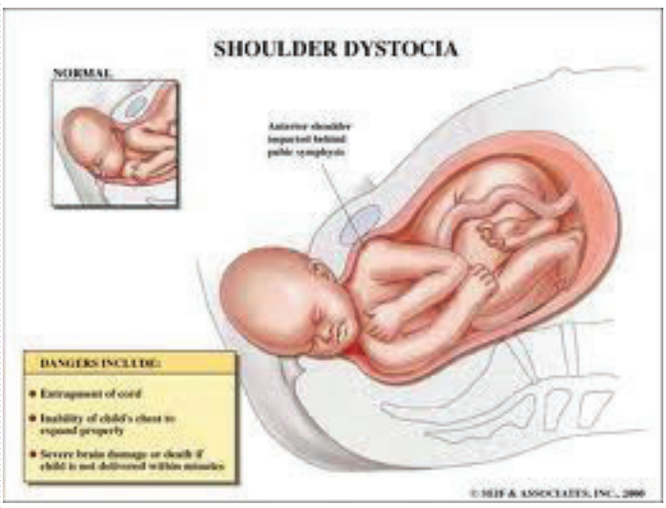
OPERATIVE VAGINAL DELIVERY

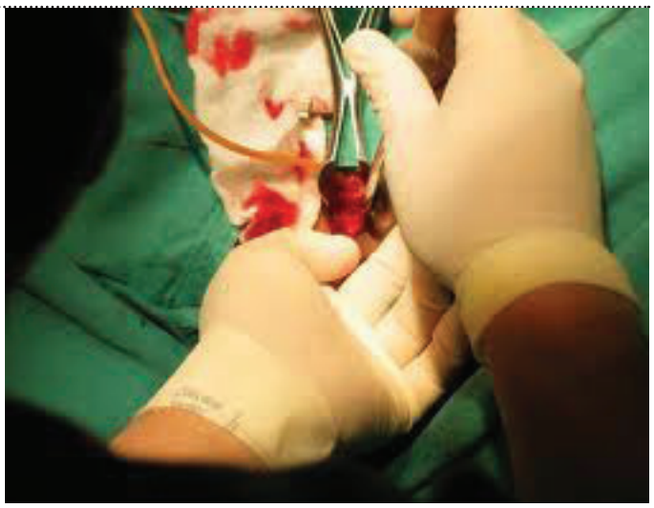
Saira Sadiq, S O Anifowoshe, Fadi Alfhaily, MA Khaled

Operative Vaginal Delivery
Patient Management

Learning Objectives

- Help to take decision when operative vaginal delivery is appropriate.
- Discuss the common indications, contraindications and prerequisites for operative vaginal delivery.
- Recognize the correct techniques required for vacuum and forceps delivery and identify the causes of failure to deliver with the instrument selected
- Be able to choose the appropriate mode and instrument of delivery by explaining the advantages and disadvantages of ventouse cup and forceps delivery in different clinical situations.
- Highlight the common complications and maternal as well as neonatal morbidity associated with operative vaginal delivery.
- Discuss the contribution of birth trauma to litigation and identify the methods that may be used to minimize or reduce these litigations.
- Know what to do when the operative vaginal delivery has failed.





Introduction

Operative vaginal deliveries expedite the delivery of a baby who is believed to be at risk of compromise or when the mother is unable to push it out herself. In the UK, operative vaginal delivery rates have remained stable at 10%–15%. These varying rates reflect different clinical practices and different attitudes in each unit. However, operative vaginal delivery remains an integral and crucial part of the obstetrician's duties. Low operative vaginal delivery rates may reflect high caesarean section rates, including those performed at full dilatation because of a reluctance to perform operative vaginal deliveries. Although operative vaginal delivery can be hazardous and should be undertaken with care, the difficulty of caesarean section at full dilatation should not be underestimated; it can be extremely difficult and is associated with high maternal morbidity. But, there has been an increasing awareness of the potential for morbidity for both the mother and the baby, following operative vaginal deliveries. Therefore, when offering women the option of a safe operative vaginal delivery, we need to improve our approach to clinical care to minimize the risk of mortality and morbidity; hence minimizing the likelihood of litigation, without limiting maternal choice.

Case scenario part 1: Counselling

A 25-year-old woman in her first pregnancy attends the antenatal clinic at 36 weeks. The pregnancy has been uneventful to date, and the baby is in a cephalic presentation. She recalls that her sister had a very traumatic delivery by forceps. She has read about problems during labour and delivery and is worried about the risks of having traumatic operative vaginal delivery like her sister.

How would you counsel her?

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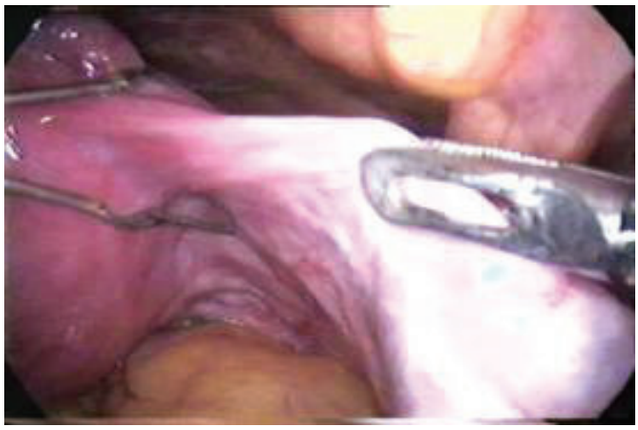


Indications of Operative Vaginal Delivery

Operative vaginal delivery should only be performed if there is an appropriate indication. Safe operative vaginal delivery requires a comprehensive knowledge in normal labour and delivery process and labour dysfunction, careful assessment of the clinical situation, appreciation of the indication and contraindication of operative vaginal delivery, clear communication with the mother and healthcare staff and expertise in the chosen procedure.

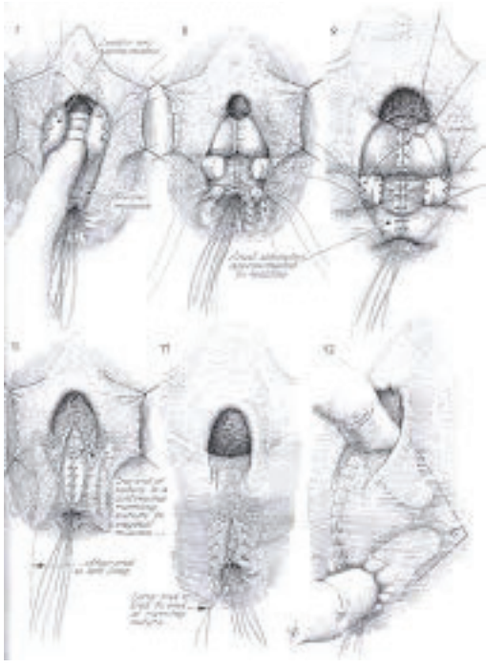


Table 1: Indications of Operative Vaginal Delivery (RCOG Guideline 26)

(No indication is absolute, and each case should be considered individually)	
Type Indication	
Foetal	Presumed foetal compromise
Maternal	*Medical indications* to avoid Valsalva (e.g., cardiac disease Class III or IV, a hypertensive crises, cerebral vascular disease, particularly uncorrected cerebral vascular malformations, myasthenia gravis, spinal cord injury)
	Maternal exhaustion
(Maternal benefit to shortened 2nd stage)	
Lack of Progress	*Nulliparous women:* lack of continuing progress for 3 hours (total of active and passive second stage labour) with regional anaesthesia, or 2 hours without regional anaesthesia
	Multiparous women: lack of continuing progress for 2 hours (total of active and passive second stage labour) with regional anaesthesia, or 1 hour without regional anaesthesia, and maternal fatigue/exhaustion

Contraindications

It should be noted that no indication for operative vaginal delivery is absolute; therefore obstetricians should be able to distinguish 'standard' from 'special' indications. The decision when to attempt operative vaginal delivery or not should involve balancing the risks and benefits of continuing pushing as against operative delivery.

A number of clinical situations exist in which operative vaginal delivery should not be attempted because of the potential risks to the foetus.

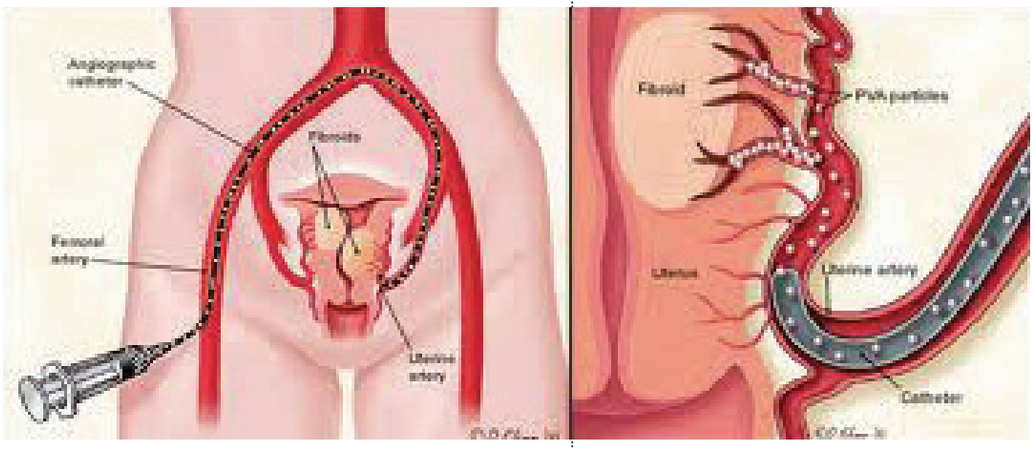
Alternatives to Operative Vaginal Delivery

Informed consent (either verbal or written) is required prior to performing an operative vaginal delivery. Alternative management strategies should be discussed and depend on the clinical circumstances and on the indication for the operative vaginal delivery. For example, if the indication is a prolonged second stage of labour in the setting of reassuring foetal testing, alternatives to an operative

Patient Management

OPERATIVE VAGINAL DELIVERY

Saira Sadiq, S O Anifowoshe, Fadi Alfhaily, MA Khaled



vaginal delivery include continued expectant management, oxytocin augmentation, and caesarean delivery. Some data suggest that most women with a prolonged second stage will ultimately deliver vaginally and that a second stage exceeding 2 hours in duration does not adversely affect neonatal outcome, therefore, continued expectant management is reasonable. If such conservative interventions fail to achieve a vaginal delivery, either an operative vaginal delivery or a caesarean delivery can be performed. Operative vaginal delivery should not be attempted unless the criteria for safe delivery have been met. The general aim of labouring women is to achieve spontaneous vaginal delivery; and therefore efforts should be focused on helping them to achieve this normally and safely. All women should have continuous support during labour. Various techniques may help in achieving high spontaneous vaginal delivery rates, such as use of a partogram, use of upright or lateral positions and avoiding epidural analgesia will reduce the need for operative vaginal delivery. Oxytocin in primiparous women with epidurals will decrease the need for operative vaginal delivery. Delayed pushing in primiparous women with an epidural will reduce the risk of rotational and mid-cavity deliveries.

Table-2: Contraindications for Operative Vaginal Delivery

• Non-cephalic presentation: transverse, face or brow presentation
• Unengaged vertex
• Intact foetal membranes
• Clinical evidence of CPD
• Incompletely dilated cervix
• IClinical evidence of CPD
• I< 34 weeks gestation (vacuum)
• IUnderlying foetal disorder: thrombocytopenia, haemophilia, foetal demineralizing diseases (osteogenesis imperfecta)
• IUncertainty about foetal position

Case scenario—Part 1: Counselling

Answer

The aim of discussion should be to relieve her operative vaginal delivery related anxiety. It is important to address maternal anxiety and fears of operative vaginal delivery as it may have a deleterious effect on the course as well as outcome of pregnancy. Emotional support is crucial by seeking information and sharing experiences. Studies have shown professional support to be very important in alleviating fears associated with operative vaginal delivery; therefore a senior input is essential by explaining the mechanism of normal and abnormal labour and highlighting the situation (indication and contraindication) when operative vaginal delivery is necessary and assuring that every step will be taken to reduce the adverse outcome of this delivery. Knowledge and information delivered positively are helpful in alleviating fears.

Alternatives to operative vaginal delivery should be fully discussed and reassessed during the course of the pregnancy especially near the end and to clearly document in her note the agreed informed plan of care. When there is time there is a need to decide the mode of delivery.

Case Scenario—Part 2: In Labour

Having had uneventful pregnancy, your patient was admitted in labour at 39 weeks. Epidural was sited at 5-cm dilatation. She had good progress in the first stage.

However, she has been fully dilated for 3 hours and requesting help. The midwife called you to assess her request.

1. How would you approach her?
2. What information would you like to get before you discuss the management options with her?

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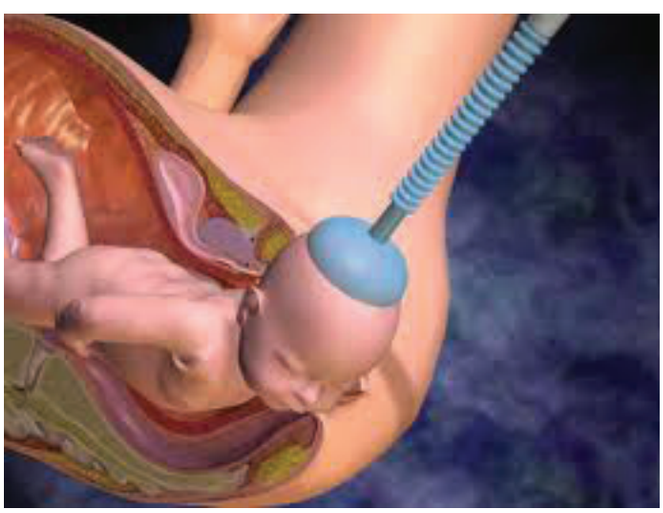
Pre-requisites for Operative Vaginal Delivery

A set of criteria is needed to be fulfilled before an operative vaginal delivery can be attempted:

• Informed consent
• Head is ≤1/5 palpable per abdomen
• Full dilatation of the cervix
• Engagement of the foetal head
• Vertex presentation
• Exact position of the head
• ≥34 weeks (vacuum delivery)
• Membranes ruptured
• Adequate maternal pelvis
• Adequate anaesthesia
• Maternal empty bladder
• Adequate facilities and backup personnel are available
• Back-up plan in place in case of failure to deliver
• Ongoing foetal and maternal assessment.
• Operator must have the knowledge, experience and skills necessary to use the instruments
• Personnel present who are trained in neonatal resuscitation

Operative vaginal delivery has a higher rate of failure and should be considered; hence, immediate recourse to caesarean section can be prepared.



Higher rates of failure are associated with:

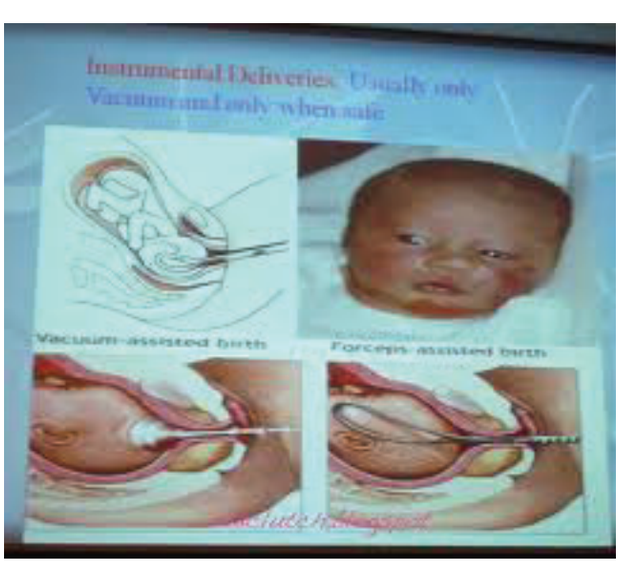
- BMI >30
- Estimated foetal weight >4000 g or clinically big baby
- Malposition: occipito-posterior position
- Mid-cavity delivery or when 1/5 head palpable per abdomen.

Selection of Instrument: Forceps vs. Vacuum

Selection of the appropriate instrument and decisions about the maternal and foetal consequences should be based on clinical findings at the time of delivery and the operator's level of confidence and experience with the specific instrument. Factors that need to be considered include the availability of the instrument, the degree of maternal analgesia, and an appreciation of the risks and benefits of each of the individual instruments.

Vacuum extractor compared with forceps is:

• More likely to fail at achieving vaginal delivery
• More likely to be associated with cephalhaematoma
• More likely to be associated with retinal haemorrhage
• More likely to be associated with maternal worries about baby
• Less likely to be associated with significant maternal perineal and vaginal trauma
• No more likely to be associated with delivery by caesarean section
• No more likely to be associated with low 5-min Apgar scores
• No more likely to be associated with the need for phototherapy



Patient Management

OPERATIVE VAGINAL DELIVERY

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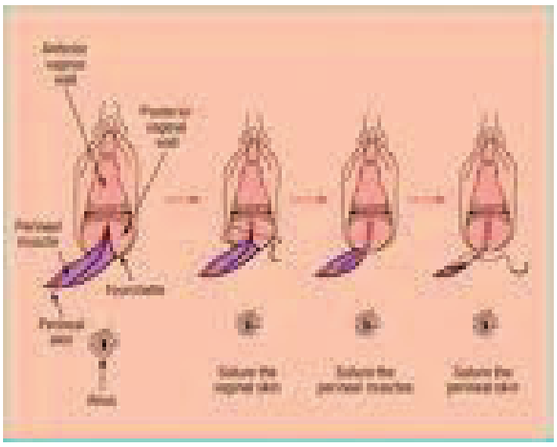


Complications of Instrumental Delivery

Each instrument has a different profile of complications.

The more serious complications are very uncommon but include:

Fetal Complications

a. Shoulder dystocia and consequences. The need to perform an instrumental delivery for lack of progress in the presence of anticipated macrosomia should alert the clinician to the increased likelihood of shoulder dystocia.

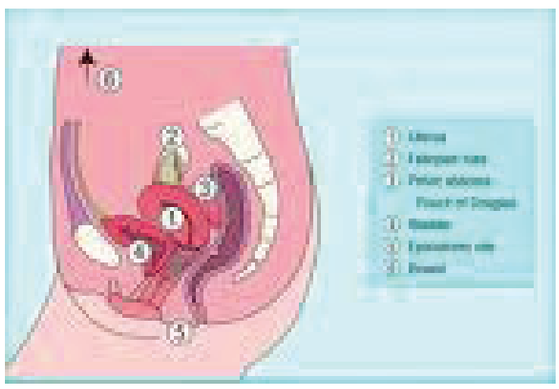
b. Subaponeurotic/subgaleal haemorrhage. A potentially life-threatening complication, occurring in approximately 1 in 300 cases of vacuum delivery

c. Facial nerve palsy, corneal abrasion, retinal haemorrhage. Facial nerve palsy and corneal abrasion are more common with forceps and retinal haemorrhage with vacuum delivery.

d. Skull fracture and/or intracranial haemorrhage.

Maternal Complications

The Cochrane review indicates more maternal pain at 24 hours and serious maternal injury with forceps than with vacuum delivery.



Operative vaginal delivery should be abandoned where there is no evidence of progressive descent with each pull or where delivery is not imminent following three pulls of a correctly applied instrument by an experienced obstetrician.

Adverse outcomes, including unsuccessful forceps or vacuum delivery, should trigger an incident report as part of effective risk-management processes.

Paired cord blood samples should be processed and recorded following all attempts at operative vaginal delivery.

a. Pain at delivery and postpartum

b. Traumatic injury including anal sphincter damage

c. Postpartum haemorrhage

Routine Use of Antibiotics and Episiotomy at the Time of Operative Vaginal Delivery

There is insufficient evidence to support the routine administration of antibiotic prophylaxis during operative vaginal deliveries to prevent postpartum infection.

Recent evidence suggests that routine use of episiotomy with vacuum extraction is associated with an increased rather than de-

Case Scenario—Part 2: In Labour

Answer

Full assessment of the patient is mandatory before attempting any operative vaginal delivery. The prerequisite criteria should be met.

Assessment of maternal and foetal wellbeing should be performed. Informed consent should be taken with full explanation of the situation, the indication, the instrument chosen, advantages and disadvantages of each instrument and alternative plans.

Feedback—Part 3: Postpartum

The foetal head is in a deflexed occito-posterior position and is at the level of the +.1 There was caput +. Hence a ventouse vaginal delivery was performed after top up of the epidural anaesthesia. Healthy baby was delivered. However, the delivery was complicated by a 3rd/4th degree perineal tear.

How would you assess the morbidity rate following operative vaginal delivery in your hospital?

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Feedback—Part 4: Postpartum

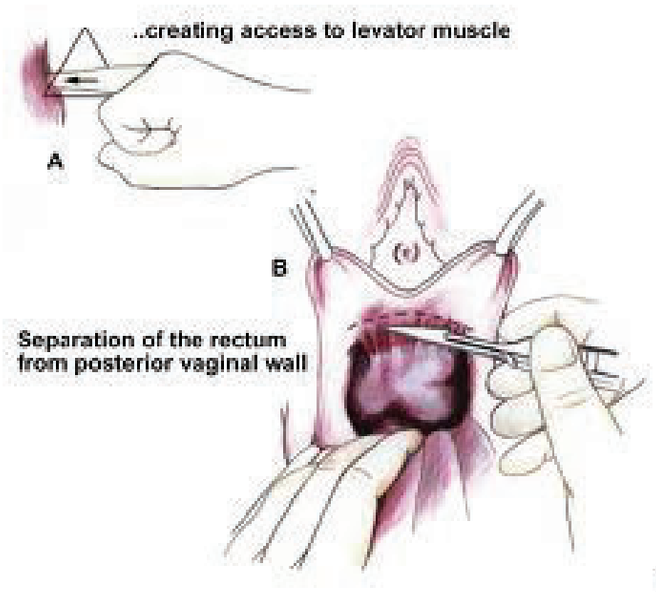
Answer

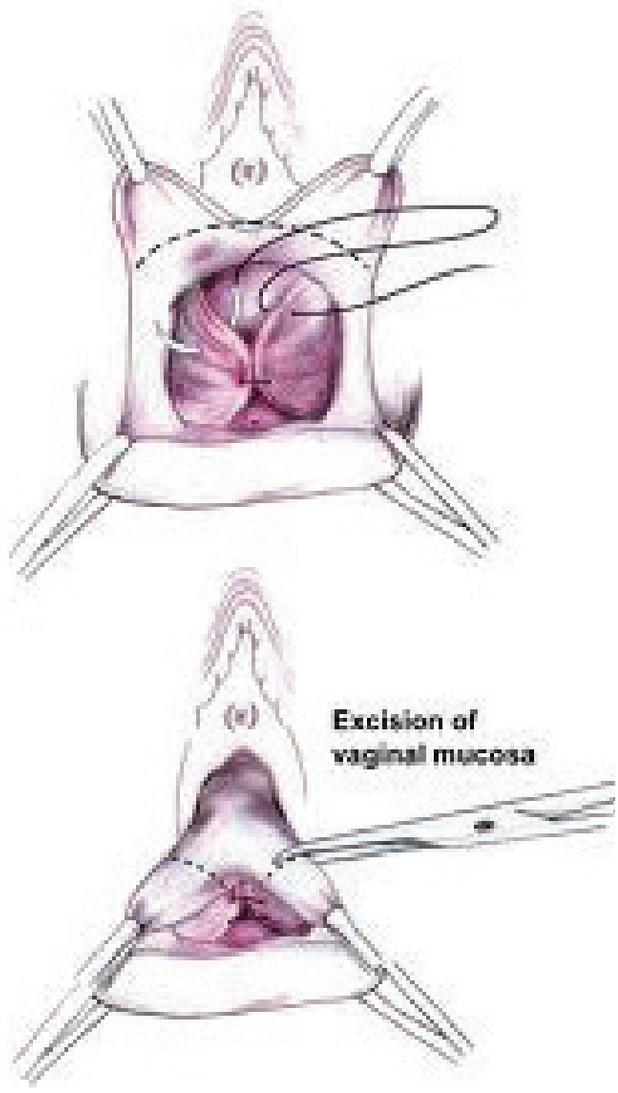
An audit should be performed on an individual operator basis as well as for the unit as a whole to identify the risk factors of foetal and maternal morbidity. The standards for the audit may include: rate of operative vaginal delivery, rate of failed operative vaginal delivery, rate of sequential instrument use, rate of third- and fourth-degree perineal tears, rate of neonatal morbidity to composite trauma (cephalhaematoma, brachial plexus injury, fracture, facial nerve palsy, cerebral haemorrhage), low Apgar (<7 at 5 min) and cord arterial pH <7.1, and standard of documentation.

creased risk of perineal trauma and rectal injuries. Episiotomy during operative vaginal delivery also increases the incidence of postpartum haemorrhage and perineal infection, the need for stronger analgesia.

Key Messages

Approximately 10%–15% of all deliveries in England are operative vaginal deliveries. There is an increasing trend towards the use of vacuum devices rather than forceps for such procedures due to mounting data suggesting that vacuum extraction is associated with less maternal morbidity. To safely perform an operative vaginal delivery, it is important that the operator understand the indications and contraindications for this procedure. Informed patient consent must be obtained. In all instances, the potential risks and benefits of a vacuum-assisted





delivery must be weighed against the available alternative, including continued expectant management, oxytocin augmentation, and caesarean delivery.

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PRINCIPLES OF PREOPERATIVE ASSESSMENT IN THE MANAGEMENT OF ELECTIVE SURGICAL PATIENTS

Eleanor Walker, Venkatesh Annam

Learning Objectives

- Provide information on principles of preoperative assessment of patients undergoing elective surgery
- Identify patients who require basic and special investigations

Introduction

The aim of preoperative anaesthetic assessment is to minimize the risk for all patients as well as to identify patients at particularly high risk. The time between the preadmission assessment and the surgery can be used to:

- Reduce patient risk.
- Prepare the staff and equipment required for surgery.
- Prepare staff and facilities for postoperative care (i.e., identifying patients who will require high dependency or intensive care postoperatively).

The following guidance comes largely from the recommendations made by the National Institute for Clinical Excellence[1] (NICE) and the Association of Anaesthetists of Great Britain and Ireland[2] with regards to appropriate preoperative assessment of all patients undergoing elective surgical procedures. Routine fasting guidelines are included as well as information regarding the use of certain concurrent medications prior to a planned surgical procedure. The preadmission assessment should proceed in a sequence of steps, starting in primary care, which for scheduled, elective surgery may take place over several months.

Principles of Preoperative Assessment in the Management of Elective Surgical Patients
Patient Management

Role of Primary Care

Preoperative primary care can help to optimize a patient's fitness prior to undergoing surgery in a number of ways:

- Smoking cessation advice
- Encouraging exercise and weight reduction
- Optimizing treatment of chronic conditions such as diabetes and anaemia

Role of Preoperative Assessment Clinic

As the majority of patients undergoing elective surgery are only admitted to hospital on the morning of their surgery, it is vital that there is an effective preadmission assessment service in order to identify 'high-risk' patients and to allow further optimization of any pre-existing conditions that may influence their surgical or anaesthetic management. The longer the time between the preadmission assessment and the anaesthetic preoperative visit, the greater the opportunity to minimize patient risk.

Knowledge of the underlying fitness of a patient and the extent of the planned surgery allows calculation of an individual's overall risk attributable to surgery. Careful assessment of this risk means that:

- The patient can make a fully informed decision about surgery
- Optimal patient care can be planned in light of any underlying problems

In most hospitals, specialist preoperative assessment nurses, supported by consultant anaesthetists, will have assessed and prepared patients before they are admitted for scheduled surgery.

Patient assessment follows the principle that effective, simple, quick and inexpensive measures, that are least likely to result in harm, should be completed before more complex, time-consuming, expensive (and possibly more risky) investigations are considered[2].

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Table 1: Important Factors in the History

1. Age
2. Sex
3. Socioeconomic status
4. History of ischaemic heart disease
5. History of heart failure (HF)
6. History of cerebrovascular disease
7. History of peripheral arterial disease
8. History of renal failure
9. Exercise tolerance

As with the majority of patient assessments, preoperative assessment should begin with a thorough history followed by a clinical examination. Relevant history can be obtained from reading the patient's notes and by talking to both the patient and their relatives or carers. An evaluation of each patient's exercise tolerance should be made and this is one of nine variables, (illustrated in Table 1) that provide independent prognostic information and each should be elicited from every patient. Knowledge of these variables enables an estimate of preoperative and postoperative risks of mortality and morbidity to be made when used in conjunction with the patient's known surgical disease and planned procedure[3].

In addition to the history and examination, certain investigations may be ordered as part of the preoperative assessment based on the suspicion of significant underlying systemic disease and according to the nature of the planned surgery.

The main purpose of preoperative investigations is to provide additional diagnostic and prognostic information to supplement the clinical history of a patient with the aim of:

- providing information that may confirm or question the correctness of the current course of clinical management;
- using this information to reduce the possible harm or increase the benefit to patients by altering their clinical management if necessary;
- using this information to help assess the risk to the patient and opening up the possibility of discussing potential increase of risk with the patient;
- predicting postoperative complications; establishing a baseline measurement for later reference (to refer back postoperatively); and
- opportunistic screening that is unrelated to planned surgery.

Investigations should only be ordered when they are sufficiently likely to provide new information and will affect patient treatment and outcome. In addition to their financial cost, investigations may also cause harm to the patient, either directly or indirectly. Examples include physical damage to a vessel when taking an arterial sample or subjecting the patient to further unnecessary investigations due to a false-positive result. Routine testing should only be done after careful consideration because there is very limited value in screening large numbers of healthy patients[4].

Table 2 ASA System of Grading Physical Status

ASA Grade	Physical Status
1	Normal healthy patient; i.e., without any clinically important comorbidity and without a clinically significant past/present medical history
2	A patient with mild systemic disease
3	A patient with severe systemic disease
4	A patient with severe systemic disease that is a constant threat to life
5	A moribund patient who is not expected to survive with or without the operation
6	A declared brain-dead patient whose organs are being removed for donor purposes
7	Suffix added for any emergency operation

For each patient a simple score can be used to stratify their risk based on their underlying fitness and the complexity of the surgery that they are undergoing as detailed in the tables below. On the basis of this score only appropriate investigations for each individual patient should be undertaken.

For patient fitness, the scheme that has been adopted worldwide is the American Society of Anesthesiologists (ASA) system of grading physical status. See Table 2.

Although no grading system is perfect, there are a number of advantages that include:

- Enabling other clinicians to get an immediate impression of a patient's overall fitness
- Allowing more appropriate comparison to be made when analysing subsequent outcome.

Surgery is classified in to four levels of complexity as described by NICE as illustrated in Table 3.

Investigations

Randomized controlled trials have shown that routine common preoperative tests, e.g., electrocardiograms (ECGs), full blood count (FBC), urea and electrolytes, do not benefit patients having minor surgery but should be targeted appropriately.

NICE systematically reviewed the evidence for these and other preoperative tests, including chest X-rays (CXR), glucose, liver function tests,

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Table 3 Grades of Surgery

Surgery Grade	Example
1 (minor)	Excision of skin lesions; drainage of a breast abscess
2 (intermediate)	Inguinal hernia; varicose veins; adenotonsillectomy; knee arthroscopy
3 (major)	Total abdominal hysterectomy; TURP; lumbar discectomy; thyroidectomy
4 (major +)	Total joint replacement; artery reconstruction; colonic resection; radical neck dissection

international normalised ratio for warfarin control, activated partial thromboplastin time, spirometry, urine dipstick, pregnancy test, and sickle cell test.

The NICE guidelines for preoperative testing can be found on their website at www.nice.org.uk.

As detailed above the NICE recommendations for preoperative tests are based on age, surgical severity and whether the patient has systemic disease**.** Table 4 shows recommendations for:

- ECG
- FBC
- Urea, electrolytes and creatinine

Further recommendations advised that a pregnancy test should be performed in all women of reproductive age who say they may be pregnant after gaining informed consent.

Table 4 Criteria for Preoperative Testing

Criteria	Age and Surgical Severity (or Grade)	Systemic Disease
ECG	Older than 60 years and surgical severity at least grade 3.	Any cardiovascular disease. Severe renal disease.
FBC	Older than 60 years and surgical severity at least grade 2. All adults if surgical severity at least grade 3.	Severe renal disease (creatinine >150 mmol/L)
U+E and creatinine	Older than 60 and surgical severity at least grade 3. All adults if surgical severity grade 4.	Any renal disease. Severe cardiovascular disease (see Appendix 1 for details).

A sickle cell screening test should be offered to anyone with a family history of homozygous disease or heterozygous trait, or those patients from areas where there is a high incidence of the disease (those with African or Afro-Caribbean ancestry, Asian ancestry, Middle-Eastern ancestry or East-Mediterranean/Cypriot ancestry).

A CXR should be considered in all patients who will require admission to critical care postoperatively and should be performed in all those undergoing cardiothoracic surgery.

Other tests should be ordered by the anaesthetist according to the clinical information available. Examples include:

- A FBC if anaemia is suspected
- A recent respiratory illness which is still symptomatic may require a CXR
- A history of prolonged bleeding should trigger a FBC and coagulation screen
- An ECG in a patient with a history of palpitations
- Severe respiratory disease will require respiratory function tests and arterial blood gases
- An undiagnosed murmur may be investigated by an echocardiogram

The American College of Cardiology and the American Heart Association (ACC/AHA) provide guidelines on advanced investigations into cardiac function[5].

In addition to the combination of a patient's exercise tolerance and grade of surgery they take in to account any cardiac symptoms reported in order to make their recommendations.

- Table 5 illustrates a simplified summary of these guidelines and demonstrates the combinations of disease and surgical severity that should lead to further cardiac investigation
- Such investigations may include cardiopulmonary exercise testing (CPX), traditional treadmill ECG exercise testing, dobutamine stress echocardiography, or myocardial perfusion scanning.

Table 5 Modified from ACC/AHA Guidelines for Cardiac Investigation

Guidelines for Advanced Cardiac Investigations

Cardiac Symptoms	Can Climb Stairs?	Grade of Surgery	Investigate?
Mild	Yes	1, 2, 3	No
Mild	Yes	4	Yes
Mild	No	Any	Yes
Severe	Yes or No	Any	Yes

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- Investigations should only be performed if they will be acted upon. If surgery is essential, there may be a case for not investigating if no further treatment for the cardiac condition would be considered.

The consequences of major surgery represent a major challenge to the body. To assess overall physiological reserve, CPX has been developed and is increasingly (though not universally) available.

- It is a non-invasive and objective method of evaluating both cardiac and respiratory function.
- Usually performed on a bicycle ergometer; the level of exercise is progressively raised whilst monitoring the body's metabolic state, to assess the extent to which oxygen delivery can be increased to meet the tissue needs.
- An important measure is the anaerobic threshold—the point at which oxygen delivery is no longer adequate and anaerobic metabolism starts.
- As with all dynamic testing, its major limitation is the patient who cannot exercise because of other problems, such as arthritis.

Key Points

- Any preoperative investigations performed should be limited to those recommended by national and local guidelines and protocols and should add to information already available.
- Grading of patient fitness and severity of surgery using standard scales can help evaluate risk and plan care.

Preoperative Fasting Guidelines

As part of the surgical pre-assessment process each patient should receive information about appropriate fasting guidelines and advice regarding the continuation or otherwise of any regular medications that they are taking.

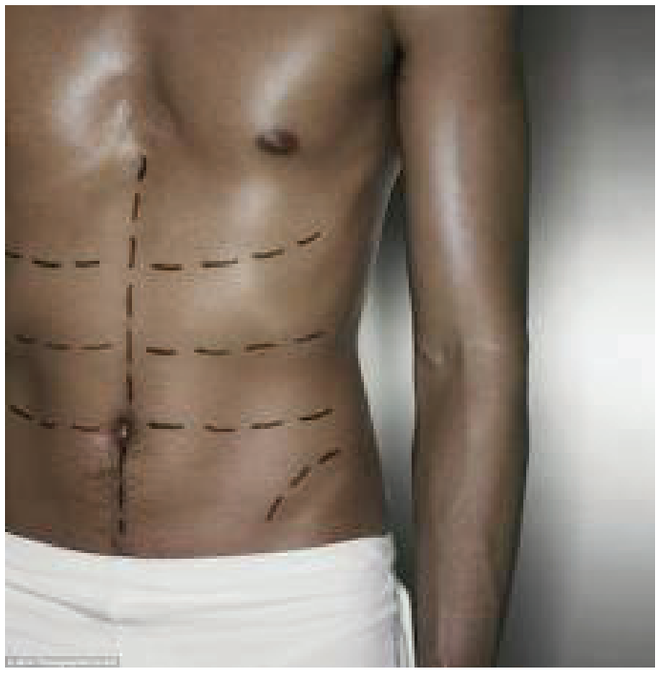
The Royal College of Nursing produced preoperative fasting guidelines in 2005 and these remain universally accepted[6].

In adults "the 2–6 rule" is usually applied:

- "2"—intake of water up to 2 hours prior to induction of anaesthesia.
- "6"—a minimum preoperative fasting time of 6 hours for food, including solids, milk and milk-containing drinks.

The anaesthetic team should consider further interventions for patients at higher risk of regurgitation and aspiration. Chewing gum may be allowed up to 2 hours prior to anaesthetic induction.

Postoperative resumption of oral intake in healthy adults should be encouraged as soon as they feel able to do so providing that there are no contraindications.



In children "the 2–4–6 rule" can be applied:

- "2"—intake of water and other clear fluids up to 2 hours prior to induction of anaesthesia.
- "4"—Breast milk up to 4 hours before.
- "6"—Formula milk, cow's milk or solids up to 6 hours before.

As in adults, those children who are judged to be at higher risk of regurgitation and aspiration should be considered on an individual basis by the anaesthetic team.

Postoperatively oral fluids should be offered to healthy children when they are fully awake following anaesthesia, providing there are no contraindications. In children there is not usually any requirement to drink as part of discharge criteria.

Great effort should therefore be made to inform patients whether they are scheduled for surgery on a morning or afternoon list and appropriate fasting times for each in an effort to minimize prolonged fasting and subsequent dehydration.

Concurrent Medication

It is important that patient's receive appropriate advice regarding the continuation of their usual medication in the preoperative period and particular consideration should be given to those that may interact with drugs given during anaesthesia as well as whether the surgical procedure itself may be affected by, or indeed affect, such medications. Medications may have to be continued, stopped or adjustment

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made to their dosages and or timings. In some instances the anaesthetic technique may need to be modified to minimize the risk of any adverse interactions occurring at the time of surgery. Sometimes an alternative mode of administration or formulation of a particular drug may be required[7].

Many drugs should be continued as normal preoperatively and the vast majority can be safely taken with a sip of water up to 2 hours prior to induction of anaesthesia.

Drugs that are important in terms of providing optimal control of underlying conditions should usually be continued preoperatively and include:

- Anticonvulsants
- Most cardiovascular drugs including most antihypertensives (discuss ACE inhibitors with an anaesthetist), antianginals and antiarrhythmics.
- Bronchodilators
- Corticosteroids
- Antiparkinsonism drugs

Some drugs may need to be stopped preoperatively and these should be considered on an individual basis taking in to account each patient's underlying condition and the nature and extent of the planned surgery.

It is usual to stop warfarin therapy three to five days preoperatively and consideration made of the need to place the patient on alternative heparin therapy. A clotting screen should be performed in each of these patient's preoperatively.

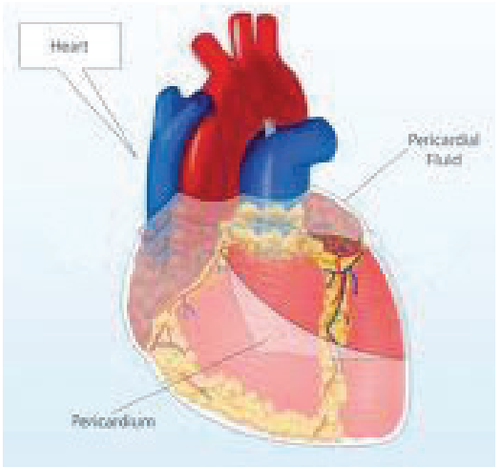
In an effort to minimize the risk of venous thromboembolism oral contraceptives and hormone replacement therapy are often stopped several weeks before surgery.

Due to the potential for potentially harmful interactions with other medications lithium therapy is stopped 24 hours prior to surgery.

When oral intake is resumed postoperatively most of these medications can be safely restarted as normal. If there is likely to be a delay in this occurring it may be necessary to consider alternative routes of administration.

Corticosteroids

The dose and formulations of these drugs are usually modified perioperatively depending on the risk of adrenal suppression. The effect on the hypothalamic-pituitary-adrenal axis has not been demonstrated with prednisolone doses of 5 mg daily or less. Those patients who are taking higher doses of corticosteroids and undergoing major surgery will require additional steroid supplementation with intravenous hydrocortisone.



Monoamine Oxidase Inhibitors

These drugs irreversibly inhibit the enzyme monoamine oxidase and may thus interact with a number of drugs given by an anaesthetist. Although it is no longer thought to be necessary to stop these drugs three weeks prior to surgery in order to allow re-synthesis of the enzyme the anaesthetist may choose to modify their anaesthetic technique in those patient's taking this class of medications. MAOIs are known to interact with opioids, (particularly pethidine) and may cause both cardiovascular and cerebrovascular excitation or depression. The concurrent administration of sympathomimetic agents may precipitate hypertensive crises.

Tricyclic Antidepressants

TCAs block the reuptake of noradrenaline by postganglionic sympathetic nerve endings. Patient's taking these medications are therefore more sensitive to catecholamines and at risk of developing hypertension and arrhythmias when given sympathomimetics.

Low Molecular Weight Heparins

Whenever spinal or epidural anaesthesia is planned it is important to consider the use of LMWH used as thromboprophylaxis. It is necessary to wait for at least 12 hours following the administration of any LMWHs before performing any central nerve blockade in order to minimize the risk of the patient developing a vertebral canal haematoma.

Platelet Antagonists

In certain circumstances medications such as NSAIDs and aspirin may need to be stopped in patient's who are at risk of excessive bleeding. Increasing numbers of patients are taking the potent platelet antagonist clopidogrel and this must be noted at the preoperative assessment and a decision made, often in consultation with a cardiologist, about the safe withdrawal of this medication prior to planned surgery.

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Herbal Medicines

It is important to actively ask at the pre-assessment visit whether patients are taking any herbal medicines as they often do not declare they are otherwise. Some of these drugs are associated with complications such as bleeding, strokes and myocardial infarction and may interact with other medications.

Garlic is thought to be beneficial for raised blood pressure in addition to lowering serum lipid and cholesterol levels. It is also inhibits platelet function and may lead to an increased bleeding risk particularly if combined with other platelet antagonists and should be discontinued 7 days prior to planned surgery.

Some patients take ginseng in order to relieve stress and it has been shown that the active components may have similar effects to steroid hormones. This can lead to an increased risk of hypoglycaemia perioperatively, and it has also been shown to have an anticoagulant effect and should be stopped 7 days preoperatively.

St John's Wort may be used to treat the symptoms of mild depression and its effects are thought to be mediated via inhibition of serotonin, noradrenaline and dopamine reuptake. As a result its use can lead to the development of a central seretoninergic syndrome. It is also known to be a potent enzyme inducer and can therefore effect the metabolism of a number of other drugs and should also be discontinued 7 days prior to any elective surgery.

Appendix 1

Cardiovascular disease (from NICE preoperative testing)

'Mild'

Mild angina pectoris (no/slight limitation of ordinary activity, e.g., >1 flight of stairs).

Myocardial infraction >1 month ago (including Q waves on an ECG).

Compensated HF (no/slight limitation of activity, comfortable at rest).

'Severe'

Severe of unstable angina with marked limitation of ordinary activity. Myocardial infarction <1 month ago.

Decompensated HF with marked limitation of ordinary activities or symptoms at rest.

Severe valvular disease (exercise induced syncope, angina, dyspnoea, orthopnoea, fatigue, palpitations).

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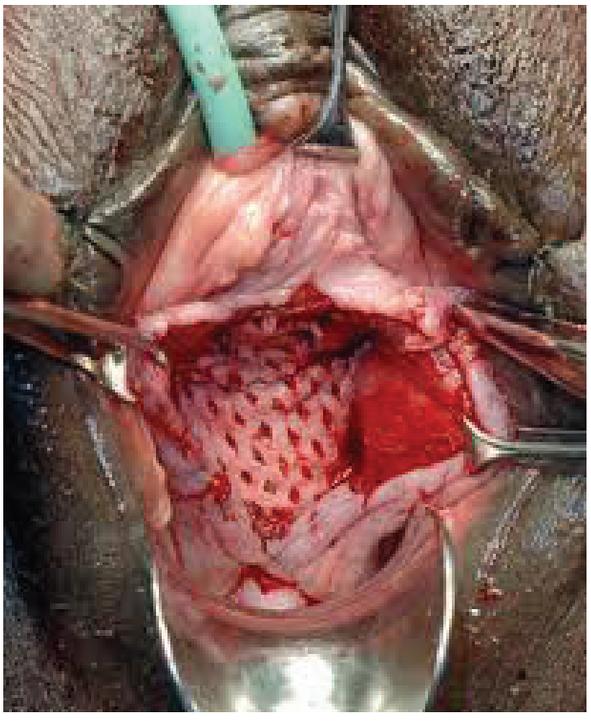
COMMON SURGICAL PROBLEMS ENCOUNTERED BY FOUNDATION DOCTORS WORKING IN OBSTETRICS AND GYNAECOLOGY

Mr C. Wright, Mr M. C. Tutton

Abstract

Foundation doctors working in Obstetrics and Gynaecology (O&G) will frequently come into contact with illnesses from other disciplines. It is important that they are aware of the most common such illnesses and should be able to recognize them and in many cases initiate the first steps in investigation and/or treatment. This paper gives an overview of the most common general surgical conditions which occur in obstetric or gynaecological patients together with the principles of investigation and management.



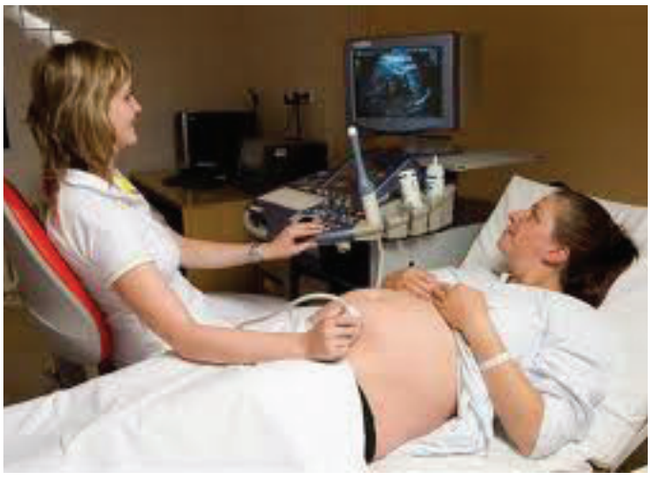
Common Surgical Problems Encountered by Foundation Doctors Working in Obstetrics and Gynaecology
Practical Procedure

Introduction

There are a number of general surgical conditions which are commonly encountered by doctors working in obstetrics and gynaecology (O&G). Some can be difficult to distinguish from gynaecological problems, whilst others present dilemmas in management, particularly in pregnant patients. Prompt recognition, thorough assessment and appropriate treatment are the keys to improving outcome.

Appendicitis

Probably the surgical problem most frequently encountered by O&G doctors is acute appendicitis, which can easily be mistaken for gynaecological disorders. In women of childbearing age, the diagnostic accuracy of appendicitis can be as low as 60%[1], and even experienced surgeons sometimes struggle. Also, although appendicitis is the single most common cause, it still accounts for less than half of women presenting acutely with RIF pain[2].



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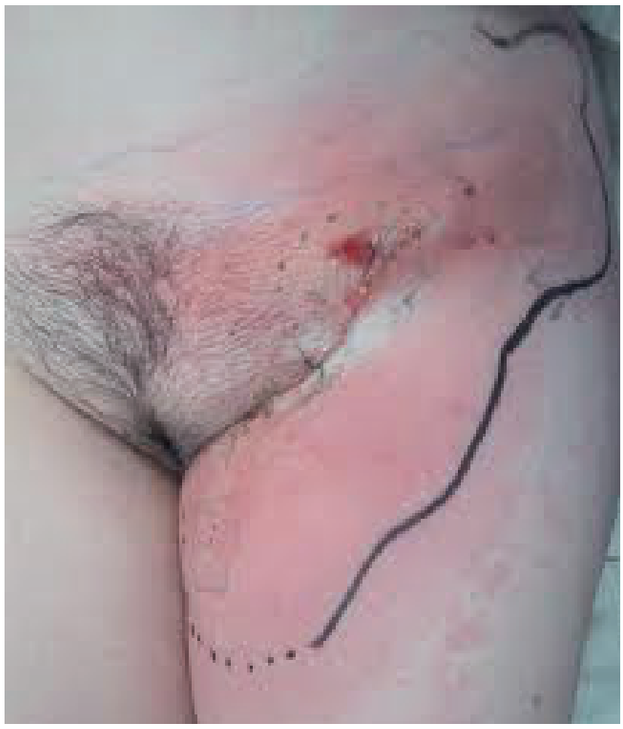


Presentation

The classical presentation of appendicitis is the triad of migratory abdominal pain (initially central, migrating to RIF), together with anorexia and GI upset (diarrhoea or vomiting). If present, this triad is 95% accurate in predicting appendicitis, however it is present in only two-thirds of patients with appendicitis[3]. Urinary symptoms such as dysuria and frequency may be present, and urine dipstix may be positive as a result of bladder irritation from an inflamed appendix and can cause confusion.

Investigations

Both leucocytosis and raised CRP add to the certainty of diagnosis, particularly in more severe appendicitis. However, both can be normal even with severe inflammation[4–6]. Where doubt still exists, ultrasound is often used for assessment of the pelvic organs rather than to confirm the diagnosis of appendicitis. The sensitivity and specificity of ultrasound in diagnosing appendicitis has been reported above 90%[7], however in non-specialist hands the false-negative and false-positive rates are substantially greater[8]. Unhelpfully therefore, a normal scan does not preclude either appendicitis or a gynaecological problem as false negatives for both are common[9].

CT has good sensitivity and specificity for diagnosing appendicitis[7], but also shows the pelvic organs and may demonstrate other differentials. It is, however, difficult to justify CT in relatively well young women with non-specific abdominal pain and a period of observation may be preferable.

Diagnostic laparoscopy is increasingly being used to investigate young women with equivocal RIF pain. It reduces the chance of readmission in the short term compared with observation, and regardless a significant number of those admitted for observation will eventually undergo laparoscopy due to failure to settle[10].

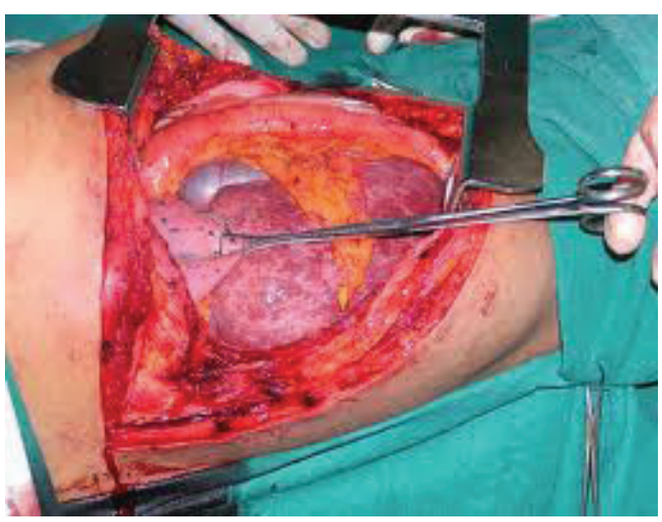
Management

Primary antibiotic therapy will usually resolve appendicitis, however upto one-third will recur over the following 18 months[11,12]. Therefore, appendicectomy remains the mainstay of treatment. The balance with RIF pain patients is in trying to reduce unnecessary surgery (negative appendicectomy), whilst avoiding delay in treatment, leading to perforation which carries a higher risk of morbidity and mortality[1].

Appendicitis in Pregnancy

Appendicitis occurs in 0.05%–0.1% pregnancies[13,14]. Once the uterus moves out of the pelvis it displaces the appendix cephalad, and the pain therefore may not localise to the RIF but instead to the right flank or even right upper quadrant (RUQ)[14]. The associated symptoms of nausea, diarrhoea and anorexia may be attributed to the pregnancy and may therefore be missed if subtle. Delay in presentation and treatment is therefore commonplace, resulting in perforation in upto half of cases[14], which carries a higher risk of foetal loss and maternal complications[14,15]. MRI may have a role in equivocal cases where CT is contraindicated[16].

Surgery remains the treatment of choice. Laparoscopic appendicectomy is, however, relatively contraindicated because of the gravid uterus, and there may also be a higher risk of foetal loss[17]. The decision on whether and/or when to operate must be made by senior surgeons in communication with senior obstetricians.



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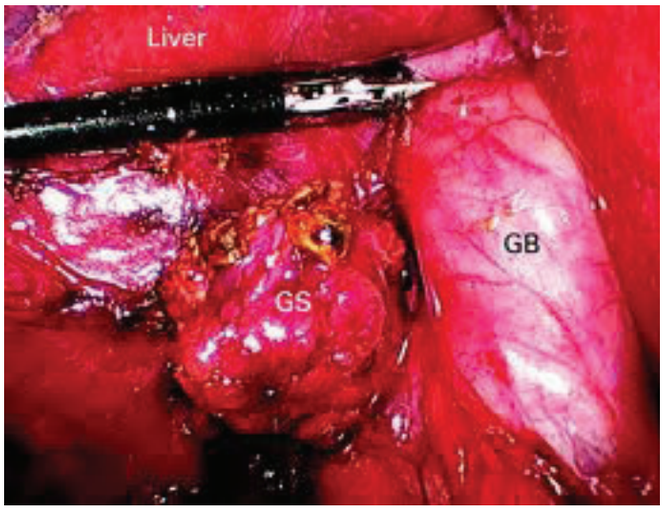
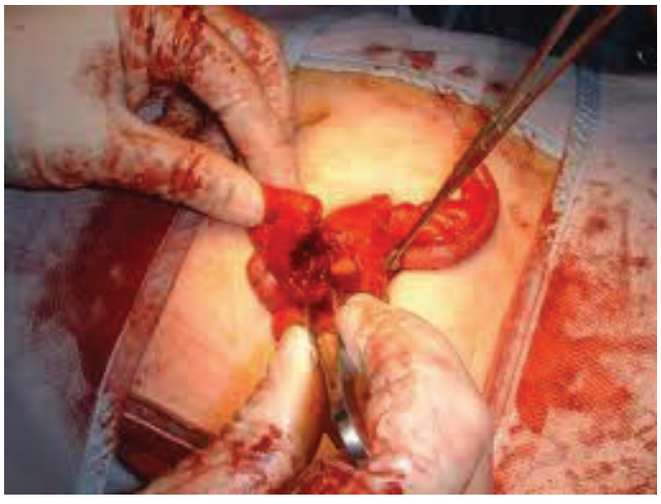


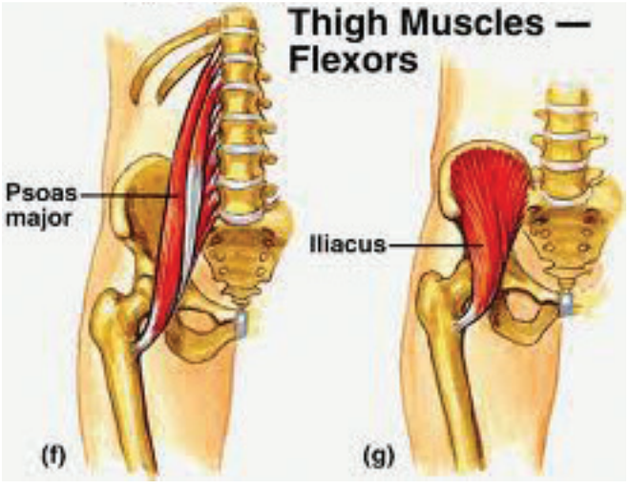
Other Surgical Conditions Presenting With RIF Pain

Diverticular Disease

This is a benign condition where the colonic mucosa herniates through the muscular wall of the bowel causing small outpouchings. It is associated with a low fibre diet causing high intraluminal pressures and with advancing age, however it can be seen in younger patients. The sigmoid colon is most often affected (95%–98%[18]). Diverticular disease can become complicated by inflammation (diverticulitis), abscess formation or perforation. Long-term complications include stricture formation and fistulation (e.g., colovaginal fistula).

Although the classic presentation of diverticulitis is of left iliac fossa pain and tenderness, occasionally patients may present with pelvic

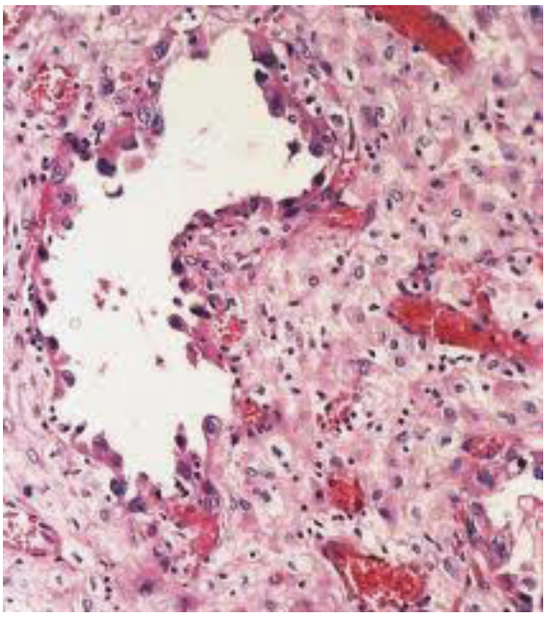




pain or even, if the sigmoid colon is highly mobile, pain in the RIF. They may have signs of sepsis, diarrhoea with or without bleeding and possibly a history of similar episodes in the past.

The gold-standard outpatient investigations are either endoscopy or contrast imaging (e.g., barium enema or CT pneumocolon). However, in the acute setting CT scan without rectal contrast will often delineate the extent of disease and/or complication.

The treatment of diverticulitis is supportive, including antibiotics; however, surgery may be indicated in complicated disease. Colovaginal fistulae usually require operative correction, either by resection of the colon or alternatively by defunctioning the bowel with a loop stoma which may allow the fistula to heal.



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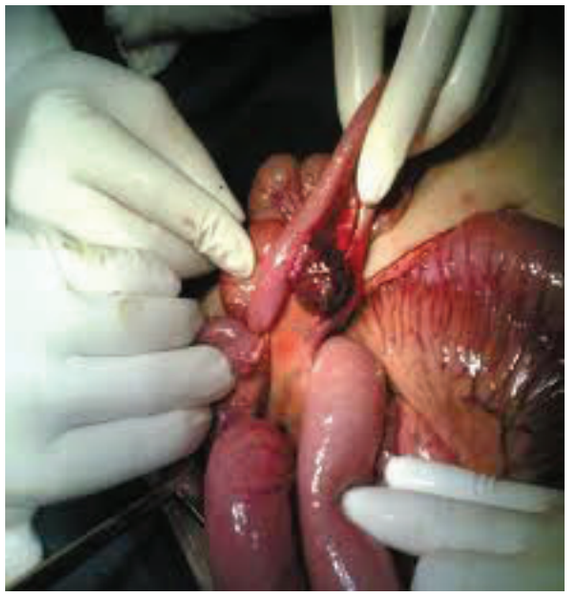


Crohn's Disease

This is a condition of unknown aetiology which has a wide spectrum of possible features. It affects up to 0.1% population, is more common in women and has a peak age of onset between 15 and 30 years with a second peak in the 6th decade[19]. It is one of the uncommon differentials for appendicitis, often presenting with RIF pain as it most frequently affects the terminal ileum. Often features may be present, such as systemic upset, weight loss, diarrhoea with or without bleeding and perianal disease. Crohn's disease involves inflammation and ulceration of the full thickness of the bowel wall and can also present with entero- or colovaginal fistulation.

Differentiation from appendicitis and adnexal pathology can be difficult. The diagnosis of Crohn's is histological but typical features may be seen on CT, MRI or on contrast enemas. Ultrasound and plain X-rays are not usually helpful. Surgery is often reserved for complicated Crohn's or for situations where medical treatment has failed and often involves some measure of bowel resection.

Symptomatic Gallstone Disease in Pregnancy

Gall stone disease is the second most common general surgical problem in pregnancy (after appendicitis) [20] . A total of 31% women develop biliary sludge and 2% new stones during pregnancy[21]. However, the majority of patients with gallstones remain asymptomatic, and just 0.1% pregnancies require cholecystectomy[21].

Biliary Colic

Patients present with colicy RUQ pain which is often exacerbated by (fatty) food. Patients are often well otherwise, but the pain can be severe enough to require opioid analgesia until the pain resolves spontaneously. Patients may experience further attacks unless the gallbladder is removed, although as symptoms may settle following delivery, cholecystectomy is not done whilst pregnant unless symptoms are so severe as to necessitate surgery.

Cholecystitis

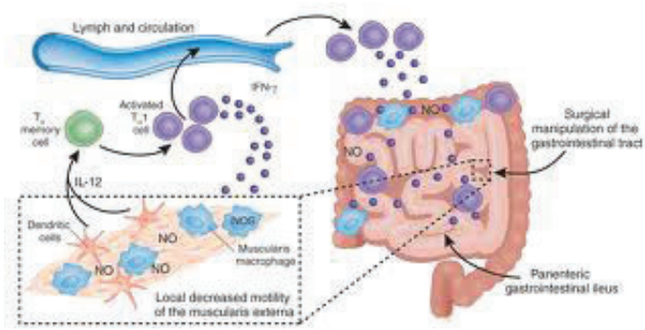
When the gallbladder becomes inflamed or infected, patients present with RUQ pain which becomes constant rather than colicy and which is not necessarily exacerbated by food. In contrast to biliary colic, they will also have tenderness on palpation in the RUQ and may have signs of sepsis such as pyrexia and raised inflammatory markers. Ultrasound can often demonstrate the inflamed gallbladder. The acute episode is treated with broad-spectrum antibiotics which are usually effective, but one-third will relapse and cholecystectomy may be necessary during pregnancy[22].

Gallbladder Empyema

This occurs when an abscess forms in the gall bladder due to an obstructing gallstone in Hartmann's pouch. As with any abscess, treatment is by drainage which can be safely achieved in pregnancy under ultrasound guidance. An alternative is acute cholecystectomy. But as empyema is a rare complication, data on this is scarce. Ultimately the patient will require cholecystectomy to prevent further problems if not performed acutely.

Obstructive Jaundice

Obstruction of the common bile duct (CBD) by a gallstone presents with colicy RUQ pain and/or jaundice. Other classical features include pale stool and dark urine as the bile pigments which are usually eliminated in stool must instead be excreted by the kidneys. Blood tests will demonstrate the abnormal liver function tests and the diagnosis can be confirmed by ultrasound. If good views cannot be obtained then magnetic resonance cholangiopancreatography will safely identify the obstruction. Removal of the stone can be performed either endoscopically (ERCP) or operatively (CBD exploration at cholecystectomy). Evidence for either of these is scarce. ERCP involves X-ray screening, however



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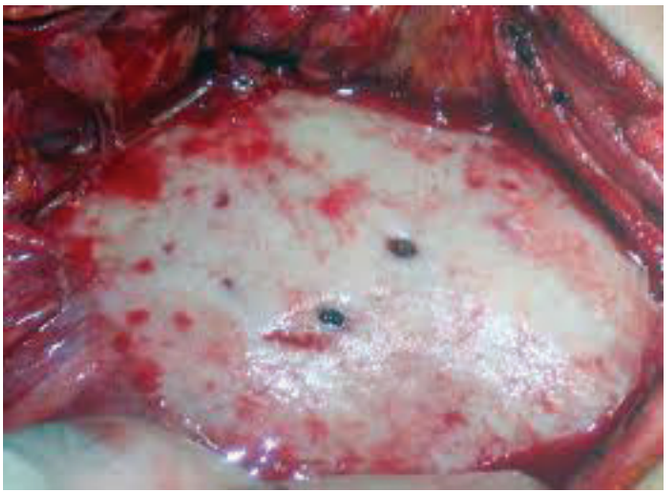

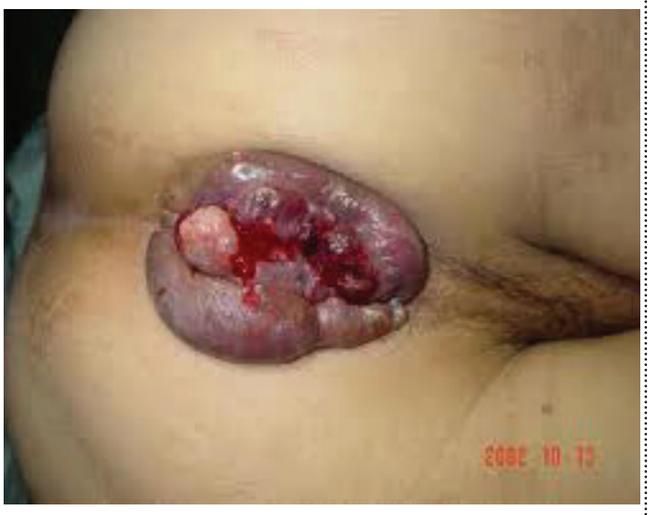

the radiation dose can be kept small and in one study no complications were identified in 15 consecutive ERCPs on pregnant women[23]. The evidence for CBD exploration is at present only in the form of case reports or small series but again would appear to be safe[24].

Pancreatitis

This is a potentially life-threatening condition, the commonest cause of which is gallstones which account for approximately 70% cases[23]. Patients present with upper abdominal pain which radiates through to the back. Systemic upset or complications may be present at the time of presentation. Blood amylase levels may help to confirm the diagnosis; however, this has poor specificity and levels rapidly return to normal. Ultrasound will not usually visualize the pancreas itself, but will show whether the patient has gallstones. In equivocal cases MRI is an alternative to CT to confirm the diagnosis.

Treatment is supportive, dealing with complications if they arise. Antibiotics are usually not indicated unless severe and early enteral feeding is beneficial if tolerated[37]. Cholecystectomy for gallstone pancreatitis is ideally performed either on the same admission or within 2 weeks of discharge[25].

Cholecystectomy During Pregnancy

This is reserved for patients who suffer severe gallstone complications or recurrent attacks. What limited evidence exists suggest that surgery is safe for both mother and foetus, although some authors advocate surgery in the second trimester as far as possible[26,27]. Once again decisions on whether and when to operate should be taken by senior surgeons and obstetricians.

Haemorrhoids (Piles)

Haemorrhoids are abnormally dilated anal cushions and are the commonest anorectal condition in pregnancy. One study found that 85% women during their second and third pregnancies had piles[28]. This is compared with a general prevalence of 50%–60% among middle-aged people[29]. The reason for this is that haemorrhoids are associated with constipation and high intra-abdominal pressures, both of which are found in pregnancy.

Presentation

The most common features in pregnancy are typical fresh rectal bleeding and perianal pain which may be associated with the bleeding[29]. Other features include pruritis ani, mucous or faecal-stained discharge and haemorrhoidal prolapse (felt as a lump at the anal verge following defecation). Patients may present acutely with a large bleed and painful prolapse or thrombosis. Rectal examination with proctoscopy will usually confirm the diagnosis; however, one must be mindful of other causes for the symptoms which can include inflammatory bowel disease and even bowel cancer, although this is obviously rare in the pregnant population. If there is doubt then further investigation is indicated with flexible sigmoidoscopy.

Management

Haemorrhoids are benign and often self-limiting, albeit distressing for the patient. Treatment of minor piles should concentrate on reducing straining by avoidance of constipation together with local pain relief as required. Banding or sclerotherapy combined with laxatives can be effective; however, recurrence risk is considerable in pregnancy. Following delivery, symptoms will often rapidly and spontaneously improve or resolve and hence the aim is to manage the piles conservatively and reserve surgery for those who do not improve. Reassurance is paramount as the symptoms can generate significant anxiety.

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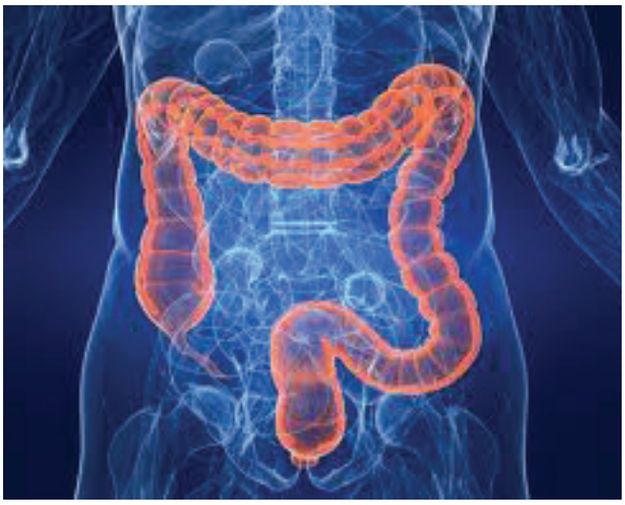

Surgical Complications of O&G Procedures

Small Bowel Obstruction

Most cases will not present to O&G, however there are exceptions. The commonest causes of small bowel obstruction (SBO) are adhesions, malignancy and hernias. Adhesions between small bowel and a fixed structure (e.g., abdominal wall), can cause the adherent loop or loops of bowel to 'kink' and become obstructed. The presenting features vary depending on the level of obstruction. Proximal obstruction tends to present with vomiting as an early feature with central colicy abdominal pain. A history of some form of previous surgery is almost invariable. Patients may still open their bowels for some time after the onset of obstruction which can cause confusion. Distal obstruction causes similar pain, but vomiting may well be a late feature and loss of bowel function may occur sooner. Patents with adhesional obstruction are not usually tender unless the obstructed bowel strangulates. The classical high-pitched or "tinkling" bowel sounds may be present, but are a subjective.

Adhesional obstruction can unusually occur early following surgery (within the first few weeks), which can thus be mistaken for other complications, however it more commonly occurs some time after surgery. Most patients with will settle with conservative management, which includes fluid resuscitation, nasogastric tube drainage and keeping patients nil by mouth, however some will require adhesionolysis +/- bowel resection in order to relieve the obstruction.

Most hernias can cause SBO if a loop of bowel becomes incarcerated. O&G doctors are most likely to see this with incisional hernias. Port-site hernias, for example, following laparoscopic procedures might cause acute SBO in the immediate post-operative period should a loop of bowel become incarcerated. This will present with a patient who is not improving as expected following surgery with persistent vomiting, worsening abdominal pain and possibly failure of bowel movements post-operatively which can be mistaken for ileus. The finding of a tender lump in the vicinity of the surgical incision is highly suggestive, and there may well not be the classical hernia cough impulse. Features in the overlying skin such as redness, warmth or oedema may suggest strangulation. Plain abdominal X-ray may confirm loops of small bowel but if findings are equivocal then CT should demonstrate both the presence of SBO and indicate the offending hernia. Treatment is invariably operative, either open or laparoscopic to reduce and repair the hernia +/- resect any non-viable bowel.

Malignant SBO can occur with several cancers, one of which is ovarian malignancy. The features of SBO may be accompanied by features suggestive of the primary tumour and weight loss is often present. Suspicion may be raised by radiological appearances of SBO in patients without a history of surgery. CT scan is indicated in these individuals and may be helpful in delineating the underlying pathology and giving some indication of the extent of disease. For small volume, localised disease, surgical resection or bypass may be better in relieving the obstruction than medical treatments such as chemotherapy. Advanced and extensive malignancy however often makes surgery difficult (or impossible) and palliative chemotherapy may confer some benefit in relieving the obstruction.

Post-operative Ileus

This has long been recognized as a complication of abdominal surgery or trauma, although less so following laparoscopic surgery[30]. The mechanisms are poorly understood but a period of reduced bowel motility occurs which can last up to 2 weeks after the index event. Patients present with failure to improve following surgery, with abdominal distension and pain, vomiting with difficulty tolerating oral intake, and failure of bowel activity. Nasogastric aspirates may be high if measured and bowel sounds will be absent. Abdominal X-rays may demonstrate dilated small bowel loops; however, during ileus there is significant movement of fluid into the bowel lumen and loops may not therefore be seen on plain films. CT scan will show global small bowel distension with no cut-off point suggestive of adhesions or hernias.

Treatment for post-operative ileus is supportive with intravenous fluids and careful fluid balance monitoring. Nasogastric drainage will reduce vomiting but early enteral feeding has been shown to reduce the period of ileus in a randomised controlled trial if tolerated[30]. Prolonged ileus may require the parenteral feeding; however, very often the ileus has resolved before benefit can been achieved. Various medications have been tried to reduce the period of ileus including laxative, pro-kinetic agents and acetylcholinesterase inhibitors, but

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none have been proven to be a cost-effective way of giving significant benefit[30].

Regardless, ileus is self-limiting and often resolves within a few days of the initial event. Early indicators of resolution include reduced nasogastric aspirates, improved appetite and tolerance of oral feed, a return of bowel sounds and the passage of flatus. This will often be followed by a short period of diarrhoea as the ileus fluid which has collected within the bowel is finally expelled. If patients fail to improve then one must consider the possibility that another complication has arisen and further investigations performed.

Summary

This paper provides a brief overview of some of the most common general surgical conditions which will be found in O&G patients. It is by no means an exhaustive list, but does highlight the diagnostic dilemmas that can occur in differentiating them from gynaecological problems. A close working relationship between O&G doctors and surgeons is essential in sorting out those cases in which these dilemmas occur with each relying on the expertise of the other in order to provide the most effective patient care.

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Teaching and Training

EARLY PREGNANCY UNIT: MANAGEMENT OPTIONS

Saira Sadiq, A N Eronini, Fadi Alfhaily, MA Khaled

Learning Objectives

- Recognize the role of early pregnancy unit (EPU) in managing early pregnancy problems.
- Understand the different management options in follow-up of women with unknown location of pregnancy.
- Improve decision-making based on clinical and ultrasound findings in management of women with early pregnancy problems.

Introduction

In recent years there has been growing interest in defining standardized management algorithms for women with early pregnancy problem, with more treatment as an outpatient basis and the development of more refined diagnostic techniques and therapeutic interventions.

All women with early pregnancy problems should have prompt and direct access to a dedicated EPU that provides efficient management and, when necessary, adequate counselling and appropriate treatment. The EPU service should be comprehensive and ideally located in a dedicated area with appropriate staffing support.

These units will help to avoid around 40% of hospital admissions and further 20% of shorter stay in the hospitals.

Case scenario part 1: presentation

During your on call for gynaecological emergency you received a phone call from a GP about a patient who is 21 years old. She presented to his surgery with 6 weeks amenorrhoea, vaginal bleeding and pain. She had a positive home pregnancy test 2 days ago. GP is asking you to see the patient as she worries very much.

How would you handle this call?

Early Pregnancy Unit: Management Options
Teaching and Training

Small number of women with pain and bleeding in the first trimester will have unknown location of pregnancy at the initial assessment. Majority of these cases will have a conservative approach of repeated investigations. However, the ideal timing and nature of these assessments depend on the clinical situation of the patient.

Early Pregnancy Units

Early pregnancy units require an efficient appointments system supported by appropriate setting, including: ultrasound equipment and easy access to laboratory facilities. The service should be available on a daily basis during the normal working week. Standardized information leaflets, referral and discharge letters should be available and regularly reviewed. High-risk groups, such as women who have had a previous ectopic pregnancy or recurrent miscarriage, can be offered future access to the service by direct self-referral via the appointments system.

Referral Criteria

There should be set criteria for referral to EPUs as 5%–10% of referral is found to be inappropriate, including 2%–5% who were not pregnant.

The following referral criteria should be followed to ensure appropriate use of EPU service:

- Positive pregnancy test.
- Less than 16 weeks gestation.
- Presenting with mild PV bleed and/or pelvic pain.
- History of first trimester miscarriage or ectopic pregnancy.
- Suspected retained product of conception following delivery or termination

However, the following cases should not be referred to EPU:

- Patients presenting with profuse vaginal bleeding or acute severe abdominal pain.
- Patients who are haemodynamically unstable

Women who are unwell, bleeding heavily or in whom an ectopic pregnancy is highly suspected should be advised to be admitted

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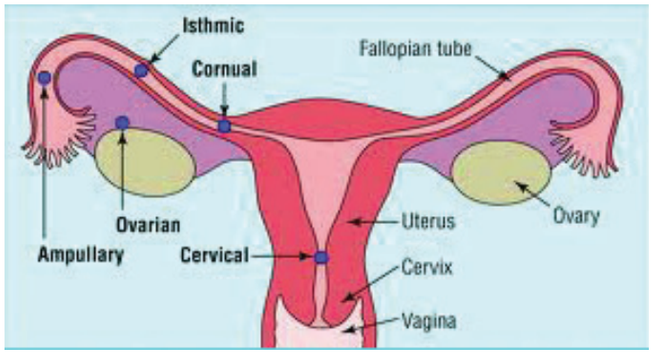


through the usual channels and not asked to wait for an appointment in an EPU. These patients must be seen first by the on call team and then managed accordingly.

Sources of Referral

A referral to EPU will be accepted from the following channels:

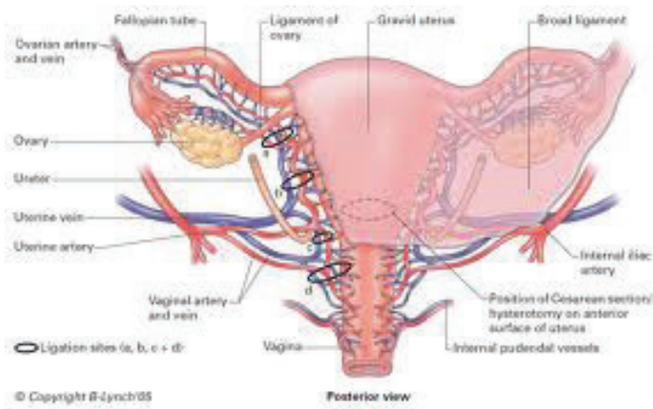
- GP referral
- Practice nurses
- Community midwives
- Patient self-referral in selected cases only (i.e., previous ectopic or pregnancy a recurrent miscarriage)
- Ultrasound department
- Antenatal/gynaecological wards
- Accident and emergency department

Initial Management in EPU

A brief history should be taken and a clinical examination should be considered when appropriate.

The history should be focused on:

- Previous obstetric history, LMP, urine pregnancy test in this pregnancy
- Description and characteristic of pain and bleeding
- Passage of Products of conception



Pelvic examination is not mandatory for all patients as anxiety levels are high in all patients attending with bleeding in early pregnancy. Moreover, there is no scientific evidence to support detailed infective screening in sporadic miscarriage. However, pelvic examination should be offered in cases of:

- Heavy bleeding
- Significant pain
- Possibility of products in the cervical os
- Evidence of sepsis
- Suspected ectopic pregnancy
- Recurrent bleeding, to exclude local causes.

Then a management plan and follow-up should be formulated based on the local guidelines and this may include:

1. A pregnancy test should be performed if a pregnancy is not clearly visible.

Case scenario part 1: presentation

Answer

A brief history should be taken from the GP over phone to be able to give the correct advice, including: previous obstetric history, LMP, urine pregnancy test in this pregnancy, characteristic of pain and bleeding.

If the patient is clinically and haemodynamically stable she could be given an appointment in EPU for further assessment and ultrasound examination to confirm the location of the pregnancy.

If she is clinically and haemodynamically unstable or there is very high suspicion of ectopic pregnancy, then you should advise the GP to send the patient to gynaecological ward or A&E department for initial management and resuscitation if required. If in doubt an advice from a senior colleague is mandatory.

Feedback and part 2: Follow-up in EPU

The GP informed you that the patient is clinically and haemodynamically stable: BP is 106/77 and her pulse is 88. This is her first planned spontaneous pregnancy and no risk factors for ectopic pregnancy.

You arranged for her to come to EPU next day morning for further assessment.

In EPU, she was stable, complaining from mild PV bleeding preceded by lower abdominal pain mainly in the left iliac fossa.

Urine pregnancy test repeated and was positive.

TVS done and showed: anteverted uterus, no gestational sac was seen, no free fluid in pelvis and no adnexal masses seen

What are your further steps for management and follow-up?

EARLY PREGNANCY UNIT: MANAGEMENT OPTIONS

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2. Transvaginal ultrasound scans (TVS)
3. Serial serum β-hCG assay and/ or single serum progesterone should be done if a pregnancy is of unknown location.
4. Support should be given where the pregnancy is non-viable or the woman is upset.
5. Appropriate written advice and telephone numbers for contact should be given at the end of each consultation.

Ultrasound Appearance of Pregnancy

The RCOG encourages a simple classification of ultrasound appearances which includes:

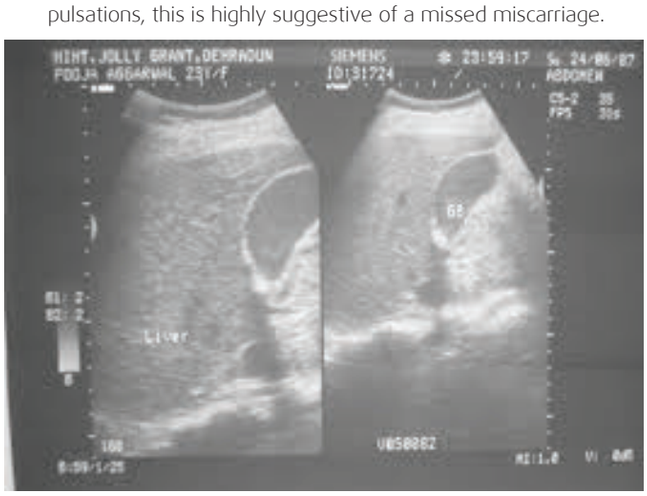
1. Viable intrauterine pregnancy (IUP)
2. Non-viable IUP (e.g., incomplete, missed)
3. IUP of uncertain viability
4. Ectopic pregnancy
5. Pregnancy of unknown location (PUL)

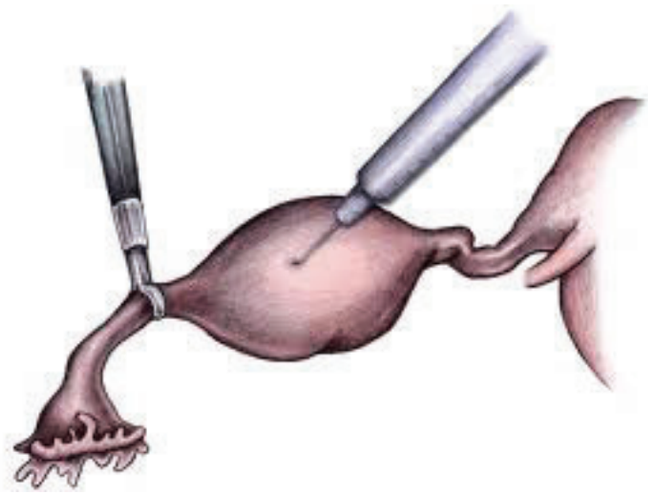
The ultrasound report should contain clear and full information about: number of sacs and mean gestation sac diameter, regularity of the outline of the sac, presence of retroplacental haematoma, presence of a yolk sac, presence of a foetal pole, crown rump length (CRL) measurement (mm), presence of foetal heart pulsation and extra uterine observations: ovaries, adnexal mass, fluid in the P.O.D.

TVS is the single most useful diagnostic tool in managing these women. An intrauterine gestational sac has 99% specificity for exclusion of ectopic pregnancy, and a complex adnexal mass or adnexal foetal pole/heart beat is specific for ectopic pregnancy in 99% and 100% respectively, but will only be seen in 56% and 10% of cases.

According to RCOG criteria:

- If the gestation sac has a mean diameter >20 mm with no evidence of an embryo or yolk sac, this is highly suggestive of a missed miscarriage.
- If the embryo has a CRL >6 mm, with no evidence of heart pulsations, this is highly suggestive of a missed miscarriage.





- When the mean gestation sac is <20 mm or the CRL is <6 mm a repeat examination should be performed at least one week later.

Management Options and Follow-up Recommendations

All EPUs should develop diagnostic and therapeutic algorithms for management of women with early pregnancy problems especially for the management of suspected ectopic pregnancy, IUP of uncertain viability and for PUL.

TVS, serial serum β hCG levels and progesterone may all be required to establish a definite diagnosis.

Table 1 Shows the ultrasound visualisation of embryonic structures

Structure	TAS	TVS
Gestational sac	5.5–6 weeks	4.5–5 weeks
Yolk sac	6–6.5 weeks	5–5.5 weeks
Foetal pole	7 weeks	5.5–6 weeks
Cardiac activity	7 weeks	6 weeks
Foetal parts	>8 weeks	8 weeks

In a healthy intrauterine pregnancy, serum levels of β-hCG double approximately every 48 hours. The lower limit of the reference range to which serum β-hCG should increase during a 2-day period is 66%. However, 15% of healthy intrauterine pregnancies do not increase by 66%, and 13% of all ectopic pregnancies have normally rising β-hCG levels of at least 66% in 2 days; moreover, 64% of ectopic pregnancies initially may have normal doubling β-hCG levels.

Management of Viable IUP

Foetal heart activity seen on TVS is generally associated with a successful ongoing pregnancy rate of 85%–97%, depending on the period of gestation.

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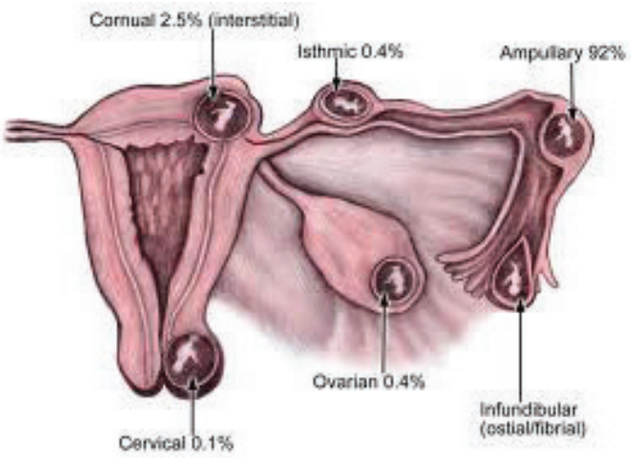


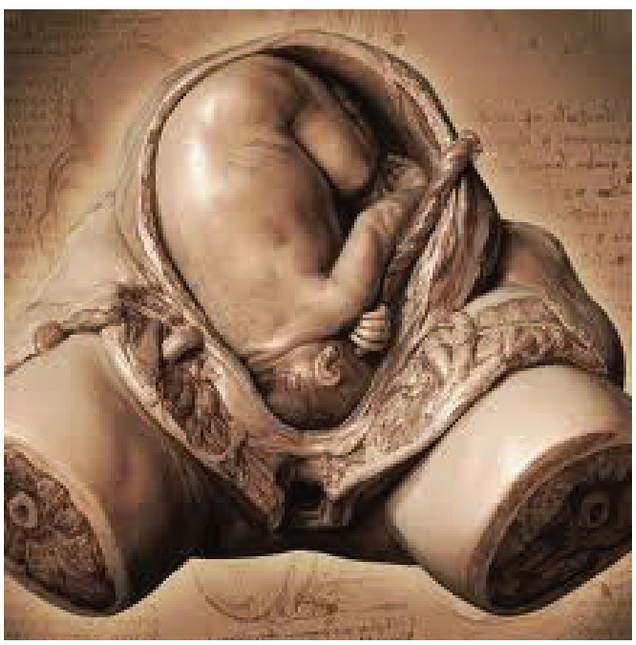
Women with threatened miscarriage and minimal bleeding will go back to GP to be referred the antenatal clinic via the usual route, with EPAU contact number given in case they need it.

Management of Non-Viable Pregnancy

Women with nonviable pregnancy should be supported in making informed choices about their care and management. Adequate explanation supplemented with written information and related leaflets should be provided.

Conservative method should be offered as an option provided the bleeding is not heavy and a rescan arranged 2 weeks later with a course of antibiotics. Advice should be given to the women to report if bleeding persisted after 2 weeks.

Alternatively, medical management may be offered if patient is not willing to wait or surgical evacuation is arranged if a patient has a strong preference.



Management of Pregnancies of Unknown Location

Women with PUL should have, in addition to monitoring their clinical status, close surveillance with serial serum β-hCG measurements every 2–3 days and repeat TVS when β-hCG is 1,000 IU/L or 1 week later.

The woman should be provided with appropriate information explaining clearly the need for further follow-up visits.

Management of Ectopic Pregnancy

Depending on clinical situation, management of ectopic pregnancy may involve: expectant, medical or surgical management (Salpingotomy vs. salpingectomy: mainly laparoscopically but laparotomy on occasions)

Feedback and part 2: Follow-up in EPU

Answer

The ultrasound report suggests PUL. Therefore, the pregnancy could be ectopic or failing intrauterine.

A serum β-hCG and serum progesterone tests done and the results were: 650 and 20, respectively.

She remained clinically stable.

How would you arrange her follow-up?

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Feedback and part 3: Diagnosis and management

Repeat TVS showed: thickened heterogeneous endometrium measuring 17 mm with no definitive intrauterine sac. Small amount of free fluid seen with left adnexal mass measures 2.5 mm and normal left ovary.

A repeat β-hCG was 1,000 IU/L. A diagnosis of intact ectopic pregnancy was made, and the patient was admitted to gynaecological ward and had uneventful laparoscopic salpingectomy.

Support, Follow-up and Counselling

All women attending the EPU and undergoing outpatient management of an early pregnancy problem should be offered a contact number following their initial referral.

A routine follow-up appointment is not given after the completion of the treatment of miscarriage. Nevertheless all women are given contact numbers along with the appropriate leaflets which contain various telephone numbers.

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INVESTIGATING THE INFERTILE COUPLE

Samar Geris and Khaled Khaled

Investigating the Infertile Couple
Good Medical Practice

Learning Objectives

Understanding the definition of infertility

Recognition of the prevalence and causes of infertility

Considering the indication and appropriate course of investigation for the infertile couple

Introduction

Prolonged time to pregnancy (TTP) can cause a great deal of anxiety for a couple who are trying for a baby. It is important to be aware that this issue raises medical concerns and also social and emotional disquiet for the couple. It is therefore imperative that a sensitive, holistic approach is undertaken when initiating investigation for infertility.

Fertility can be primary, in couples who have never conceived or secondary, in those who have conceived previously and have been subsequently unsuccessful. The National Institute of Clinical Excellence (NICE) defines infertility as the, "failure to conceive after regular unprotected sexual intercourse for 2 years in the absence of known reproductive pathology," but in practice this definition is not that rigid; the World Health Organisation (WHO) states 12 months is the lower reference limit for TTP. Inability to conceive after this time is generally taken as indication for further investigation. In addition, factors such as the age of the women (>35), predisposing factors, chronic infection and malignancy should be considered when diagnosing infertility and deciding to initiate earlier investigation.

The probability of becoming pregnant for couples who have sexual intercourse every 2–3 days is 84% in the first year and 92% in the second year. In the UK, one in six couples (17%) will experience fertility problems. Although this is an increase from one in seven couples as outlined in the 2004 guidelines, it appears that more people are seeking help for such problems than previously. Infertile couples present to their GP at a later age compared with twenty years ago, and after a shorter period of failing to conceive.

This article is aimed at understanding the most common and most likely causes of infertility and the appropriate course of investigation

for these. Investigation should be timely and relevant, employing the use of invasive procedures only where indicated, thus minimising distress to the couple.

Causes

The causes of infertility can be divided into 4 principle categories; male infertility (30%), female infertility (45%), unexplained infertility (25%) and infertility of both; an identifiable cause is found in both the man and the woman in 30% of couples.

Table 1: Common causes of infertility

Male infertility	Female infertility
Semen abnormalities; oligospermia and azoospermia (16%), asthenozoospermia and teratozoospermia (17%)	Ovulatory failure; gonadotrophin deficiency, hyperprolactinaemia (7%), amenorrhoea and oligomenorrhoea (21%), PCOS
Coital disorders; ejaculation abnormalities (1%)	Tubal and pelvic damage; genital tract infection, Tubal damage (15%), pelvic adhesions (12%)
Structural/physiological abnormalities; Varicocele (17%), genital tract infection (4%), sperm autoimmunity (1.6%)	Uterine abnormalities (10%); uterine malformations, fibroids
Testicular failure; gonadotrophin deficiency (0.6%)	Physiological abnormalities; endometriosis (7%), cervical mucous abnormalities (3%)

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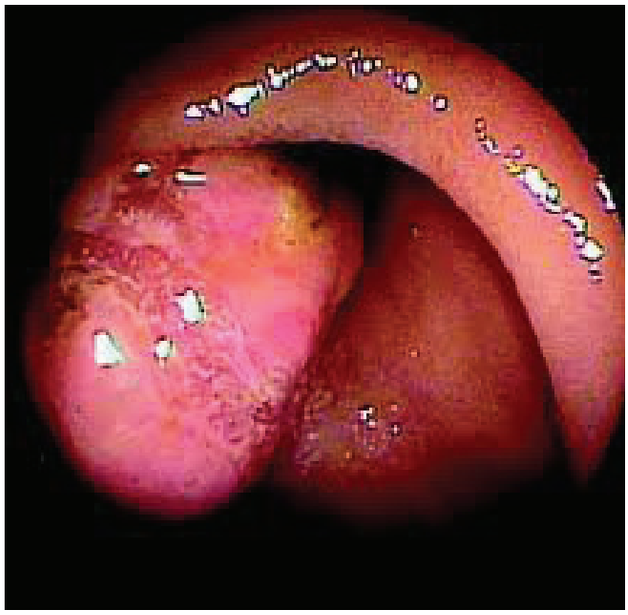


Course of Investigation

Principles of Care

A couple-centred approach should be taken, ensuring adequate support via access to counselling and support groups. It is important that the couple are well informed and that the appropriate evidence-based information is given to them, as although fertility treatment provides hope it is not always successful, and this can be devastating.

Initial Advice and Assessment

In the primary care setting, lifestyle advice should be given on smoking cessation, weight reduction, reducing alcohol intake and recreational drugs, and for the woman to start pre-conceptual folic acid. This should increase the chances of conceiving naturally.

- A BMI >29 especially in the woman is associated with reduced fertility. Weight loss is associated with resumption of ovulation in anovulatory women and a reduced miscarriage rate, and improves the reproductive outcome in all types of fertility treatment.
- Some drugs may be harmful in pregnancy
- Recreational drugs such as cannabis may contribute to male infertility
- Folic acid deficiency predisposes neurological foetal abnormalities

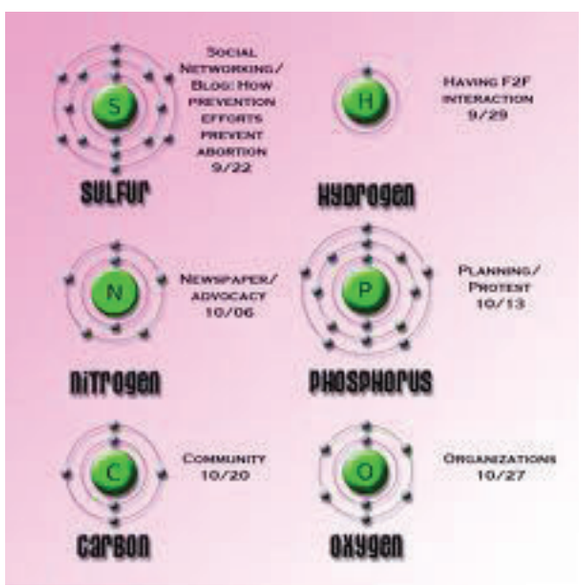
A detailed history is imperative to formulating differential diagnoses and planning the course of investigation. A general medical history should be taken with a detailed sexual history.

In particular ask the woman about:

- Age
  - A maternal age > 35 is associated with reduced fertility; 5% of women aged from 25 to 29 years are infertile, this increases to 9% at 30–34 years, and 20% at 35–39 years. Ovarian reserve also reduces with age.
- Sexual development and menstrual history, specifically age of menarche, length and regularity if cycle, characteristics of the bleeding.
- Previous pelvic infections and current vaginal discharge characteristics.
- Contraception; specific methods used and any complications.
  - Depot-Provera injection efficacy may persist long after injections have been stopped (up to 18 months).
- Previous pregnancies and their outcome; any miscarriages or ectopic.
- Abdominal or pelvic surgery including terminations.
- Family history; any early menopause or genetic abnormalities

Ask the man about:

- Sexual development; age of puberty, history of undescended testes.
- Previous children.
- Abdominal and genital surgery; hernia repair (may result in damage to the vans deferens, previous torsion and retroperitoneal/pelvic surgery (may result injury to the sympathetic nerve and anejaculation).
- Prior penile or testicular injury; excessive heat, trauma and torsion.



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- Infection; sexually transmitted infections (STI), adult mumps (orchitis).
- Erectile or ejaculatory dysfunction; associated with neurological co-morbidities, diabetes mellitus, and previous transurethral surgery.

In addition, the couple should be asked about:

- Occupation; if either partner works away, this may indicate reduced coital frequency, and difficulty timing intercourse with ovulation.
- Past medical history and review of systems; directly asking about diabetes, thyroid disease, cardiovascular disease and genetic disorders.
- Current medications and over-the-counter (OTC) drug use; medications such as anabolic steroids, spironolactone, phenytoin and chemotherapy can affect sperm quality.
- Social history; smoking (associated with poor sperm quality and increased miscarriage rates), alcohol, recreational drugs.
- Sexual history;
  - Technique; is penetration adequate?
  - Frequency; intercourse is recommended every 2–3 days particularly 14 days prior to the next menstrual cycle
  - Outcome of sexual intercourse and mechanical factors; dyspareunia, erectile dysfunction and ejaculatory failure.

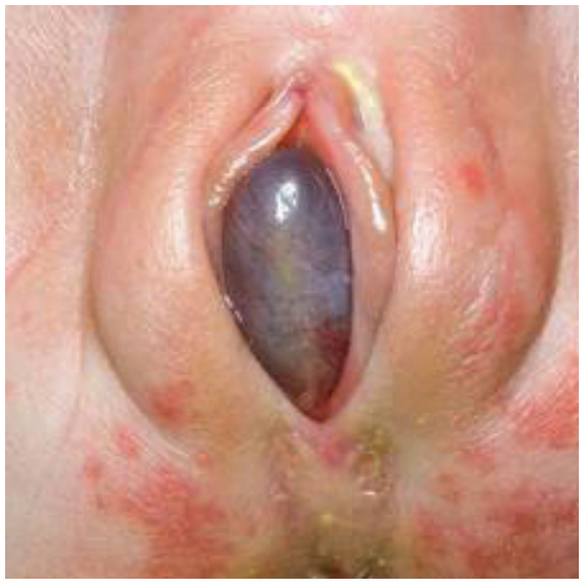
Clinical Examination

Female Examination

Record height, weight and blood pressure

Abdominal Examination

Inspect for scars, hair distribution, and hernias. Palpate the abdomen for tenderness and masses.



Digital Bimanual Examination

Inspect the vulva and vagina for any abnormalities; palpate the cervix for tenderness, texture, consistency, masses, and the presence of cervical excitation. Assess the size of the uterus and check for any adnexal masses.

Speculum Examination

Look for any vaginal, cervical abnormalities and discharge. Swabs may be taken if indicated.

Male Examination

Record height, weight and blood pressure

Further examination is normally indicated if sperm analysis is normal.

General Examination

Inspect for scars, hernias, gynaecomastia, and reduced hair distribution.

Genital Examination

Inspect for varicoceles, penile abnormalities and scars. Palpate the testes for size and masses.

Course of Investigation

Male

Semen Analysis

Semen abnormality is the most common cause of male infertility and is therefore the primary investigation.

These criteria have good sensitivity detecting nine out of ten men with true semen abnormality, but are not very specific, meaning an abnormal test does not always indicate a true semen abnormality. In clinical practice this means that if the result of semen analysis is normal, no

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Table 2: The WHO reference values for semen assessment (2000)

Criteria	Reference Values
Volume	2 ml or more
Liquefaction time	Within 60 minutes
pH	7.2
Sperm Concentration	20 million per millilitre (ml) or more
Total sperm number	40 million per ml or more
Motility	50% or more motile, 255 with progressive motility
Morphology	15–30%
Vitality	75% or more live
White blood cells	<1 million per ml

Note: an update of these criteria was published in 2009, however there is no current guidance on whether these values have bee adopted.

further tests are required. If the result is abnormal, repeat analysis is required to confirm the diagnosis. Ideally the second sample should be undertaken at least three months after the first (the length of the spermatozoa formation cycle), unless the sperm is grossly abnormal or deficient, subsequent analysis should be repeated sooner.

If the repeat is normal, no further analysis is required. If the repeat is abnormal, hormonal assessment and further assessment of semen quality and specialist referral may be required, particularly in the case of azoospermia or if assisted reproduction techniques are being considered.

If the man cannot produce a sample, he must be investigated for anejaculation and retrograde ejaculation.

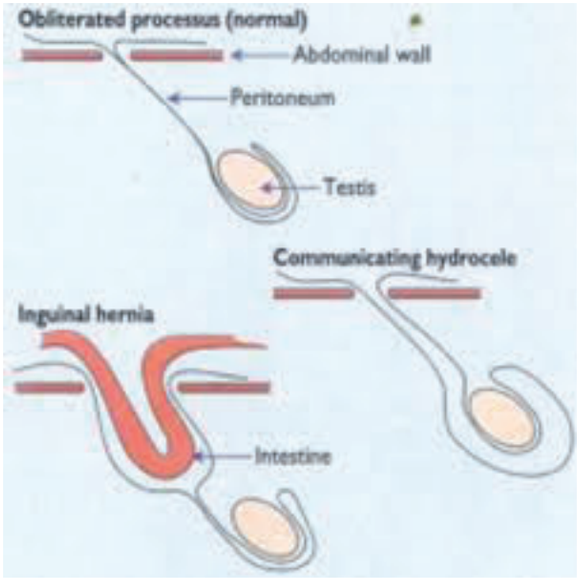
The current NICE guidelines state that testing for antisperm antibodies is not currently indicated as there is no effective treatment available for this which will improve male fertility.

Testicular Failure

Abnormal semen characteristics are idiopathic in 26% of infertile men; however hormone profiles should be obtained to confirm the cause which in some cases may be treatable without the use of invasive procedures.

Non-obstructive primary testicular failure is the most common cause of oligo/azoospermia and is the result of a defect within the reproductive system (66% unknown cause). Diagnosis is confirmed by high levels of follicle-stimulating hormone (FSH) and reduced testicular volume. There is no effective treatment to restore fertility in this group and sperm retrieval or donor sperm may be considered.

A diagnosis of obstructive primary testicular failure (azoospermia) is based on the finding of normal FSH and testicular size. This condition is rare (2%) and may be associated with congenital absence of vas deferens seen in CF, and congenital renal tract abnormalities



and previous infection. These conditions are treatable via sperm recovery or surgery, as normal sperm is still being produced.

Hypogonadotrophic hypogonadism (secondary testicular failure) is a result of pituitary or hypothalamic dysfunction. This condition is characterised by low levels of lutenising hormone (LH), FSH, and testosterone resulting in the failure of spermatogenesis and testosterone secretion. This is the only cause of testicular failure which is consistently treatable with hormone replacement therapy.

Testosterone and LH levels are only indicated if androgen deficiency is suspected.

Female

Ovulation Disorders

Ovulatory disorders account for approximately 20% of female infertility. Primary investigation is aimed at determining the presence of ovulation. A regular menstrual cycle is usually a good indicator of ovulation and this can be confirmed retrospectively by measuring serum progesterone seven days prior to the end of the menstrual cycle (mid-luteal phase) i.e. day 21 progesterone in a 28-day cycle, or weekly after day 21 in those with very irregular or prolonged cycles. Gonadotrophin (LH and FSH) levels help to differentiate the cause of the ovulation disorder.

Hypothalamic pituitary failure (10%); usually presents with amenorrhoea due to failed ovarian follicle development and is characterised by low gonadotrophins, low oestrogen and normal prolactin.

Hypothalamic pituitary dysfunction accounts for 85% of ovulatory disorders and is usually associated with polycystic ovaries. the diagnosis is made by ultrasound scan showing the presence of 12 or more follicles

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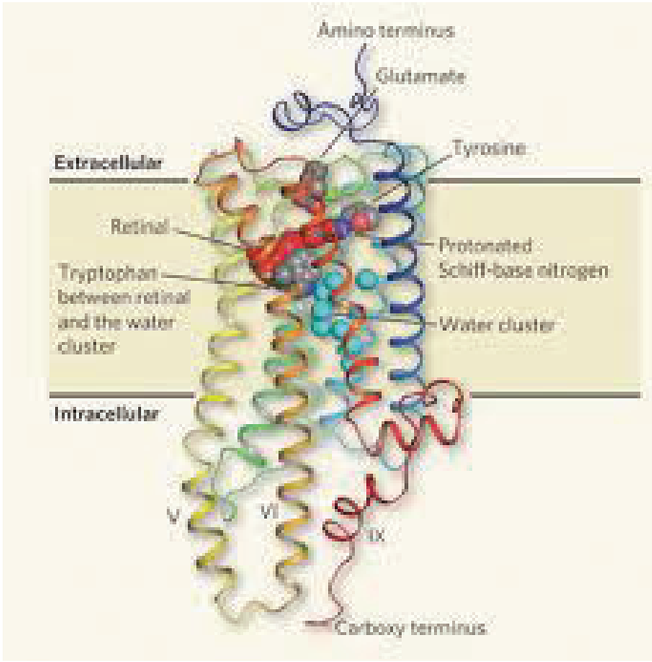


2–9 mm in size or ovarian volume greater than 10 ml. LH: FSH ratio >3:1 is no longer used as many women with PCO have normal levels.

Ovarian failure (also known as early menopause) is diagnosed on the finding of high LH and FSH and low oestrogen as well as hypogonadism on ultrasound.

Ovarian reserve should be assessed for women over 35. An elevated day three basal FSH is consistent with diminished ovarian reserve.

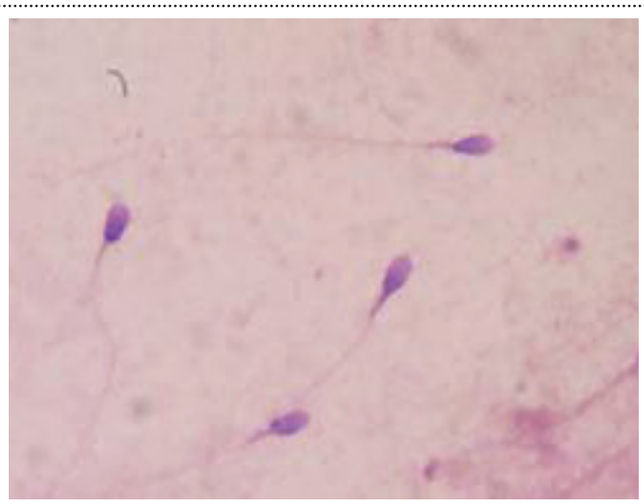
Tests for hyperprolactinaemia should only be offered to those who are symptomatic or have proven ovulatory dysfunction. Thyroid function test should only be offered to those who are symptomatic only.

Semen analysis and ovulation assessment should be known before proceeding to investigate for a tubal or uterine cause.

Tubal Occlusion

Hysterosalpingography (HSLr) and laparoscopy and dye are the most commonly used methods for the investigation of tubal patency. Screening and prophylactic antibiotics for Chlamydial infection should be offered to prevent the introduction of upper tract infection.

HSG is the less invasive of these procedures. It is less sensitive that laparoscopy, but is very specific and therefore a good indicator of tubal patency. Therefore it is offered to women who have no previous history of pelvic co-morbidities (pelvic inflammatory disease, ectopic pregnancy or endometriosis.) Hysterosalpingo-contast-ultrasonography is an alternative to HSG which is equally effective in assessing tubal patency.

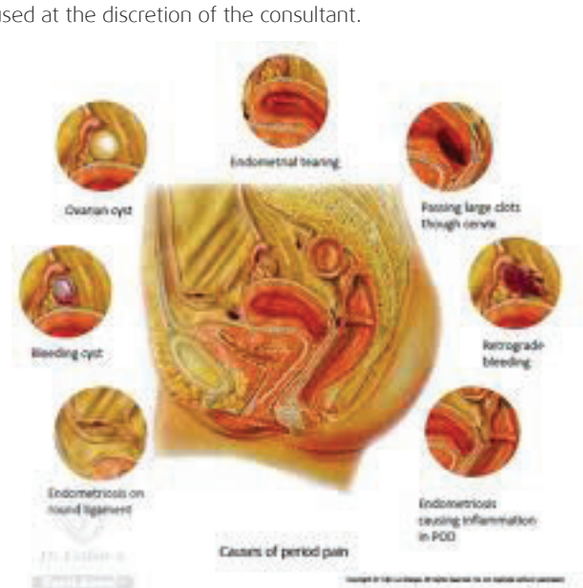


Laparoscopy and dye is indicated for those who are suspected to have pelvic co-morbidities as it is more sensitive and allows direct visualisation and assessment of other pelvic pathologies.

Uterine Pathology

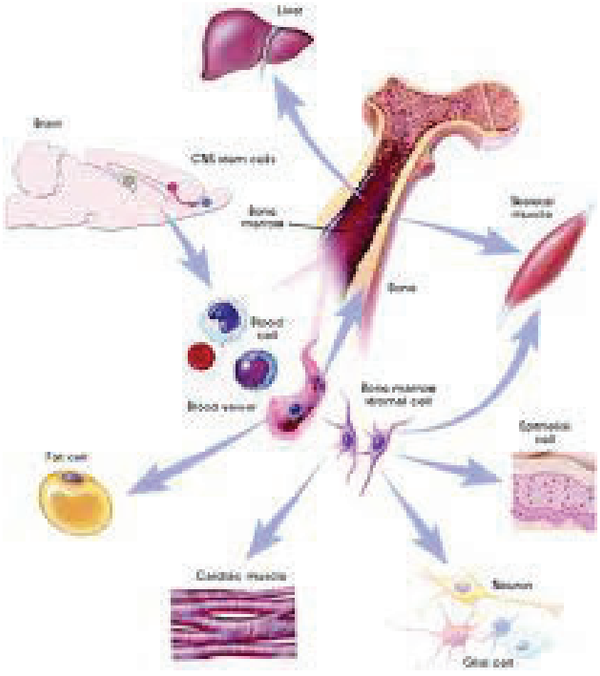
Transvaginal ultrasound provides an accurate assessment of the female anatomy and can be reliably used in the evaluation of pelvic pathology. Hysteroscopy is offered as the gold standard for identifying uterine abnormalities, however is not recommended as part of the initial investigation (unless clinically indicated) as there is no evidence that treatment of uterine abnormalities improves pregnancy rates.

Falloposcopy and fertiloscopy are relatively new techniques used to asser the uterus and fallopian tubes transvaginally as an alternative to laparoscopy. These techniques require further evaluation, and can be used at the discretion of the consultant.



INVESTIGATING THE INFERTILE COUPLE

Samar Geris and Khaled Khaled



Testing post-coital cervical mucous for sperm motility is still under debate, as this is a poor predictor of fertility.

A diagnosis of unexplained infertility is made if no cause is found in either of the couple. Approximately 72% of these couples will conceive (spontaneously) after 3 years.

Conclusion

Adopting a systematic, evidence-based approach for the investigation of infertility provides optimal clinical care; minimising the use of invasive procedures, and testing for factors which when treated have been shown no change in outcome. The clinician should be aware of the most common causes of infertility, the sensitivity and specificity of the investigations to be carried out and be able to provide good patient education regarding these issues. It is important to bear in mind that the indication for investigation via invasive procedures is case specific and therefore a good history should be obtained.

Making the diagnosis of infertility allows the appropriate treatments to be discussed, and provides the couple with a prognosis.

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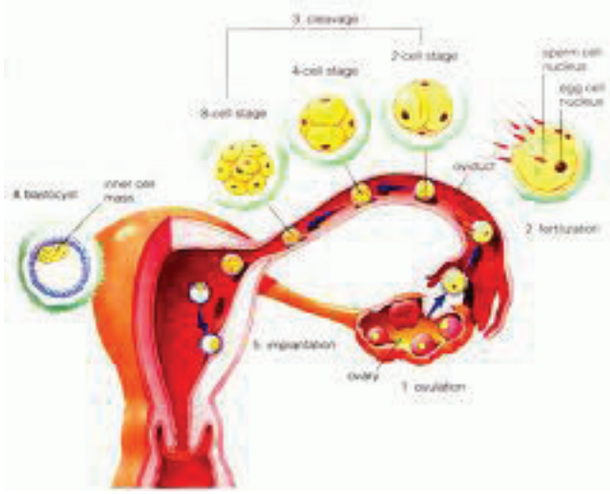

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Good Medical Practice

HYPOXIA AND CARE OF FOETUS IN LABOUR: CARDIOTOCOGRAPHY

Smita Rajshekhar, Nandika Herat, Fadi Alfhaily

Hypoxia and Care of Foetus in Labour: Cardiotocography

Good Medical Practice

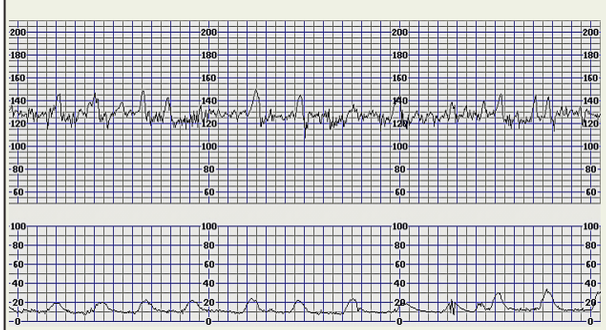
Learning Goals

- Improve basic knowledge of foetal monitoring during labour
- Discuss foetal heart rate (FHR) patterns and interpret cardiotocography (CTG) abnormalities that might suggest hypoxia using systematic approaches in foetal monitoring using Dr C Bravado.
- Identify risk factors of antenatal and intrapartum hypoxia that may lead to neurological consequences.

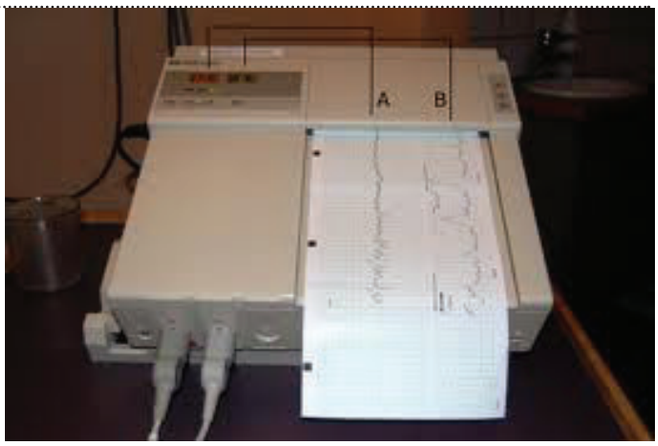
Interactive Case-Based Discussion—Part 1

A 28-year-old lady at 42 weeks, in her second pregnancy is admitted for induction of labour. She had an emergency caesarean section due to severe preeclampsia and failure to progress in her first pregnancy.

She has opted for a vaginal birth after C/S (VBAC). During her current pregnancy she developed gestational diabetes which was controlled by diet, and later on she had mild preeclampsia. On admission, her vaginal examination was done and her cervix was found to be 1 cm dilated with intact membranes. This is her CTG on admission:



1-What are her risk factors?
2-How would you monitor the baby during labour?
3-How would you interpret her admission CTG?



Introduction

According to the 4th Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI) in 1995, almost 50% of the 800 intrapartum deaths were attributed to:

- A failure to recognize the CTG trace abnormalities
- A delay in communication and timely action
- Or a combination of these

Hypoxic ischemic encephalopathy or death of the foetus accounts for nearly 38% of claims handled by the Medical Defence Union and Medical Protection Society in the UK. Moreover, nearly £200 million was paid out in 1998 in claims related to obstetrics, mainly for birth asphyxia.

Basics of Electronic Foetal Monitoring Recording

In order to ensure accurate record-keeping regarding EFM, the date and time clocks on the EFM machine should be correctly set. Traces should be labelled with the mother's name, date and hospital number.

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Any intrapartum events that may affect the FHR should be noted on the CTG trace, which should be timed, dated and signed (e.g., vaginal examination, foetal blood sampling (FBS), start of syntocinon or siting of an epidural).

Any member of staff who is asked to provide an opinion on a trace should note their findings on both the trace and the woman's medical records along with the date, time and signature. Following birth, the healthcare professional should sign and note the date, time and mode of birth on the FHR trace. The FHR trace should be stored securely with the woman's medical records at the end of the monitoring process.

Indications for Use of CTG

Continuous EFM is recommended in all high-risk pregnancies, e.g. preeclampsia, vaginal birth after previous caesarean section, intrauterine growth restriction (IUGR) and preterm labour, etc. (see Table

In low-risk pregnancies, intermittent auscultation (IA) with Pinard's fetoscope is sufficient for monitoring foetal well-being. If foetal compromise is suspected on IA, then monitoring should be switched to continuous EFM.

Continuous CTG during labour is associated with a reduction in neonatal seizures, but no significant differences in cerebral palsy, infant mortality or other standard measures of neonatal well-being. However, continuous CTG is associated with an increase in caesarean sections and instrumental vaginal births.

Terminology and Definition

A FHR has four definable features: baseline rate, variability, accelerations and decelerations.

- **Baseline FHR** is the mean level of the FHR when this is stable, excluding accelerations and decelerations. It is determined over a time period of 5–10 minutes, expressed as beats per minute (bpm). Normal baseline FHR is between 110 and 160 bpm. Baseline heart rate less than 110 is termed as bradycardia and more than 160 is termed as tachycardia.
- **Baseline variability** is the fluctuation in baseline FHR (the degree to which the baseline varies). It is assessed by estimating the difference in bpm between the highest peak and lowest trough of fluctuation in one minute segments of the trace which does not have accelerations and decelerations. Normal variability is 5–25 beats. Reduced baseline variability (<5) can be associated with period of foetal sleep which usually lasts for 40 minutes.
- **Accelerations** are transient increases in FHR of 15 bpm or more above the baseline and lasting 15 seconds or more. Accelerations are the hallmark of foetal well-being.
- **Decelerations** are transient episode of slowing of heart rate 15 bpm or more below the baseline lasting 15 seconds or more, which are:

Table 1: Indications for the continuous EFM *

Foetal Indications	Maternal Indications	Indications for Changing from IA to EFM
• IUGR • Oligohydramnios • Abnormal Doppler velocimetry • Preterm labour • Multiple pregnancy • Malpresentations (Breech) • Rhesus iso-immunization	• Previous C/S • Delay in 1st and 2nd stage • Pre-eclampsia/PIH • Postdate: >42 weeks • Prolonged SROM >24 hours • Diabetes • Antepartum haemorrhage • Significant medical diseases	• Meconium-stained liquor • Abnormal FHR on auscultation ♦ baseline <110 or >160 bpm ♦ any decelerations after a contraction • Maternal pyrexia ♦ 38°C once ♦ or 37.5°C on two occasions 2 hours apart • Fresh bleeding in labour • Oxytocin augmentation • Maternal request

*Adapted from NICE Clinical Guideline – Intrapartum Care (Sept 2007)

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♦ **Early:** uniform, repetitive decrease of FHR return to baseline by the end of the contraction (synchronous with contractions). Early decelerations are associated with foetal head compression and hence common in late first stage and second stage of labour. They are invariably benign.

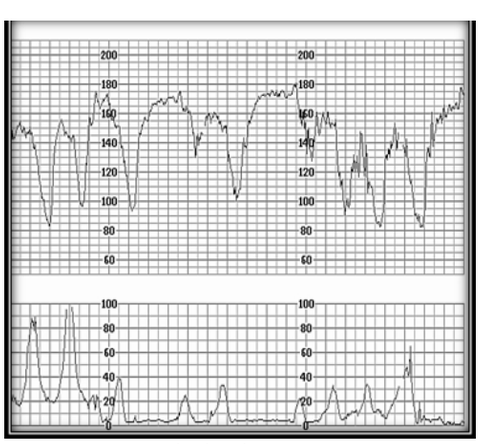
♦ **Variable:** repetitive or intermittent decreasing of FHR with rapid onset and recovery. Variable decelerations are variable in shape. Time relationships with contraction cycle may be variable but most commonly occur simultaneously with contractions. They are due to cord compression and when associated with atypical features may suggest hypoxia. Typical variable decelerations have an acceleration preceding and following them. It should be noted that 80% of decelerations in labour are variable.

The following additional features indicate the likelihood of foetal hypoxia:
1-Foetal tachycardia or bradycardia
2-Reduced variability
3-Slow return to baseline FHR after the end of the contraction
4-Deep deceleration: Large amplitude (by 60 bpm or to 60 bpm) and /or long duration (60 seconds)
5-Loss of pre and post deceleration shouldering (abrupt brief increases in FHR baseline).

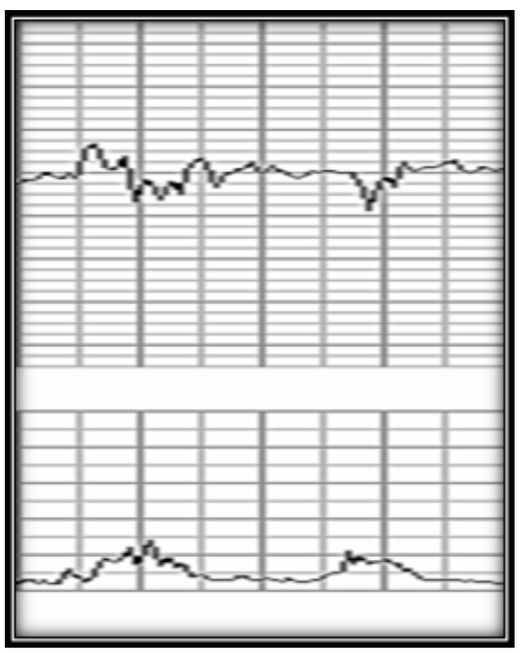
♦ **Late decelerations:** uniform, repetitive decreasing of FHR with which starts at the mid to end of the contraction and nadir more than 20 seconds after the peak of the contraction and ends after the contraction. They usually suggest hypoxia.

Classification of FHR Features and CTG

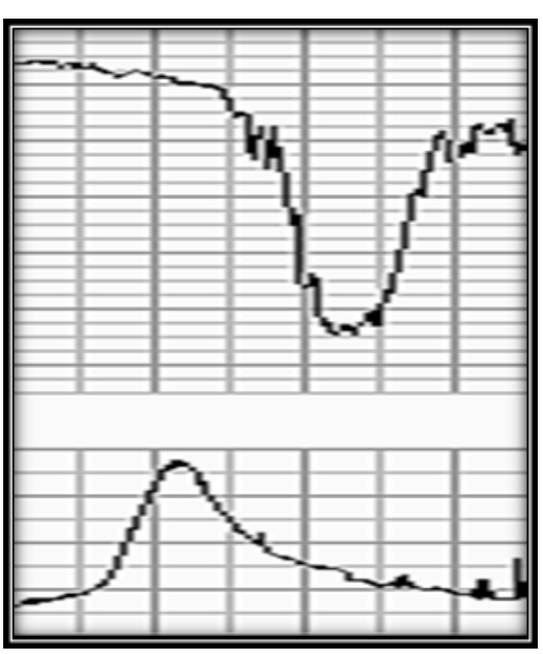
CTGs are categorized as normal, suspicious or pathological. A normal CTG is one in which all four features are reassuring. When there is one non-reassuring feature CTG is suspicious. When there are two or more non-reassuring or one abnormal feature the CTG is pathological.



Early deceleration



Late deceleration



Atypical variable deceleration

Tables 2 and 3 show the classification of CTG according to NICE guidelines.

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Table 2

Feature	Baseline	Variability	Decelerations	Accelerations
Reassuring	110–160	≥5	None	Present
Non-reassuring	100–109 161–180	<5 for 40–90 min	-Typical variable decelerations with >50% of contractions, occurring for ≥90 min -Single prolonged deceleration ≤3 min	Absence of accelerations with other reassuring features is of uncertain significance
Abnormal	<100 >180 Sinusoidal pattern for ≥10 minutes	<5 for >90 min	-Atypical variable or Late decelerations with >50% of contractions for >30 min -Single prolonged deceleration >3 min	

The pneumonic DR C BRAVADO is universally used for ease of interpretation. DR stands for define risk (low/high) in pregnancy, C for contractions (rate, duration of contractions, Coordinate or in-coordinate, baseline tone), BRA for baseline heart rate, V for baseline variability, A for accelerations, D for decelerations and O for overall assessment.

For women having continuous EFM, a documented assessment should be undertaken every hour.

Factors Affecting Interpretation

Preterm foetus has a higher baseline rate, reduced variability. Also, accelerations in preterm foetuses may be of lesser amplitude and shorter duration.

Excessive foetal movements, maternal pyrexia, infection may be associated with tachycardia. Hypoxia, drugs like sedatives, antihypertensive agents, anaesthetics, prematurity, congenital malformations (CNS), cardiac arrhythmias, anaemia and infection are associated with reduced variability.

A tachycardia in the baby of 160–180 bpm, or bradycardia of 100–110 bpm where accelerations are present and no other adverse features appear, should not be regarded as suspicious. However, an increase in the baseline heart rate, even within the normal range, with other non-reassuring or abnormal features should increase concern.

True early uniform decelerations are rare and benign and therefore not significant

Table 3

Category of Trace	Definition "An FHR trace where...."
NORMAL	All four features are 'reassuring'
SUSPICIOUS	One feature is 'non-reassuring' but Remainder of features are 'reassuring'
PATHOLOGICAL	Two or more features are 'non-reassuring' or One or more features are 'abnormal'

Interactive Case-Based Discussion—Part 1

Answers

1. Her risk factors are: postdate (42 weeks), induction of labour, previous emergency caesarean section, history of severe preeclampsia in her first pregnancy and gestational diabetes and mild preeclampsia in her current pregnancy.
2. She is a high-risk pregnancy therefore she needs continuous EFM
3. DR high
   C: 3 in 10
   BRA 120–130
   V more than 5
   A Present
   D None
   O Normal CTG

HYPOXIA AND CARE OF FOETUS IN LABOUR: CARDIOTOCOGRAPHY

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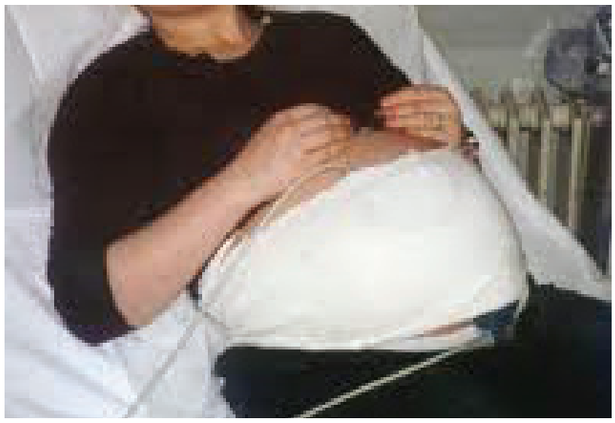
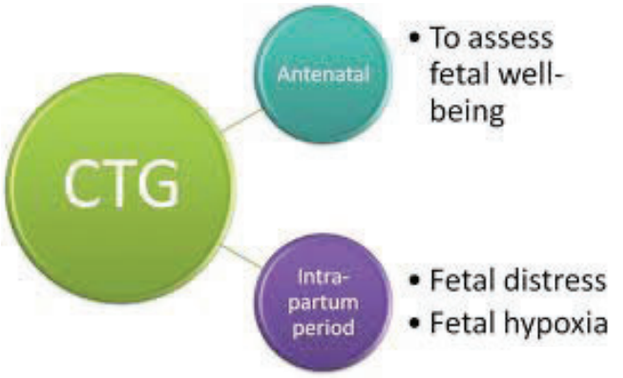




Management of Abnormal CTG

Clinical situation should be assessed to identify pre-existing risks and new events preceding the abnormal CTG. Midwives monitoring CTGs should alert the obstetricians. CTG may improve with change in maternal position usually lateral (left is preferred) and hydration (usually intravenous). In the majority of women, there is decreased venous return due to the pressure of the pregnant uterus on the inferior vena cava and increased intra-abdominal pressure. The decreased venous return reduces the cardiac output and, in return, can reduce utero–placental blood flow. At times, compression of the aorta may lead to reduced uterine perfusion. Epidural anaesthesia may sometimes complicate this problem by causing peripheral vasodilatation that could cause hypotension.

If foetal tachycardia is associated with maternal pyrexia or infection, paracetamol and intravenous antibiotics may help. There is insufficient evidence to support use of maternal facial oxygen and prolonged use may be harmful to the baby and should be avoided.

In the presence of abnormal FHR patterns and uterine hypercontractility, tocolysis should be considered (subcutaneous terbutaline 0.25 mg). If it is associated with oxytocin, the drip should be slowed or stopped.

If a bradycardia occurs in the baby for more than 3 minutes, preparations should be made to expedite the birth of the baby; either by caesarean section or instrumental vaginal birth. This could include moving the woman to theatre. If the foetal heart recovers, the decision to deliver should be reconsidered in conjunction with the woman if it reasonable to do so.

Role of Foetal Blood Sampling

A normal reactive trace indicates a foetus that is not hypoxic, while a pathological trace is associated with a large number of false positives. Intervention on the basis of an abnormal trace alone will increase the caesarean section rate and instrumental delivery rate, with only a 50%–60% chance of foetal acidosis.

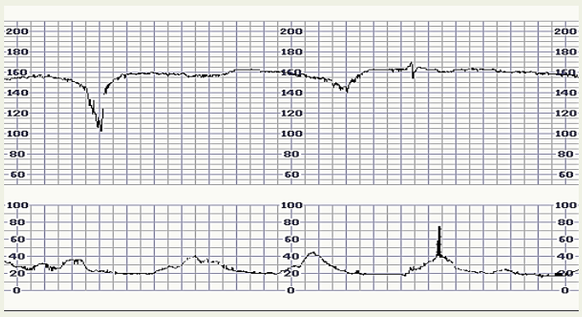
FBS should be advised in the presence of a pathological FHR trace, unless there is clear evidence of acute compromise or contraindication to FBS (HIV infection, suspected foetal bleeding disorders, prematurity). In clinical situations like massive antepartum haemorrhage or cord prolapse associated with foetal compromise, FBS should not

Interactive Case-Based Discussion—Part 2

Our patient had prostin gel, and 8 hours later she started to have labour contractions. Her vaginal examination revealed cervical dilatation of 4 cm.

After 2 hours, she had artificial rupture of membranes performed and syntocinon started for augmentation. Her blood pressure was 155/100.

Her CTG was:



1. How would you interpret her CTG now?
2. What management options you would offer her?

HYPOXIA AND CARE OF FOETUS IN LABOUR: CARDIOTOCOGRAPHY

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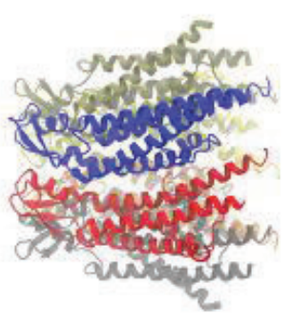
Table: Factors that affects the CTG Recording

Maternal	Foetal	Technical
• Pyrexia • Drugs (sedatives/antihypertensives/anaesthetics) • Haemorrhage: (abruption placenta/hypotension) • Contractions: (frequent/prolonged without periods of rest) • Position: (supine hypotension, cord compression) • Regional anaesthesia • Uteroplacental factors • Excessive uterine activity • Smoking • Chorioamnionitis • Maternal disorders: respiratory, significant anaemia and all chronic maternal conditions • Uteroplacental dysfunction	• Prematurity • IUGR • Congenital malformations (CNS) • Cardiac arrhythmias • Anaemia • Infection • Abnormal Doppler • Oligohydramnios, • Decreased foetal oxygen carrying capability	• Paper speed (1 cm/min) • Contact of FHR sensor with maternal abdomen • Interference (TENS)



be undertaken; instead urgent preparations to expedite birth should be made.

FBS requires at least 3 cm of cervical dilatation, ruptured membranes and engaged head in labour.

These results should be interpreted taking into account the previous pH measurement, the rate of progress in labour and the clinical features of the woman and baby.

Foetal Hypoxia and Neonatal Outcome

The aim of intrapartum foetal surveillance is to reduce short-term and long-term morbidity related to intrapartum hypoxia. A neonate at birth is assessed on the basis of APGAR score, cord blood pH and lactate. The APGAR score is scored on the basis of baby's heart rate, respiratory effort, colour, muscle tone and reflexes. It gives an estimation of a baby's condition at set times and indicates need for resuscitation. It could have some role in prognosis but majority of babies with a low APGAR at birth have normal outcome.

The diagnosis of hypoxic acidaemia requires a blood gas analysis to show evidence of metabolic acidosis. This is achieved by performing umbilical cord arterial and venous pH and base deficit. Ideally, paired samples should be taken from the umbilical artery and vein to verify their discordancy (the arterio–venous difference is usually >0.03). The sensitivity of pH in predicting neurological outcome is low, as respiratory acidosis is fairly common and innocuous and is usually associated with a good prognosis. However, profound acidosis with a pH <7.0 and a base deficit of >12 mmol/L in cord arterial blood is significantly correlated with a poor neonatal outcome. Lactate which is a byproduct of anaerobic metabolism indicates metabolic acidosis which correlates better with neurological morbidity and mortality.

Table 5 below shows the interpretation of FBS and the management options.

Scalp pH	Interpretation	Action
≥7.25	Normal	Repeat in 1 hour if the CTG remains pathological or sooner if there are further abnormalities.
7.21–7.24	Borderline	Repeat in 30 minutes if the CTG remains pathological or sooner if there are further abnormalities.
≤7.20	Abnormal	Expedite delivery.

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Interactive Case-Based Discussion—Part 2

Answers

1. DR High risk:

C: 2 in 10	A None
BRA 160	D Atypical variable decelerations
BV reduced	O Pathological CTG

2. The initials management: stop syntocinon, lateral position and perform FBS. If FBS is not achievable then perform category 1 emergency C/S.

Feedback

On examination, the cervix is 5 cm dilated. FBS is performed and results are first sample (pH 7.28 with B.E. -6.1) and second sample (pH 7.27, B.E. 5.0). Decision to continue monitoring is made as her blood pressure came down to 140/92. After 30 min, the midwife informs the registrar on-call about heavy fresh vaginal bleeding. On review, the CTG has deteriorated with deep atypical variable deceleration for more than 50% of contractions. Emergency caesarean section is performed. Scar dehiscence and placental abruption were noted at operation.

Intrapartum hypoxia alone accounts for only a small proportion (probably 10%–15 %) of cases of newborn encephalopathy and subsequent cerebral palsy.

The origins of many cases of cerebral palsy are antenatal but the following criteria have to be met for a case of cerebral palsy to be causally linked to acute intrapartum hypoxia:

- Evidence of metabolic acidosis in umbilical cord arterial or early neonatal sample (pH <7.00 and base deficit >12 mmol per litre)
- Early onset of severe or moderate neonatal encephalopathy in infants of greater than 34 weeks of gestation
- Cerebral palsy of the spastic quadriplegic or dyskinetic type

Non-specific criteria which suggest intrapartum insult are a sentinel hypoxic event occurring immediately before or during labour, deterioration of the FHR pattern usually after the hypoxic sentinel event, APGAR scores of 0–6 for longer than 5 minutes, multi-system involvement and imaging evidence of acute cerebral abnormalities.

It is important to have a health professional trained in neonatal resuscitation at delivery of neonates requiring assistance at birth. Adequate communication within multidisciplinary teams involving anaesthetists, paediatricians and theatre staff is paramount in safe delivery of a newborn. In smaller hospitals with limited neonatal facilities especially for premature babies, in utero preferably or ex utero transfer should be considered.

Risk Management

FHR traces should be kept for 25 years and, where possible, stored electronically.

In cases where there is concern that the baby may suffer developmental delay, FHR traces should be photocopied and stored indefinitely in case of possible adverse outcomes.

Tracer systems should be available for all FHR traces if stored separately from women's records and to ensure that FHR traces removed for any purpose (risk management or teaching) can always be located.

Regular CTG meetings to review interesting cases and for teaching should be encouraged. Drills and skills training within each trust should include sessions on CTG interpretation and neonatal resuscitation. There are registered courses like Advanced Life Support in Obstetrics and Neonatal Life Support which offer standardised training and periodic revalidation.

Key Messages

- CTG like electrocardiogram should always be analysed in keeping with clinical situation. It should be interpreted with caution in situations like growth restricted and preterm babies who have reduced reserves. CTG abnormality may be the first sign of scar dehiscence in women with previous caesarean section who are in labour.
- Pathological CTG does not equate delivery. Change in maternal position, hydration, slowing the oxytocin infusion or tocolysis should be considered. Clinicians should take into account the time that it will take to achieve birth when making decisions regarding concern over foetal well-being during labour.
- Senior obstetrician's input should be sought if difficulties in interpreting and managing CTG arise. Trained paediatrician should be present at birth of a neonate who is compromised in labour or at delivery.
- Debriefing of patient, birth partners and health professionals involved and documentation including incident reporting should be undertaken in the event of obstetric or neonatal critical events and near misses.

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Good Medical Practice

INVESTIGATION AND MANAGEMENT OF SECONDARY AMENORRHOEA

Fadi Alfhaily, Busola adeyomo

Investigation and Management of Secondary Amenorrhoea

Good Medical Practice

Objectives

- Understand general concept of secondary amenorrhoea.
- Adopt a systematic approach to investigate and manage secondary amenorrhoea

Clinical-Based Scenario 1

A 30-year-old woman with previous one child was referred by her GP to outpatient gynaecological clinic. She stopped combined oral contraceptive pill for 10 months in the hope of conceiving but has not had a period since.

She took the pill for 7 years. Menarche occurred at 13 years of age, but she never had a normal regular cycle. No significant medical or surgical history. She has no history of sexually transmitted infection.

The GP has performed some preliminary investigations:

- FSH = 0.5 iu/l
- LH = 0.3 iu/l
- E2 <50 nmol/l
- Normal semen analysis for her partner.

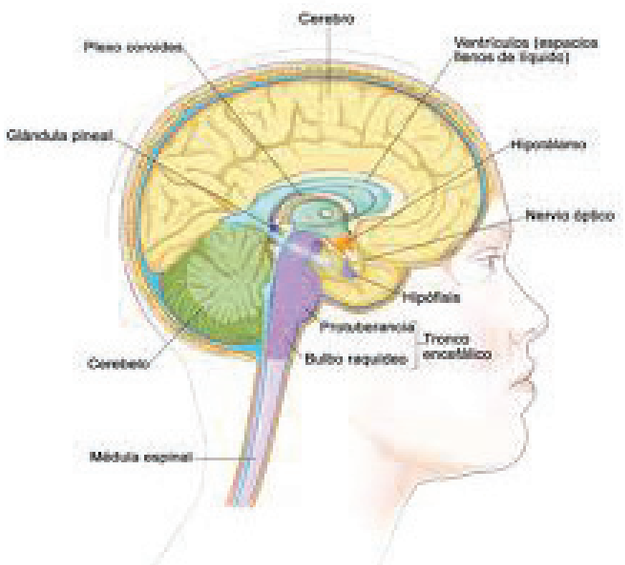
1. What is the most likely diagnosis?
2. What clinical examination and other initial investigations you will do?

Answers

1. The most likely diagnosis is hypogonadotrophic hypogonadism
2. Body mass index (BMI), blood pressure, TSH/T4, prolactin, testosterone and pelvic ultrasound scan

Introduction

Regular monthly menstruation is a phenomenon of modern society. Most people associate monthly menstrual loss with functioning fertility hence absence or cessation of menstruation will get most women concerned and seek medical explanation and a possible solution to their problem.



Amenorrhoea is the complete absence or cessation of menstrual bleeding for more than 6 months (excluding pregnancy or lactation). Primary amenorrhoea is defined as no spontaneous onset of menstruation by 16 years of age in the presence of normal secondary sexual characteristics, or 14 years in the absence of other evidence of puberty. Secondary amenorrhoea is defined as absence menstruation for 6 months longer if the patient has previously experienced regular menses and 12 months or more when a patient has oligomenorrhea. The prevalence of amenorrhoea in the absence of a physiological cause is 1.8%–3% in the reproductive age group; the prevalence of secondary amenorrhoea is 2%–5%.

Aetiology

The causes of Secondary Amenorrhoea are included in the following table:

Physiological
- pregnancy
- lactation
- menopause

Uterus
- Cervical stenosis
- Asherman syndrome

Hypothalamic (hypogonadotophic hypogonadism)
- Chronic illness
- Weight loss
- Extreme exercise
- Psychological disturbance, e.g., depression, stress
- idiopathic

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Pituitary/ hypothalamic damage (hypogonadism)
- Tumour compression (e.g. craniopharyngioma)
- Surgical damage, irradiation
- Head injury
- Sarcoidosis
- Tuberculosis
- Infarction secondary to Sheehan's syndrome

Pituitary
- Functional failure, secondary to hypothalamic failure
- Sheehan syndrome
- Hyperprolactinaemia
- Post-pill amenorrhea

Ovarian
- Polycystic ovarian syndrome
- Damage by surgery, chemotherapy, radiotherapy
- Idiopathic premature menopause
- Resistant ovary syndrome
- Functional failure, secondary to hypothalamic failure

Systemic
- Chronic debilitating illness
- Weight loss
- Endocrine disorders (thyroid disease, Cushing's syndrome)

Clinical Approach for Diagnosis and Management

A systematic approach based on body compartment will cover the most common causes of amenorrhoea. However, we must remember that amenorrhoea is also frequently physiological, and pregnancy must always be ruled out first.

The investigations should be guided by a comprehensive history and a thorough examination and often do not require an extensive hormonal and imaging studies. Regular menstruation indicates that the hypothalamo–pituitary–ovarian axis is intact and women whose cycles are between 26 and 35 days are invariably ovulatory.

When taking history we should consider the following:

1. Evidence of psychological disorders or emotional stress
2. Family history of any relevant gynaecological problem
3. Mother's obstetric history with index child
4. Family history of genetic disorder or diabetes
5. The presence of galactorrhoea
6. Symptoms of hypothyroidism or any other chronic illnesses
7. Nutrition/exercise habits, weight change
8. Hirsutism
9. Menopausal symptoms
10. Sexual activity/contraceptive practice
11. History of uterine/cervical surgery

Examination

When examining the patient, it is important to explain what will happen and obtain verbal consent from the woman especially if she is young.

The young woman should understand that consent can be withdrawn at any time.

Examination should take place in comfort and privacy and in the presence of a professional chaperone. Physical examination should include:

1. Weight, height, BMI
2. Blood pressure
3. Signs of hirsutism/galactorrhoea
4. Signs of thyroid disease
5. Estrogen status of tissues

Investigations

The initial investigations should include:

- Pregnancy test
- Follicle-stimulating hormone (FSH), luteinizing hormone (LH) levels to assess the pituitary–ovarian axis
- Prolactin elevation to rule out pituitary dysfunction
- TSH
- Fasting blood glucose

A transvaginal ultrasound scan provides information about ovarian morphology and possible upper tract malformation. However, a trans-abdominal ultrasound scan can be performed if bimanual examination is inappropriate or declined.

Management

Amenorrhea may be caused by many causes. The appropriate management of this will depend on the accurate diagnosis. A logical approach makes it possible to do it systematically and in a shorter period of time.

Some conditions may be correctable while others are not. Objectives of treatment may vary, but the underlying cause in each must be addressed and treated accordingly.

The history is highly suggestive of hypothalamic dysfunction as the cause of her symptoms. Women who exercise vigorously or experience high levels of emotional stress may develop hypothalamic dysfunction. The only tests needed to confirm the diagnosis of hypothalamic amenorrhea are serum FSH and LH. In patients with hypothalamic amenorrhea, the levels of FSH and LH are very low. The patient does not have premature ovarian failure because her serum gonadotropin levels were low-normal. In premature ovarian failure, these hormones are abnormally high. The patient does not have

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PCOD because she did not have withdrawal bleeding after treatment with medroxyprogesterone acetate. Intrauterine synechiae usually develops after postpartum or retained product of conception curettage, and this patient has never been pregnant. MRI of the pituitary gland is not necessary because serum prolactin levels in patients with hypothalamic amenorrhea are usually top-normal and never elevated.

Sheehan's syndrome is defined as a pituitary failure secondary to ischemia and infarction as late consequences to obstetric haemorrhage. Usually, the volume of the anterior pituitary increases during pregnancy by approximately one-third, resulting in an upward convexity of the superior surface on radiography. The hypertrophied pituitary gland of pregnant women is very susceptible to a compromised blood supply through the low pressure sinusoidal system that accompanies postpartum haemorrhage. Classically, patients with Sheehan's syndrome present with rapid breast involution and failure to lactate, resume menses, or regrow shaved pubic or axillary hair. Bleeding that is not related to obstetrics does not cause pituitary ischemia and infarction.

Clinical-Based Scenario 2

A 24-year-old nulliparous female runner presents to you because of cessation of menses for 18 months. She has been running regularly for 4 years, and for the past year she has been running 55 miles per week. She has been using IUCD for contraception for 5 years. Physical examination is normal, and no hirsutism or galactorrhoea is noted. She is 6 ft 1 in tall and weighs 119 lb.

She has no withdrawal bleeding after treatment with medroxyprogesterone acetate, and her serum FSH and LH levels are low. Which of the following statements is correct?

A) The patient has premature ovarian failure.
B) The patient has polycystic ovary disease (PCOD)
C) The patient has hypothalamic amenorrhea.
D) The patient has intrauterine synechiae secondary to IUCD use.
E) Magnetic resonance imaging (MRI) of the pituitary gland is essential for the final diagnosis.

Answer

The correct answer is C.

The history is highly suggestive of hypothalamic dysfunction as the cause of her symptoms. Women who exercise vigorously or experience high levels of emotional stress may develop hypothalamic dysfunction. The only tests needed to confirm the diagnosis of hypothalamic amenorrhea are serum FSH and LH. In patients with hypothalamic amenorrhea, the levels of FSH and LH are very low. The patient does not have premature ovarian failure because her serum gonadotropin levels were low-normal. In premature ovarian failure, these hormones are abnormally high. The patient does not have PCOD because she did not have withdrawal bleeding after treatment with medroxyprogesterone acetate. Intrauterine synechiae usually develops after postpartum or retained product of conception curettage, and this patient has never been pregnant. MRI of the pituitary gland is not necessary because serum prolactin levels in patients with hypothalamic amenorrhea are usually top-normal and never elevated.

Clinical-Based Scenario 3

Sheehan's syndrome can develop in one of these patients?

A) A patient who has hyperthyroidism
B) A patient with polycystic ovaries who has irregular heavy menstrual periods
C) A patient with congenital adrenal hyperplasia
D) A patient with severe postpartum haemorrhage
E) A patient who had two uterine curettages in 1 week

Answer

The correct answer is D

Sheehan's syndrome is defined as a pituitary failure secondary to ischemia and infarction as late consequences to obstetric haemorrhage. Usually, the volume of the anterior pituitary increases during pregnancy by approximately one third, resulting in an upward convexity of the superior surface on radiography. The hypertrophied pituitary gland of pregnant women is very susceptible to a compromised blood supply through the low pressure sinusoidal system that accompanies postpartum haemorrhage. Classically, patients with Sheehan's syndrome present with rapid breast involution and failure to lactate, resume menses, or regrow shaved pubic or axillary hair. Bleeding that is not related to obstetrics does not cause pituitary ischemia and infarction.

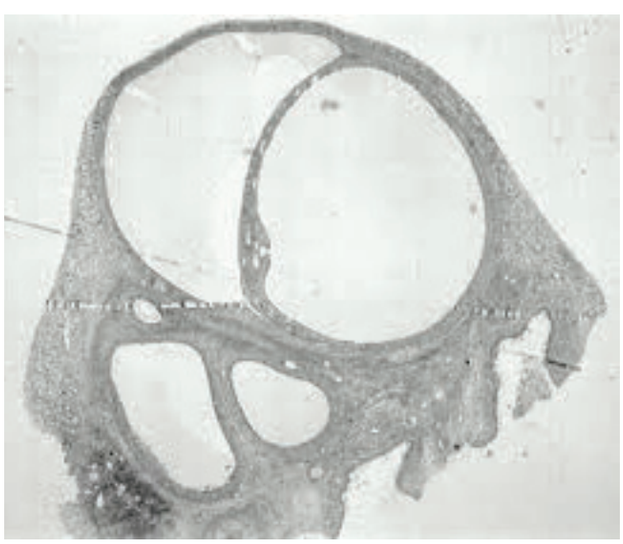

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Table 1

Normogonadotropic hypogonadism causes
Hyperandrogenic anovulation
Acromegaly
Androgen-secreting tumor (ovarian or adrenal)
Cushing's disease
Exogenous androgens
Nonclassic congenital adrenal hyperplasia
Polycystic ovary syndrome
Thyroid disease
Outflow tract obstruction
Asherman's syndrome
Cervical stenosis

Table 2

Causes of Hypergonadotropic hypogonadism
Postmenopausal ovarian failure
Premature ovarian failure
Autoimmune
Chemotherapy
Galactosemia
Genetic
17-hydroxylase deficiency syndrome
Idiopathic
Mumps
Pelvic radiation

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Table 3

Causes of Hypogonadotropic hypogonadism
Anorexia or bulimia nervosa
Central nervous system tumor
Chronic illness
Chronic liver disease
Chronic renal insufficiency
Diabetes
Immunodeficiency
Inflammatory bowel disease
Thyroid disease
Severe depression or psychosocial stressors
Cranial radiation
Excessive exercise
Excessive weight loss or malnutrition
Hypothalamic or pituitary destruction
Sheehan's syndrome

Causes of Hyperprolactinaemia

1. Prolactin <100 ng/ mL (100 mcg per L)

Altered metabolism
- Liver failure
- Renal failure

Ectopic production
- Bronchogenic(e.g., carcinoma)
- Gonadoblastoma
- Hypopharynx
- Ovarian dermoid cyst
- Renal cell carcinoma
- Teratoma

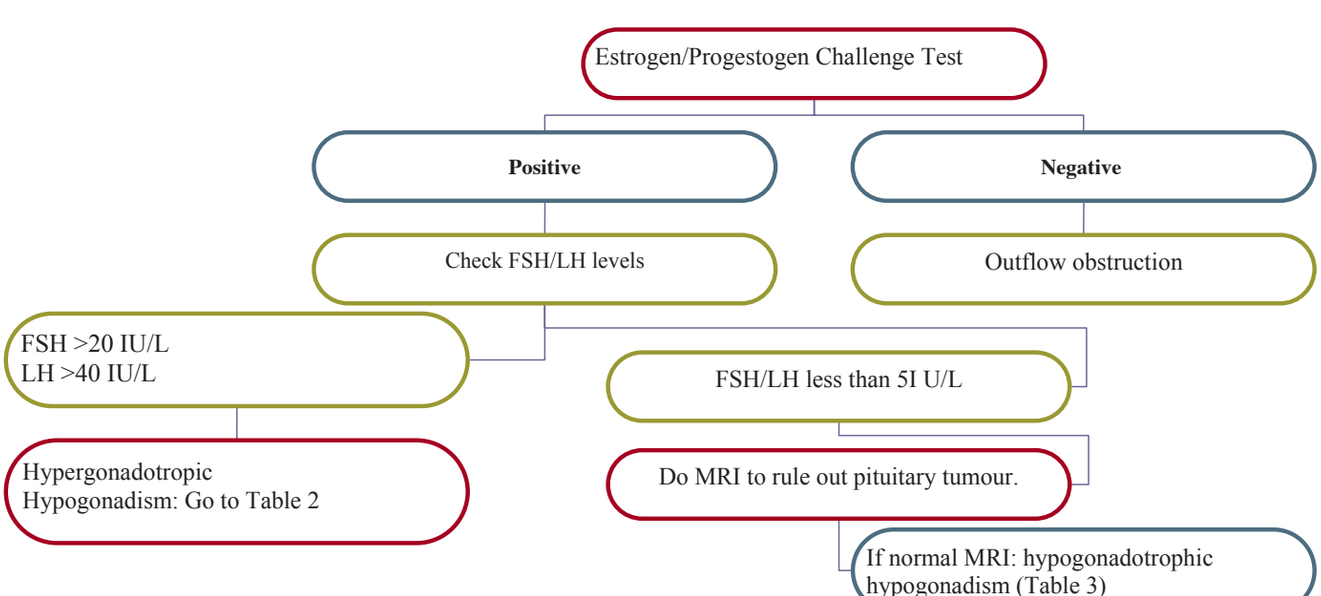
Breastfeeding

Breast stimulation

Hypothyroidism

Medications
- Oral contraceptive pills
- Antipsychotics
- Antidepressants
- Antihypertensive
- Histamine H2 receptor blockers
- Opiates, cocaine

2. Prolactin >100 ng/mL
- Empty sella syndrome
- Pituitary adenoma



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INVESTIGATIONS AND MANAGEMENT OF RECURRENT MISCARRIAGES

Rekha Remadevi, Fadi Alfhaily, Jonathan Evans-Jones

Investigations and Management of Recurrent Miscarriages
Good Medical Practice

Learning Objectives

- Provide basic information about women with recurrent miscarriage
- Identify causes and high-risk factors of recurrent miscarriages

Introduction

Definition and Incidence

Recurrent miscarriage is defined as the loss of three or more pregnancies. It is a heterogeneous condition that has many possible causes; more than one contributory factor may underlie the recurrent pregnancy losses.

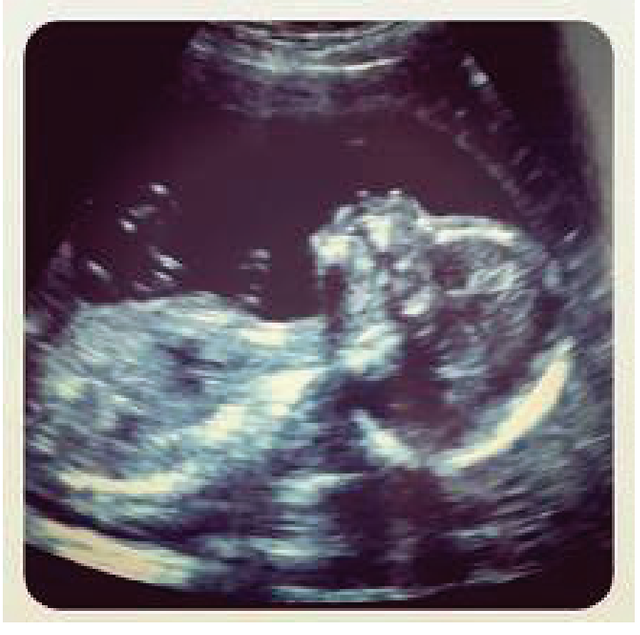
Recurrent miscarriage affects 1% of couples who are trying to achieve a successful pregnancy. Because the incidence is higher than expected of chance alone (0.34%), a proportion of couples with recurrent miscarriage have a persistent underlying cause for their pregnancy losses.

Case-based discussion 1

The following table summarizes the history of a 28-year-old women referred to you with history of recurrent miscarriages

Year	Gestational Age	History
2007	11 weeks	Miscarriage following viable pregnancy on scan at 9 weeks. Surgical evacuation of retained products of conception was performed
2008	8 weeks	Empty sac. Surgical evacuation of retained products of conception
2009	17 weeks	Late spontaneous miscarriage. Retained placenta and ultrasound guided surgical evacuation of retained products of conception
2010	20 weeks	Late spontaneous miscarriage and intrauterine death

1. How will you evaluate her?
2. What are the immediate investigations?
3. What are the important causes and/or associations with late pregnancy loss after 12 weeks of gestation?
4. How would you plan/manage her next pregnancy?



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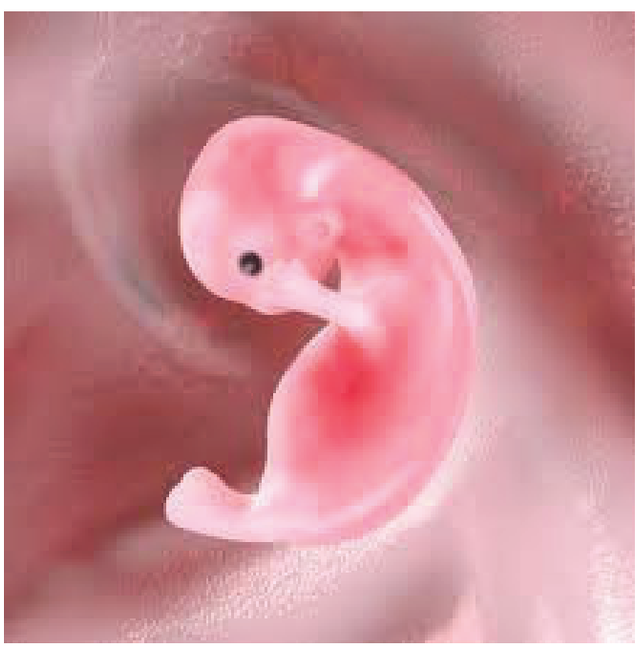

Answers and Discussion

Detailed history should be obtained which include:

- Pattern, trimester, characteristics of prior pregnancy losses
- Symptoms like painless cervical dilatation
- How the miscarriages were managed
- History of subfertility or infertility
- Menstrual history
- Prior or current gynaecologic or obstetric infections
- Signs or symptoms of thyroid, prolactin, glucose tolerance, hyperandrogenic disorders (PCOS) and full maternal medical history
- Personal or familial thrombotic history
- Features associated with the antiphospholipid syndrome (thrombosis, false-positive test results for syphilis)
- Other autoimmune disorder
- Medication
- Environmental exposures, illicit and common drug use (particularly caffeine, alcohol, cigarettes, and in utero DES exposure)
- Genetic relationship between reproductive partners
- Family history of recurrent spontaneous miscarriages, obstetric complications, or any syndrome associated with embryonic or foetal losses
- Previous diagnostic tests including karyotyping of products and treatments

The history should be supported by comprehensive physical examination including:

- BMI
- Signs of hirsutism and acanthosis
- Thyroid examination
- Breast examination and galactorrhoea
- Pelvic examination to assess Anatomy , Infection, Trauma, Estrogenisation

In general the basic investigations of a couple presenting with recurrent miscarriage should include full blood count, antiphospholipid antibodies (lupus anticoagulant and anticardiolipin antibodies), parental karyotype, early follicular phase FSH and LH, pelvic ultrasound and/or hysterosalpingogram. Other investigations should be limited to particular cases and/or used within research programs.

Antiphospholipid antibody screening should be elevated on two occasions repeated more than 6 weeks apart, including lupus anticoagulant (dilute Russell's viper venom time is the best test), anticardiolipin and antibodies.

Thrombophilia screen includes: activated protein C resistance, antithrombin III, protein C and protein S levels.

In management of this case thromboprophylaxis commenced at 6 weeks of gestation using low dose aspirin 75 mg daily plus low molecular weight heparin. Preconceptual folic acid should be started with the plan for the next pregnancy.

Although treatment with aspirin and heparin may have a beneficial effect in reducing risk of foetal death, the appearance of a second pathology (cervical incompetence) is found in approximately 10% of recurring second trimester cases. Therefore, serial viability ultrasound

Good Medical Practice

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including cervical length measurement in second trimester should be included in her management.

It is important to remember that thrombophilia disorders are associated with intrauterine death before presentation and bacterial vaginosis can be associated with bleeding, pain and early rupture of membranes at presentation of the late miscarriages.

Cervical cerclage should be discussed and may be offered in her next pregnancy.

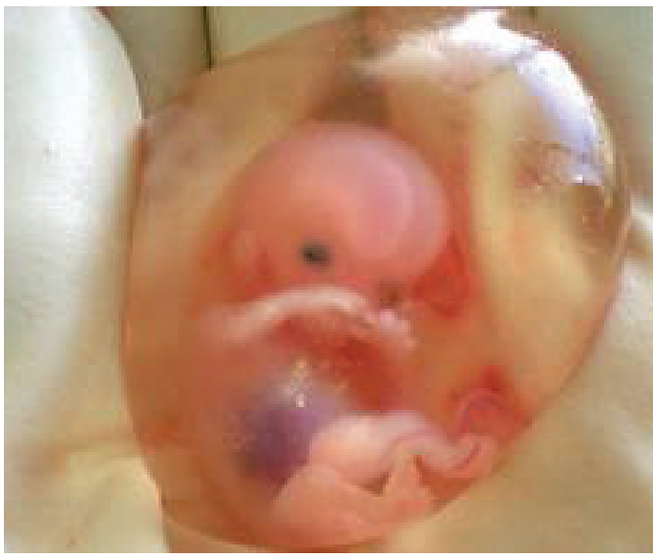
Risk Factors

Majority of recurrent miscarriages are unexplained, however underlying aetiological factors may be identified in about 50% of cases.

- Epidemiological factors: maternal age, reproductive history
- Anatomical factors: congenital uterine malformations, cervical incompetence, fibroids (submucosal and intramural), intrauterine adhesions (Asherman's syndrome)
- Genetic factors: parental chromosomal rearrangement, embryonic aneuploidy and polyploidy
- Coagulation and immunological factors: thrombophilias, antiphospholipid antibodies.
- Endocrine factors: polycystic ovary syndrome, hypersecretion of luteinizing hormone, hyperandrogenemia
- Infection factors: bacterial vaginosis

Management Options and Recommendations

- If first trimester miscarriage occurred, determine whether the loss was biochemical, anembryonic (blighted ovum), embryonic (6–8 weeks) or foetal (>8 weeks). Different pathological factors affect various stages of early pregnancy. For example, biochemical and anembryonic losses are more likely to be associated with chromosomally abnormal embryos.
- Note whether foetal heart activity was detected before the miscarriage. Most first trimester miscarriages associated with APS occur after the establishment of foetal heart activity.
- When surgical evacuation of products of conception is performed, it is important to document suspected uterine anomalies such as bicornaute or subseptate uterus or fibroids. Tissue should be collected and sent for histology (to exclude trophoblastic disease) and foetal karyotype.
- If a second trimester miscarriage occurred, note whether the pregnancy loss was preceded by intrauterine foetal death, spontaneous rupture of membranes, vaginal bleeding, painful uterine contractions or painless cervical dilatation. This information is particularly useful in identifying or excluding a presumed diagnosis of cervical incompetence. The couple should be encouraged to consent to a full post-mortem examination, foetal karyotyping and placental histology examination.
- Ensure that a follow-up appointment is scheduled for the couple.
- Couples should be treated sensitively and sympathetically and it is important to avoid recommending unproven treatments.
- Advanced maternal age and the previous number of miscarriages are two important independent risk factors that need to be considered.
- Parental chromosomal anomalies appear to be directly associated with recurrent miscarriage and occur in 4% of couples with recurrent miscarriage. The risk of miscarriage in couples with reciprocal translocation is approximately 50%. With Robertsonian



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translocation the risk is approximately 25%. Most couples with balanced chromosome rearrangements have healthy children. The finding of abnormal foetal karyotype warrants genetic counselling. No treatment of the condition is available, however prenatal diagnosis and preimplantation genetic screening may be offered. In selected cases, consideration should be given to the use of donor gametes

- As a screening test for uterine anomalies, ultrasound assessment of the uterine cavity with or without sonohysterography when performed by skilled staff is as informative as invasive hysterosalpingography. Three-dimensional ultrasound may provide additional information in uterine malformations. Minor uterine defects do not warrant surgical correction. Hysteroscopic metroplasty has been shown to improve live birth rates significantly. However this data comes from retrospective observational studies only. Intra uterine adhesions can be corrected by hysteroscopic lysis, placement of an intrauterine device and administration of oestrogen after surgery.

There is no satisfactory objective test to identify nonpregnant women with cervical incompetence. Prepregnancy cervical cerclage is advocated in some cases of assumed cervical incompetence, although the benefit is unproven.

- The diagnosis of antiphospholipid antibody syndrome requires fulfilment of at least one of the following criteria:

1. Three or more unexplained spontaneous miscarriages before 10 weeks of gestation with maternal anatomical and hormonal factors and parental chromosomal abnormalities excluded.
2. One or more unexplained deaths of morphologically normal foetus after 10 weeks of gestation, with normal foetal morphology documented by ultrasound or by direct examination of foetus.
3. One or more premature birth of morphologically normal neonate at or before 34 weeks of gestation because of severe preeclampsia or eclampsia or severe placental insufficiency.

In addition persistent abnormality of one of the following tests when measured at least twice, more than 6 weeks apart:

A. Lupus anticoagulant
B. Antiphospholipid antibodies

The combination of low dose aspirin and heparin significantly reduces pregnancy loss by 54% compared to aspirin alone. After the diagnosis of APS is made women should be advised to start aspirin and heparin treatment after confirmation of their next pregnancy (4–5 weeks).

- Uncontrolled studies suggest that heparin therapy may improve live birth rates in women hereditary thrombophilias.
- No alloimmune theory is substantiated and no immunologic tests identified to predict pregnancy outcome. Further immunotherapy is of no proven benefit and may actually cause harm.

Unexplained Recurrent Miscarriage

The prognosis for a successful pregnancy outcome in women who receive supportive care alone is approximately 75%. General advice about smoking cessation, avoiding excessive alcohol and caffeine intake, weight loss and dietary balance is important. Folic acid 400 mcg/day is advisable.

Case-based discussion 2

A woman comes to you at 10 weeks in her 5th pregnancy having had previous three miscarriages. Her first pregnancy ended by delivery a full term healthy baby. Recurrent miscarriage investigations done prior to pregnancy were all normal. How will you manage current pregnancy?

Answer and Discussion

It is important to elicit history of miscarriages and perform a full comprehensive physical examination. All investigations should be reviewed and explained to both couples with empathetic attitude.

This is a case of unexplained recurrent miscarriages. Therefore, the couple should be assured that the prognosis and future outcome is very good with chance to have a live baby is approximately 75% without treatment. General advice about smoking cessation, avoiding excessive alcohol and caffeine intake, weight loss and dietary balance is important. Folic acid 400 mcg/day is advisable.

Psychological support is very crucial as guilt feeling is very common among patients with recurrent losses and the risk for major depression is increased greater than twofold in most women and arises in the first weeks after delivery. Referrals to support groups and counsellors should be offered.

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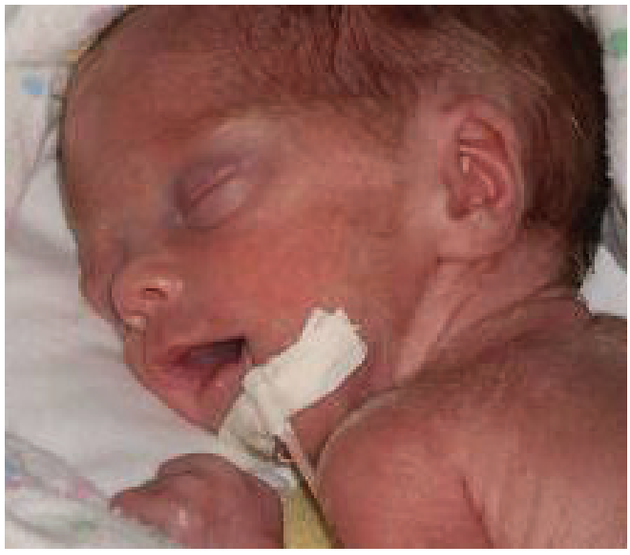

Appendix 1

Risk of Pregnancy Loss Increases with Two or Three Consecutive Losses

Pregnancy History	Risk of Pregnancy Loss
First pregnancy	11%–13%
One pregnancy loss	14%–21%
Two consecutive pregnancy losses	24%–29%
Three consecutive pregnancy losses	31%–33%

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Appendix 2

Recommendation for Investigations in Couples with Recurrent Miscarriage

	Do	Don't	Evidence Level
Karyotyping of both partners			
Woman <34 years old at the time of 2nd miscarriage	X		B
Woman 34–39 years old at the time of 2nd miscarriage	Dependent on family history and number of miscarriages (see Table 1 in the original guideline document)		
Woman ≥39 years old at the time of 2nd miscarriage (irrespective of the number of miscarriages)		X	
Karyotyping of conceptus		X	C
Progesterone in luteal phase		X	B
Thyroid function		X	C
Glucose		X	C
Lupus anticoagulant (LAC), anticardiolipin antibody (ACA), immunoglobulin G (IgG) and immunoglobulin M (IgM)	X		B
Antithrombin (AT), protein C, protein S, F V Leiden, prothrombin 20210G/A mutation, and F VIII		X*	B
Random homocysteine	X		B
Determine body mass index (BMI)	X		B
Determine lifestyle (smoking/alcohol/coffee)	X		B

*Assessment of thrombophilia factors should take place if there is venous thromboembolism in the woman's medical history and/or if there is a first-degree family member with a known thrombophilia defect as well as a venous thromboembolism.

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Appendix 3

Recommendation for Treatment in Couples with Recurrent Miscarriage

	Do	Don't	Evidence Level
Pre-implantation genetic screening (PGS)		X	No randomized controlled trials (RCTs)
Pre-implantation genetic diagnosis (PGD) (indication of structural chromosome abnormality in male or female partner)	?*		No RCTs
Progesterone or hCG		X	B
Correction of uterine anomaly		X	No RCTs
Anticoagulant treatment (indication antiphospholipid syndrome)	X		B
Anticoagulant treatment (indication hereditary thrombophilia factor)		X	B
Advise to lose weight	X		B
Stop smoking	X		B
Eat healthily	X		C
Calculate prognosis for subsequent pregnancy (if unexplained recurrent miscarriage)			

PGD should be considered in the case of established carrier status of a structural chromosome abnormality in the male or female partner. The final decision for PGD will

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