Miscarriage

Synonym: spontaneous abortion

**Miscarriage** is defined as the loss of a pregnancy before 24 weeks of gestation and is either early (≤12 weeks) or late (13-24 weeks). Ectopic pregnancy and gestational trophoblastic disease are not included.

Bleeding after 24 weeks is termed 'antepartum haemorrhage'.

**Classification of miscarriage**
- Threatened miscarriage: mild symptoms of bleeding. Usually little or no pain. The cervical os is closed.
- Inevitable miscarriage: usually presents with heavy bleeding with clots and pain. The cervical os is open. The pregnancy will not continue and will proceed to incomplete or complete miscarriage.
- Incomplete miscarriage: this occurs when the products of conception are partially expelled. Many incomplete miscarriages can be unrecognised missed miscarriages.
- Complete miscarriage: presents with a history of confirmed intrauterine pregnancy, followed by heavy bleeding and clots but a subsequent ultrasound scan shows no pregnancy tissue in the uterine cavity. (If the pregnancy has not previously been confirmed as intrauterine on an ultrasound scan, it is described as a 'pregnancy of unknown location'.)
- Missed miscarriage: the fetus is dead but retained. Also described as early fetal demise, empty sac or blighted ovum. The uterus is small for dates. A pregnancy test can remain positive for several days or even weeks in some cases. It presents with a history of threatened miscarriage and persistent, dark-brown discharge. Early pregnancy symptoms may have decreased or gone.
- Habitual or recurrent miscarriage: three or more consecutive miscarriages.

**Aetiology**[1]

Often no cause is found but common recognised causes include:

- Abnormal fetal development.
- Genetically balanced parental translocation.
- Uterine abnormality.
- Incompetent cervix (second trimester).
- Placental failure.
- Multiple pregnancy.
- Polycystic ovary syndrome.
- Antiphospholipid syndrome.
- Inherited thrombophilias.
- Infections.
- Poorly controlled diabetes.
- Poorly controlled thyroid disease.

**Epidemiology**

- Miscarriage accounts for 42,000 hospital admissions in the UK annually[1].
- Miscarriage occurs in 12-24% of recognised pregnancies; the true rate is probably higher as many may occur before a woman has realised she is pregnant[1].
- 85% of spontaneous miscarriages occur in the first trimester.
The risk falls rapidly with advancing gestation\(^2\):
- 9.4% at 6 complete weeks of gestation.
- 4.2% at 7 weeks.
- 1.5% at 8 weeks.
- 0.5% at 9 weeks.
- 0.7% at 10 weeks.

**Risk factors\(^3\)**
- Age: it is more frequent in women aged >30 years and even more common in those aged >35 years (due to an increased risk of random chromosomal abnormalities).
- Cigarette smoking: the risk increases with smoking while pregnant and with the amount smoked\(^4\).
- Excess alcohol. Even low amounts - four units a week of alcohol consumption during early pregnancy - have been shown to increase the risk of spontaneous miscarriage substantially\(^5\).
- Low pre-pregnancy BMI.
- Paternal age >45 years (independent of maternal age).
- Fertility problems and taking longer to conceive.
- Illicit drug use.
- Uterine surgery or abnormalities - eg, incompetent cervix.
- Connective tissue disorders (systemic lupus erythematosus, antiphospholipid antibodies - lupus anticoagulant/anticardiolipin antibody).
- Uncontrolled diabetes mellitus.
- Being stressed, anxious or experiencing one or more stressful or traumatic events.

A previous live birth, nausea and eating a healthy diet are all protective factors.

Socio-economic status, working full time, short pregnancy interval, heavy lifting and strenuous exercise do not appear to increase the risk of miscarriage. Nor is obesity a risk factor, except in obese women who have become pregnant following assisted conception.

An association between low vitamin D levels and an increased risk of first trimester miscarriage has been identified but it is not known if it is causal\(^6\).

**Presentation**
- Most cases present with vaginal bleeding and pain that is worse for the patient than a period.
- The patient may also have seen products of conception but may not recognise them as such.
- Approximately half of women with a threatened miscarriage will go on to have a complete miscarriage. This is most likely if they have bleeding that is increasing, bleeding that is heavier than a normal menstrual period or bleeding with clots.
- A history of continued pregnancy-associated vomiting associated with bleeding in early pregnancy decreases the risk of miscarriage to approximately 30%.
- There are signs to look for in cases of first-trimester bleeding:
  - Is the patient shocked through blood loss? If so, pelvic and speculum examination are indicated:
  - Are there products of conception in the cervical canal? (Remove with sponge forceps.)
  - Is the cervical os open? (External os of multigravida usually admits the tip of the finger.)
  - Is bleeding from cervical lesions and not from the uterus?
  - Is the uterine size appropriate for dates?

**Differential diagnosis**
- **Ectopic pregnancy:**
  - The single most important diagnosis to exclude.
  - In ectopic pregnancy, the pain is usually great, may be unilateral and usually precedes the bleeding.
  - Compared to a miscarriage, the loss is usually less heavy and darker - almost black in some cases - and there is acute pain on manipulating the cervix (cervical excitation).

- Implantation bleed
- Cervical polyp
- Cervical ectropion
- Cervicitis/vaginitis
- Neoplasia.
- Hydatidiform mole

**The role of the Early Pregnancy Assessment Unit\(^7\)**
- Provided GPs have access to an effective Early Pregnancy Assessment Unit (EPAU), hospital admission can be avoided in up to 40% of patients.
- The ideal EPAU should have an efficient system for appointments, ultrasound equipment (including transvaginal probes) and easy access to laboratory facilities for rhesus antibody testing and selective serum human chorionic gonadotrophin (hCG) and progesterone estimation.
- The EPAU should be available seven days a week for women with early pregnancy complications.
- It should be staffed by healthcare professionals with training in sensitive communication and breaking bad news.
- Printed literature should be available for patients and standardised discharge letters sent.
Women who may be at risk in the future (eg, with a history of previous ectopic pregnancy or recurrent miscarriage) should be told how they can access the service in the event of a future pregnancy.

**Investigations**

**Ultrasound**

- The majority of women will require a transvaginal ultrasound (TVS) and 98% of complete miscarriages can be diagnosed in this way.
- If a transvaginal ultrasound scan is unacceptable to the woman then a transabdominal ultrasound scan should be offered and the woman should be made aware of the limitations of this method of scanning.
- If there is no visible heartbeat then a second scan should be performed. This is either done at a minimum of 7 or 14 days, depending upon the measurements of the crown-rump length or the mean gestational sac [7].
- Be aware that a woman with a pregnancy of unknown location may have an ectopic pregnancy.

**Serum hCG**[7]

- Serum hCG tests can help to exclude an ectopic pregnancy in women with a complete miscarriage (or pregnancy of unknown location), determined by ultrasound.
- Serial tests are required but results should complement clinical assessment and not replace it. Two tests are taken as close as possible to 48 hours apart:
  - >63% increase suggests ongoing pregnancy.
  - >50% decrease suggests pregnancy is unlikely to continue.
  - A woman with results between these parameters should be reviewed in the EPAU within 24 hours.
  - Slow doubling times are associated with miscarriage and declining values have high sensitivity of 93-97% in diagnosing a complete miscarriage [1].

- Rare causes of a raised hCG should also be borne in mind, including gestational trophoblastic disease or cranial germ cell tumour, which must be considered.

**Progesterone**

- One meta-analysis has shown that a single low progesterone measurement for women in early pregnancy, presenting with bleeding or pain and inconclusive ultrasound assessments, can rule out a viable pregnancy [8].
- However, a very low serum progesterone can be seen in normal viable pregnancies, so progesterone should not be used as the definitive diagnostic test without other evidence [1].

**Management**[7]

- Admission to hospital can be avoided in 40% of women with threatened or actual early pregnancy loss.
- Following a miscarriage, all women should have access to support, follow-up and formal counselling when necessary.
- Anti-D rhesus prophylaxis (250 IU) should be offered to all rhesus-negative women who have a surgical procedure to manage a miscarriage.
- However, anti-D rhesus prophylaxis does not have to be given to those women who:
  - Receive solely medical management for an ectopic pregnancy or miscarriage.
  - Have a threatened miscarriage.
  - Have a complete miscarriage.
  - Have a pregnancy of unknown location.

- Women need evidence-based information to guide their decisions, as well as access to support and counselling; leaflets, web addresses and helpline numbers for support organisations should be offered to all women experiencing miscarriage.
- There is no evidence to support a couple delaying attempts to conceive following a miscarriage [9].

There are three options for the management of a woman with a miscarriage: expectant or conservative (70%), medical (20-30%) and surgical:

**Expectant (conservative) management**

- If a scan at the EPAU confirms a first-trimester miscarriage, expectant management (waiting to see if the miscarriage will resolve naturally without intervention) with a urine pregnancy test at 7-14 days can be offered as the initial management strategy. However, other management options should be considered for those women with:
  - An increased risk of haemorrhage (for example, she is in the late first trimester).
  - A previous adverse or traumatic experience associated with pregnancy (such as stillbirth, miscarriage, or antepartum haemorrhage).
  - An increased risk from the effects of haemorrhage (for example, if she has coagulopathies or is unable to have a blood transfusion).
  - Any evidence of infection.

- If bleeding and pain have not started or bleeding and pain are persisting and/or increasing then these women should have a repeat ultrasound examination performed. Alternative management may be offered to those whose miscarriage is incomplete or has not started.
Those women who have resolution of bleeding and pain should perform a pregnancy test after three weeks. If this is still positive, they need to be reviewed and considered for either medical or surgical management.

Women should be counselled so they are fully aware of what to expect. In most cases, resorption of fetal tissue occurs without much bleeding. However, loss of fetal tissue vaginally can be associated with heavy bleeding and pain and the patient may prefer to opt for medical or surgical management rather than cope with this.

Conservative management is associated with higher unplanned emergency interventions and blood transfusion rates than active management (medical or surgical) but no difference in infection rates.\[1\]

In a clinical setting, when disposing of fetal tissue which is not being sent for histology, the guidelines of the Human Tissue Authority should be followed.\[10\]

Medical management

- Women may opt for medical management at the initial stage or following failed expectant treatment.
- Medical management can cause more pain and bleeding than surgical management but patients who opt for this approach cite 'being in control' and avoiding general anaesthesia as the main reasons for their choice.
- All women should be given analgesics and anti-emetics as needed.
- Vaginal misoprostol should be offered for the medical treatment of missed or incomplete miscarriage.
- Oral misoprostol is an acceptable alternative if this is the woman's preference.
- Mifepristone should no longer be given as a treatment for missed or incomplete miscarriage as it has been shown to be ineffective.
- Women should be advised that bleeding can continue for up to three weeks.
- Women should perform a pregnancy test three weeks after receiving medical management, unless they have worsening symptoms. If these occur, they should be reviewed to ensure there is no molar or ectopic pregnancy.
- Medical management avoids surgery in 70% of women with early fetal demise. In women with incomplete miscarriages is as effective as expectant management.\[1\]

Surgical management

- Clinical indications for offering surgical evacuation include persistent excessive bleeding, haemodynamic instability, evidence of infected retained tissue and suspected gestational trophoblastic disease.
- Where clinically appropriate, women should be offered a choice of:
  - Manual vacuum aspiration under local anaesthetic in an outpatient or clinic setting.
  - Surgical management in a theatre, under general anaesthetic.

  Vacuum aspiration is safe, quick to perform and less painful than sharp curettage.\[11\]

- Serious complications of surgery include perforation, cervical tears, intra-abdominal trauma, intrauterine adhesions and haemorrhage.
- A sexual history, and screening for infection if indicated, including for Chlamydia trachomatis, should be undertaken in women undergoing surgical uterine evacuation.
- Tissue obtained at the time of miscarriage is examined histologically to confirm pregnancy and to exclude ectopic pregnancy or gestational trophoblastic disease.
- Surgical management is less likely than medical management to lead to emergency intervention and is associated with shorter duration of bleeding and fewer gastrointestinal side-effects but there is no difference in infection rates or need for transfusion.\[1\]

Complications

- Expectant management has been shown to lead to a higher risk of incomplete miscarriage, need for unplanned (or additional) surgical emptying of the uterus, bleeding and need for transfusion\[12\].
- After complete miscarriage, bleeding normally ceases within 10 days. If part of the placenta remains, bleeding may continue with cramps. If this occurs then a repeat ultrasound should be undertaken and surgery is often required.
- The 2014 triennial report from Mothers and Babies: Reducing Risk through Audit and Confidential Enquiries across the UK (MBRRACE-UK) into maternal deaths in the UK and Ireland, highlighted the importance that loss of a child, including by miscarriage, has on a woman's vulnerability to mental illness and that she will need additional monitoring and support.\[13\]

Prognosis

- Threatened miscarriage is associated with risk of subsequent preterm delivery.
- Increased risk of further miscarriages. After three miscarriages, consider as recurrent spontaneous miscarriage.
- In the UK there were 0.05-0.22 reported deaths due to miscarriage per 100,000 maternities in the period 1985-2008.\[1\]

Prevention

- Encourage reduction of alcohol consumption.
- Smoking cessation and stopping illicit drug use.
- Vitamin supplementation prior to, or in early pregnancy, does not prevent miscarriage, although multivitamins with iron and folic acid do reduce the risk of stillbirth.\[14\]

Further reading & references

7. Ectopic pregnancy and miscarriage: diagnosis and initial management; NICE Clinical Guideline (December 2012)
10. Guidance on the disposal of pregnancy remains following pregnancy loss or termination; Human Tissue Authority. March 2015
13. Saving Lives Improving Mothers’ Care - Surveillance of maternal deaths in the UK 2011-13 and lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2009-13; MBRRACE-UK, Dec 2015

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