“ Summary “ for

Cardiac Disease in Pregnancy

Epilepsy in Pregnancy

Mental Health During Pregnancy

Ovulation Induction

VTE

Cervical Screening

Maternal Collapse

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Using Oxford handbook for Obstetrics and Gynecology, Hacker and Moore’s essentials of Obstetrics and Gynecology, and RCOG guidelines.

** **Highlighted in yellow** are the most important.

Cardiac Disease in Pregnancy

General Overview

Physical findings in pregnancy

- New systolic flow murmur.
- S3 gallop.
- Increased resting heart rate.
- Decreased diastolic blood pressure.
  ** The presence of these findings can complicate the management.

Valvular Heart Disease

Mitral stenosis

- With severe mitral stenosis, consider surgery before pregnancy.
- The risk of thromboembolism is 71.5% in pregnancy, higher with left atrial enlargement and AF (treat with LMWH).

Effect of pregnancy on mitral stenosis

- During pregnancy, mitral stenosis worsens as cardiac output increases.

- Asymptomatic patients may develop symptoms of cardiac decompensation and pulmonary edema as pregnancy progresses.

Mitral regurgitation

Mitral regurgitation is well tolerated in pregnancy; heart failure and endocarditis are rare.

Aortic Stenosis

- Aortic valve disease is less common than mitral valve disease (it isl ess likely to be s to rheumatic disease, more likely to be due to a congenital bicuspid valve).
- The severity and risk of complications is dependent on the gradient across the valve: >100mmHg in the non-pregnant state is severe.
- Associated symptoms are chest pain, syncope, and sudden death

Artificial Heart Valves

Women with artificial heart valves often have near-normal cardiac function and therefore tolerate pregnancy well. The main maternal and fetal risk is from anticoagulation, which must be continued throughout pregnancy as without it there is a high morbidity, stroke and mortality valve thrombosis. The choice of anticoagulant should be made after discussion with the patient. Warfarin better protects against valve thrombosis, therefore is better for the mother, but heparin is better for the fetus.

Anticoagulant drugs and risks

Low molecular weight heparin

- Less maternal bleeding.
- No risk to fetus; does not cross the placenta.
- Increased risk of embolic events.
- Increased risk of valve thrombosis — may require emergency valve replacement and has a high mortality.

Warfarin

- Increased risk of miscarriage.
- Risk of warfarin embryopathy; risk dose dependent: ↑ if >5 mg/day.
- Maternal and neonatal bleeding.
- Long half-life.

Management

- Antenatally there are two options:
    - Continue warfarin throughout pregnancy — aim for an international normalized ratio (INR) of 3.0.

    - Conceive on warfarin, change to LMWH from 6–12 weeks to minimize risk of warfarin embryopathy, then use warfarin from 12 to 37 weeks.

- Risk of bleeding in labour with warfarin, mother and baby, is high:
    - All patients should be changed to LMWH at 37 weeks.
    - LMWH should be stopped in labour and restarted after delivery.
    - Warfarin should be restarted 7–10 days post-partum.
- Reversal in the event of life-threatening bleeding:
    - Warfarin — fresh frozen plasma, vitamin K, and prothrombin complex concentrates (PCCs).
    - LMWH — protamine sulphate.
- Heparin and warfarin can safely be given to breast-feeding mothers.
- Low-dose aspirin should be given with LMWH because of its anti-thrombotic effects and relative safety.

Tissue valves

- Bio-prosthetic or homograft valves do not require anticoagulation.
- They have a shorter life expectancy than mechanical valves, so structural deterioration may occur in pregnancy, especially the mitral valve.
- Anticoagulation would still be required with arrhythmias, e.g. atrial fibrillation.

Congenital Heart Disease in Pregnancy

After repair

- If the anatomic defect has been corrected during childhood with no residual damage, the patient is expected to go through pregnancy without complications.

Generally well-tolerated conditions

- Patients generally tolerate pregnancy well if they have:
    - Persistent atrial septal defects.
    - Persistent ventricular septal defects.
    - Tetralogy of Fallot with complete surgical correction.

High-risk conditions

- Patients are at risk of decompensation during pregnancy if they have primary pulmonary hypertension or cyanotic heart disease with residual pulmonary hypertension.

Pulmonary hypertension and Eisenmenger syndrome

- Pulmonary hypertension is associated with increased maternal mortality during pregnancy or in the immediate postpartum period.
- Care should be taken to avoid overloading circulation, pulmonary congestion, heart failure, and hypotension. Women should be advised to avoid getting pregnant and termination offered if pregnancy occurs.
- Significant pulmonary hypertension with Eisenmenger syndrome is a contraindication to pregnancy because of high maternal mortality.

- Pregnancy should be managed in a pulmonary hypertension centre with multidisciplinary care from cardiologists, obstetricians, and anaesthetists.
- Antenatal care includes anticoagulation, oxygen, bed rest, and serial assessment of fetal growth.
- Avoid manoevures that suddenly increase vagal tone (with resultant Bradycardia) and venous return, e.g. ergometrine.
- A void PGF2 which is associated with pulmonary vasoconstriction and pulmonary hypertensive crisis

Coarctation of Aorta

- This has usually been corrected before pregnancy. The main risk is of aortic dissection; this risk is highest if there is hypertension present, usually treated with β-blockers. Condition is also associated with berry aneurysms, which can bleed in pregnancy causing cerebral haemorrhage.
- If uncorrected or recurrent, coarctation risks include:
    - Hypertension
    - Heart failure
    - Angina
- Avoid balloon angioplasty in pregnancy (↑ risk of dissection).Deliver by CS if there is associated aortic dilatation.

Tetralogy of Fallot

- The majority of women with Fallot's will have had surgery and the risk to their pregnancy will depend on not only the type of surgery but also its level of success.
- There are two main risks in pregnancy:
    - Paradoxical emboli can pass from right-to-left through the shunt causing strokes.
    - Cyanosis affects the fetus leading to increased risk of miscarriage, IUGR, prematurity, and death *in utero*.
- Risks are minimized by anticoagulation, prophylactic dose LMWH, bed rest, and oxygen.

Cardiac Arrhythmias in Pregnancy

General

- Palpitations are common in pregnancy and are a frequent indication for ECG.
- Thyroid tests
- If anticoagulation is indicated, use heparin or low-molecular-weight heparin, and avoid warfarin during pregnancy.

If an arrhythmia is detected

- Echocardiogram should be obtained to determine whether there is underlying structural heart disease.

Atrial premature beats

- Common.
- Usually benign.
- Usually do not require therapy other than eliminating exogenous stimulants such as caffeine and cigarettes.

Supraventricular tachyarrhythmias / SVTs

- Management may include carotid massage, Valsalva maneuver, antiarrhythmic therapy, or direct current cardioversion.
- Choice depends on the patient's hemodynamic status.

Atrial fibrillation and atrial flutter

- Usually associated with underlying maternal cardiac disease.
- Atrial fibrillation is more common in patients with severe mitral stenosis.
- Nearly all women who develop atrial fibrillation during pregnancy experience congestive heart failure.

Treatment principles

- Treatment is similar to nonpregnant adults.
- Antiarrhythmic agents cross the placenta.
- Fetal risks are largely unknown.

Ischemic Heart Disease in Pregnancy

Diagnosis

- Stress testing and angiography should be done before pregnancy. *Delivery:* aim for a vaginal delivery with a short 2nd stage (avoid ergometrine as it can cause coronary artery spasm)

Medications to avoid during pregnancy

- Avoid lipid-lowering agents and ACE inhibitors during pregnancy because of concerns regarding fetal toxicity.

Antiplatelet agents

- Certain antiplatelet agents may be safe for the fetus, but they should be stopped before delivery to avoid bleeding complications.

Peripartum Cardiomyopathy

Definition

- Patients have no underlying cardiac disease and develop symptoms of cardiac decompensation in the last weeks of pregnancy or within 6 months postpartum.

Risk factors

- History of preeclampsia.
- Hypertension.
- Poor nutrition.

Cardiac finding

- It is a dilatational cardiomyopathy associated with decreased left ventricular ejection fraction: LVEF < 45%.

Differential diagnosis to exclude

- Hypertensive cardiomyopathy.
- Drug-induced cardiomyopathy.
- Ischemic heart disease.
- Viral myocarditis.
- Valvular heart disease.

Delivery if disease presents antepartum,.

Management of Cardiac Disease During Pregnancy

NYHA classification

- The New York Heart Association functional classification is useful for assessing pregnancy risk in patients with acquired cardiac disease and determining optimal management during pregnancy, labor, and delivery.

Maternal and fetal risk by NYHA class

- Maternal and fetal risks are small in Class I and Class II disease.
- Risks are greatly increased in Class III disease, Class IV disease, and cyanosis.

Lesion-specific risk

- The type and severity of the cardiac defect are important.
- Higher risk of decompensation occurs with mitral stenosis with valve area < 2 cm^2 and aortic stenosis with valve area < 1.5 cm^2.

Why stenotic lesions are higher risk

- Mitral and aortic stenosis carry a higher risk of decompensation than mitral or aortic regurgitation.
- Pregnancy-induced decrease in systemic vascular resistance improves cardiac output in regurgitant lesions.

Other high-risk patients

- Significant pulmonary hypertension.
- LVEF less than 40%.
- Marfan syndrome.
- Mechanical valve.
- Previous history of cardiac event or arrhythmia.
- Significant comorbidities.

Prenatal Management

Multidisciplinary care

- All pregnant cardiac patients should be managed with a cardiologist, maternal-fetal medicine specialist, and anesthesiologist.

Initial evaluation

- A careful evaluation should include history, physical examination, ECG, and echocardiogram.

Counseling

- The evaluation helps in counseling the patient about pregnancy-associated risks and available options, including pregnancy termination.

Follow-up

- Frequent prenatal visits are indicated.
- Frequent hospital admissions may be needed, especially for Class III or Class IV cardiac disease.

General Recommendations

- Avoidance of Excessive Weight Gain and Edema, if chronic left ventricular failure is present treat with sodium restriction, loop diuretic, and beta-blockers
- Women should be encouraged to rest in the left lateral decubitus position for at least 1 hour every day to avoid compression of the vena cava.
- Adequate sleep should be encouraged.
- Aldosterone antagonists should be avoided because of potential antiandrogenic fetal effects.
- Avoidance of Strenuous Activity
- Avoidance of Anemia
- Avoidance of Infection (Cesarean delivery should only be performed for clear obstetric indications because of increased risk of endometritis and wound infections)
- Women requiring full anticoagulation include mechanical valve patients and patients with atrial fibrillation. Use heparin or low-molecular-weight heparin and Warfarin may be restarted postpartum.
- Women with congenital heart disease have an increased risk of having children with heart disease.
- Early detection with fetal echocardiography can help plan neonatal management.

Management of Delivery and Immediate Postpartum Period

Mode of delivery

- Cardiac patients should be delivered vaginally unless obstetric indications for cesarean delivery are present.

Labor positioning and monitoring

- Patients should be allowed to labor in the left lateral decubitus position with frequent assessment of vital signs, urine output, and pulse oximetry.

Pain control

- Adequate pain relief is important.

Second stage of labor

- Pushing should be avoided during the second stage of labor because increased intraabdominal pressure can lead to cardiac decompensation.

- The second stage can be assisted by outlet forceps delivery or vacuum extractor.
- Aim for a shorter second stage

Immediate Postpartum Risks

Why postpartum is risky

- After delivery of the placenta, the uterus contracts and about 500 mL of blood is added to the effective blood volume.

Cardiac output changes

- Cardiac output increases up to 80% above prelabor values in the first few hours after vaginal delivery.
- Cardiac output increases up to 50% after cesarean delivery.

Preventing overload and bleeding

- To minimize risks of volume overload or depletion, pay careful attention to fluid balance, avoid overload, and prevent uterine atony with oxytocin and uterine massage.

Prostaglandins

- PGF2α can be administered if pulmonary hypertension and reactive airway disease are not concerns.
- Methylergonovine should be avoided because of its pronounced vasoconstrictor effects.

Endocarditis Prophylaxis

Main concern

- A particular concern is the risk of endocarditis.

Antibiotic prophylaxis

- Antibiotic prophylaxis is recommended only for high-risk patients, such as those with prosthetic valves, unrepaired or incompletely repaired congenital heart disease, or previous history of bacterial endocarditis.

Acute Cardiac Decompensation in Pregnancy

Emergency status

- Acute cardiac decompensation with congestive heart failure should be managed as a medical emergency.
- The immediate postpartum period carries the greatest risk.

General management goals

- Medical management is directed at correcting precipitating factors and may include morphine sulfate, supplemental oxygen with ventilatory support if needed, and intravenous loop diuretic such as furosemide to reduce fluid retention and preload.

Medications to avoid

- Beta-blockers should not be used in acute heart failure.
- ACE inhibitors and similar drugs should be avoided.

Vasodilators

- Vasodilators can be used to improve cardiac output by reducing afterload, such as hydralazine, nitroglycerin, and rarely nitroprusside.

Inotropic support

- Some patients may require inotropic support with dopamine or dobutamine.

Digoxin

- The usefulness of digitalis is controversial.

Monitoring

- Very frequent monitoring is advised, including vital signs, urine output, pulse oximetry, and continuous electrocardiographic monitoring.

Pulmonary artery catheterization

- Routine use is discouraged.
- It may be contraindicated if the patient has cyanotic heart disease.

Endocarditis prophylaxis

Endocarditis prophylaxis should be given to the following two groups:

High risk

- Prosthetic heart valves (mechanical or tissue).
- Previous bacterial endocarditis.
- Complex cyanotic heart disease (Fallot's tetralogy, transposition).
- Surgically constructed systemic/pulmonary shunts.

Moderate risk

- Hypertrophic cardiomyopathy.
- Acquired valvular lesions.
- Mitral valve prolapse with severe regurgitation.
- Other congenital cardiac malformations.

Prophylaxis is not recommended for:

- Isolated secundum ASD.
- Surgically repaired ASD or VSD.
- Cardiac pacemakers.
- Mitral valve prolapse without regurgitation.

► Recommended antibiotics:

- Amoxicillin 1g IV plus gentamicin 120mg IV at onset of labour or rupture of membranes, then amoxicillin 500mg orally 6h later.
- Vancomycin 1g IV or teicoplanin 400mg IV if penicillin allergy with gentamicin 120mg IV.

1. Quick Core Facts

Topic	High-yield point
Risk in pregnancy	Up to 5-fold increased risk of DVT/PE.
Highest-risk timing	First few weeks postpartum, especially after cesarean delivery.
Common PE source	Most PE cases are related to DVT; about 70% have DVT as the instigating factor.
D-dimer	Not reliable as a screening tool in pregnancy.
Fetal-safe anticoagulants	UFH and LMWH do not cross the placenta.
Warfarin	Avoid in pregnancy; may be used postpartum and is compatible with breastfeeding.

2. Why Pregnancy Causes VTE: Virchow Triad

Virchow triad component	Pregnancy-related cause
Hypercoagulability	Decreased protein S; increased fibrinogen; increased factors V, VII, and X; increased von Willebrand factor.
Venous stasis	Compression of pelvic veins by the gravid uterus, endocrine-mediated venodilation, and reduced mobility.
Endothelial injury	Delivery, especially cesarean delivery, can injure uteroplacental and pelvic vessels.

- **Key memory line**: pregnancy prepares the body to prevent delivery hemorrhage, but that same physiology increases clot risk.
- **Major risk factors**: previous DVT/PE, inherited or acquired thrombophilia, smoking, prolonged immobility/bed rest, cesarean delivery, and postpartum state.

3. Deep Vein Thrombosis in Pregnancy

Exam pearl: Clinical diagnosis is difficult because around half of DVT cases may be asymptomatic. Symptoms alone do not rule in or rule out DVT.

Clinical feature	High-yield meaning
Calf pain + pain on dorsiflexion	Positive Homan sign, but unreliable.
Dull ache, tightness, or leg pain	Often worse with walking.
Acute unilateral swelling	More suspicious than bilateral mild pregnancy swelling.
Thigh pain + femoral triangle tenderness	Suggests iliofemoral thrombosis.
Left leg predominance	Pregnancy DVT is usually left-sided due to venous compression.
Calf circumference difference >= 2 cm	One of the more reliable clinical signs in pregnancy.

Investigation	Use
Compression ultrasonography	Primary diagnostic test for suspected DVT in pregnancy; noninvasive and has high sensitivity/specificity.
MRI	Consider if pelvic/iliac thrombosis is suspected and ultrasound is negative or incomplete.
D-dimer	Not reliable in pregnancy.

4. Pulmonary Embolism in Pregnancy

Clinical importance: PE is one of the major causes of pregnancy-related death. If treated early, mortality is low; if

untreated, mortality is very high.

Symptoms	Signs
Pleuritic chest pain, shortness of breath, air hunger, palpitations, hemoptysis, syncope.	Tachypnea, tachycardia, low-grade fever, pleural friction rub, chest splinting, pulmonary rales, loud P2, right ventricular failure in severe PE.

- **Obstetric trap**: PE symptoms can be subtle in pregnancy. Do not wait for dramatic collapse before investigating.

Investigation	High-yield point
ECG	May show sinus tachycardia, premature beats, or right axis deviation; not diagnostic.
Chest X-ray	May show atelectasis, pleural effusion, obliteration of arterial shadows, or elevated diaphragm; helps guide imaging choice.
ABG	May show PaO2 <80 mmHg, but normal oxygenation does not exclude PE.
Bilateral compression ultrasound	If positive for DVT in a symptomatic patient, PE may be presumed and treated.
V/Q scan	Minimal fetal risk; less useful with abnormal CXR, asthma, or COPD.
CT pulmonary angiography	Directly visualizes thrombus; fetal dose is low, but maternal breast radiation exposure is a concern.

Bottom line: PE is ultimately a radiologic diagnosis. Treatment and follow-up are the same general anticoagulation strategy as DVT.

5. Treatment of Confirmed DVT or PE

Treatment point	High-yield details
First-line agents	LMWH such as enoxaparin, or UFH.
Enoxaparin treatment dose	1 mg/kg subcutaneously every 12 hours; anti-Xa target may be 0.6-1.0 U/mL.
UFH treatment	Dose-adjusted IV UFH to keep aPTT 1.5-2.5 times control; continue IV therapy at least 5-7 days, then convert to subcutaneous heparin.
Duration	Continue through pregnancy and for at least 6 weeks postpartum.
Fetal safety	UFH and LMWH are safe for the fetus because they do not cross the placenta.
UFH vs LMWH	LMWH is often preferred because it is predictable and has lower risk of maternal thrombocytopenia and osteoporosis than UFH.

6. Peripartum Anticoagulation Plan

Timing/situation	Management
Planned induction or cesarean while on LMWH	Stop LMWH about 24 hours before delivery.
Alternative near delivery	Switch to UFH because it can be stopped about 6 hours before delivery.
Neuraxial anesthesia	May be given if anticoagulation timing is appropriate and aPTT is normal when using UFH.
Postpartum restart	If no postpartum hemorrhage, restart LMWH or UFH 12-24 hours after delivery.
Transition postpartum	Patient may be transitioned to warfarin; continue

	anticoagulation for at least 6 weeks postpartum.

Drug	Pregnancy	Breastfeeding
UFH	Safe; does not cross placenta.	Compatible.
LMWH	Safe; does not cross placenta.	Compatible.
Warfarin	Avoid because it crosses placenta and can cause fetal hemorrhage/teratogenicity.	Compatible; not a contraindication.

- **Warfarin monitoring**: INR target 2.5, acceptable range 2.0-3.0.

7. Thrombophilia Evaluation

- Consider thrombophilia workup in patients with PE or DVT, especially recurrent thrombosis, positive family history, or obstetric history suggestive of antiphospholipid syndrome.

Category	Tests
Acquired thrombophilia	Lupus anticoagulant, anticardiolipin antibody.
Inherited thrombophilia	Factor V Leiden, prothrombin G20210A mutation.
Natural anticoagulant deficiency	Protein C, protein S, antithrombin III.

8. Prophylactic Anticoagulation

- Pregnant patients with a past history of PE or DVT usually need prophylactic anticoagulation during pregnancy and for 6 weeks postpartum.
- Some high-risk patients may require full therapeutic anticoagulation instead of prophylaxis.
- All pregnant women undergoing cesarean delivery should have pneumatic compression stockings for thromboprophylaxis.

Prophylaxis option	Dose from slide
UFH	5000-10,000 units subcutaneously every 12 hours.
Enoxaparin	40 mg subcutaneously once daily.

9. Superficial Thrombophlebitis

Definition: Thrombosis and inflammation of a superficial vein, usually localized and commonly associated with varicose veins, obesity, limited activity, or prior superficial thrombophlebitis.

Clinical feature	Description
Distribution	Usually limited to the calf area.
Local inflammation	Erythema, warmth, swelling, and tenderness along the involved vein.
Palpable cord	Firm/tender cord along the course of the superficial vein.
Risk of PE/DVT	Usually does not progress to DVT or PE, but ultrasound is indicated if deep extension is suspected.

Treatment	High-yield point
Leg elevation	Reduces swelling.
Pain medication/anti-inflammatory agents	Symptom control; anti-inflammatory agents may be considered.
Local heat	Reduces discomfort and inflammation.

Ambulation	Encouraged; avoid unnecessary bed rest.
Support stockings	May help prevent recurrence.
Anticoagulation	Usually not needed unless concern for extension or higher-risk features.

Epilepsy in Pregnancy

Overview:

- The fetus usually tolerates seizures without long-term sequelae, but there is a risk of fetal demise with status epilepticus.

- Most women have been diagnosed before conception

- Poorly controlled epileptics and those who stop medication are at the highest risk of increased seizure frequency.

- There is an increased risk of major congenital anomalies (2–5%) in women with epilepsy. Most of this risk is due to anticonvulsant medication.

Prepregnancy counselling

- Involve a neurologist to confirm diagnosis is epilepsy.
- Optimize treatment, achieve seizure control, and educate patient.
- Use the least number of drugs at the lowest dose to control seizures to minimize risk of congenital anomalies.
- Consider stopping drugs if seizure free for >2yrs (warn of risk ofseizures and implications for driving).

- All women should take folic acid 5mg for at least 12wks before conception and continue until delivery (d risk of neural tube defects)

- Don't change medication in pregnancy if well controlled, and stress the importance of compliance with medication.
- Prenatal screening: alpha fetoprotein (neural tube defects), detailed anomaly scan (facial clefts and cardiac abnormalities).
- Consider fetal echocardiography at 22–24wks.
- Consider vitamin K 10mg/day for the last 4wks of pregnancy (hepatic enzyme-inducing drugs may lead to neonatal coagulopathy).
- women of reproductive age who are taking AEDs are advised to take at least 0.4 to 0.8 mg of folic acid daily to protect against neural tube defects should they become pregnant (till end of the first trimester)
- Valproic acid should probably not be used in a woman planning a pregnancy, unless other drugs have proven ineffective.

Intrapartum care

- • Aim for vaginal delivery (CS should be for obstetric indications; seizures are not an indication unless in refractory status epilepticus).

- Labour is associated with increased risk of seizures due to sleep deprivation, reduced absorption of drugs, and hyperventilation.
- Control seizures with benzodiazepines.
- Based on current evidence, routine monitoring of serum AED levels in pregnancy is not recommended although individual circumstances may be taken into account.
- Ensure usual anticonvulsants are taken at the correct time.

- Antacids and antihistamines should be avoided in patients receiving phenytoin, because they lower plasma levels of phenytoin and may precipitate a seizure attack. (Monitoring plasma levels of drugs during preg is not indicated unless high risk)

Postnatal care

- All babies born to a patient taking enzyme-inducing AEDs should be offered 1 mg of intramuscular vitamin K to prevent haemorrhagic disease of the newborn.
- • Breast-feeding is not contraindicated (anticonvulsants reach breast milk and thus slow withdrawal occurs, although phenobarbital and benzodiazepines may cause sedation in the baby).
- If the anticonvulsant dose was increased in pregnancy it should be reduced back to prepregnancy levels slowly post-partum.
- Contraception should be offered with enzyme-inducing drugs: COCP containing 50 micrograms estrogen with a shorter pill free interval. progestogen-only pill (POP) is less effective. intrauterine contraceptive device (IUCD) is ideal.
- The dose of the anticonvulsant drug should be discussed 10 days postpartum and may be lowered to prevent toxicity, provided that a therapeutic level is maintained.

Status epilepticus,

Immediate hospitalization is required. Management is similar to that in the nonpregnant adult.

- Left lateral tilt and Patency of the airway and adequate oxygenation (+ iv access)should be ensured.
- After blood is drawn for plasma levels of anticonvulsants, intravenous lorazepam should be given slowly, if after 20 mintutes no seizure termination administration of second line agent (phenytoin)
- The management of labor and delivery follows obstetric indications.
- If there is no intravenous access, diazepam 10−20 mg rectally repeated once 15 minutes later if there is a continued risk of status epilepticus, or midazolam 10 mg as a buccal preparation are suitable.
- If seizures are not controlled, consider administration of phenytoin or fosphenytoin.The loading dose of phenytoin is 10–15 mg/kg by intravenous infusion,
- If there is persistent uterine hypertonus, consider administration of tocolytic agents.
- After the mother is stabilized, continuous electronic fetal monitoring should be commenced.
- If the fetal heart rate does not begin to recover within 5 minutes or if the seizures are recurrent (refractory), expedite delivery. This may require caesarean delivery if vaginal delivery is not imminent.
- Give usual AED medication if already on treatment

(if you are in doubt if this is a seizure SE or Eclampsia administration of MgSo4 is required)

Mental Health During pregnancy:

Alcohol Abuse

- **Fetal alcohol syndrome**
- There is evidence that this occurs in some children born to mothers who drink excessively: 0.5–5:1000 live births. The exact relationship between alcohol and birth defects is a complex one, but there is no known safe lower limit for alcohol consumption; current recommendations limit consumption to 1 U/day. Women drinking >18 U/day have a 1 in 3 chance of fetal alcohol syndrome, characterized by pre- and postnatal retardation, developmental delay, and characteristic craniofacial dysmorphism, correlating with low IQ.
- **Management of pregnancy in women abusing alcohol**
  - Attempt to reduce harm by:
    - Counselling about risks and encouraging ↓ alcohol intake
- □ Detailed anomaly USS.
- □ Serial USS to assess growth and fetal well-being.
- □ Multidisciplinary team management with involvement of:
  - Paediatric team
  - Anaesthetic team
  - Social services
  - Local specialist alcohol support workers

Psychatric Disorders:

- Women suffering with recurrent and severe mental disorders who want to have children may benefit from pregnancy planning, as:
  - Relapses are predicted by major life events.
  - A medication holiday can be tried before conception, avoiding complications of relapse on pregnancy.
  - Reproductive toxicology of essential medication can be minimized.
  - Closer antenatal monitoring can be planned in advance.
  - Contingency plans, including those for child protection, can be made with, and shared by, all the relevant agencies and caregivers.

Anxiety Disorders:

- Reassurance
- Must identify and concurrent depression to treat preconception
- Psychological management (including cognitive-behavioural therapy (CBT)) is preferable to anxiolytics, but access within the timescale of pregnancy may be limited.
- Benzodiazepine use should be avoided.

Schizophrenia:

- Clinical features vary, but include delusions, hallucinations, and abnormalities of affect, speech, and volition.
- Maintenance medication is usually required throughout pregnancy.
- Significant proportion of patients are unable to care for the child.
- Older antipsychotics (such as haloperidol) are preferred because more data are available with no strong evidence of malformations.
- Clozapine is not routinely used in pregnancy and breast-feeding due to the theoretical risk of agranulocytosis in the fetus/neonate

Depression

- As common antenatally as it is postnatally.
- Can be effectively treated with pharmacological and psychological therapy.

- **Eating disorders**
- Characterized by disturbances in eating behaviour and abnormalities in
- body image.
- Although anorexia nervosa is associated with reduced fertility andfecundity, patients with sub-threshold symptoms can become pregnant and require careful monitoring and management.
- Possible effects on fetal outcome include IUGR, low birth weight, prematurity, and a possible increase in congenital anomalies.

Psychiatric Medications:

**** most of psych drugs can be continued**
Lithium:

- *Early pregnancy:* risk of Ebstein's anomaly lower than previously estimated
- *Late pregnancy:* levels need to be measured more frequently as plasma volume and GFR increase.
- *Labour:* reduced vascular volume and potential dehydration necessitates careful fluid balance and monitoring of serum lithium levels.
- *Neonate:* reported association with floppy baby syndrome, neonatal thyroid abnormalities, and nephrogenic diabetes insipidus.

- Breast-feeding is not recommended.
- If women continue to take lithium, serum levels should be checked every 4wks until 36wks, then weekly.

**Women taking lithium should deliver in a consultant-led obstetric unit.
** Can be substituted with an Antipsychotic

Antidepressants:

When choosing an antidepressant, prescribers should bear in mind that the safety is not well understood, but take into account:

- Tricyclic antidepressants (amitriptyline, imipramine, and nortriptyline) have lower known risks than other newer antidepressants.
- Most tricyclics have a higher fat toxicity index than SSRIs.
- Fluoxetine is the SSRI with lowest known risk in pregnancy.
- No strong evidence of malformations with tricyclic drugs.
- Paroxetine may have association with cardiac malformations.
- SSRIs in late pregnancy have been associated with incidence of persistent pulmonary hypertension in infants.
- Venlafaxine may be associated with risk of high BP, toxicity in overdose, and difficulty in withdrawal.
- Serotonin and norepinephrine reuptake inhibitors (SNRIs) are relatively untested and so are not recommended as first-line drugs in pregnancy.
- Citalopram and fluoxetine are present in breastmilk at relatively high concentrations.
- Imipramine, nortriptyline, sertraline, and paroxetine have particularly low concentrations in breastmilk and are therefore recommended for breast-feeding mothers.

! Any decision to stop psychiatric medication for women with serious mental health problems should be made in consultation with a specialist, bearing in mind that the period of maximum vulnerability has often passed by the time pregnancy is identified.

! Most psychiatric drugs are not associated with a significant increase in fetal anomalies.

! The risks of a relapse of psychiatric disorder during pregnancy tend to be underestimated.

! The risks of continuing medication need to be considered in terms of:

- Early fetal exposure
- Late fetal expose
- Delivery and neonatal withdrawal
- Breast-feeding and longer-term neurobehavioral toxicity

Puerperal psychosis

- This is a commonly used term that describes a range of psychotic conditions presenting in the immediate postnatal period. Most cases are episodes of bipolar affective disorder, although severe unipolar depression, schizophrenia, and acute physical illness with associated organic brain syndrome can all present with psychotic symptoms.
- **Presentation**
- Puerperal psychosis presents rapidly, usually within 2 weeks of delivery, high suicide and baby harm risk.
- **Risk factors**
  - Personal history of bipolar affective disorder.
  - Previous episode of puerperal psychosis.
  - 1st-degree relative with history of puerperal psychosis.
  - 1st-degree relative with bipolar affective disorder.
- **High-risk patients**

- High-risk patients should be referred to specialist perinatal mental health services antenatally, so an appropriate care plan can be developed and the use of prophylactic medication, following delivery, may be considered.
- **Treatment and recovery**
- !!!!Women presenting with puerperal psychosis need urgent psychiatric assessment and treatment. They should be admitted, because of the risks to both mother and baby, neglect as well as direct harm; ideally this will be to a specialist mother and baby unit, where the maternal–infant relationship can be protected.
- !!!!Any decision to admit a baby to a mother and baby unit must be child centred, and involve full consideration of the longer-term possibility of the baby remaining with the mother if the mental health problems have been long-standing.
- Puerperal psychosis is treated according to diagnosis. This may involve:
  - Antidepressant or antipsychotic medication.
  - Mood stabilizers.
  - Electroconvulsive therapy, ECT.
- Most patients presenting with puerperal psychosis make a full recovery, but the 10-year recurrence rate, puerperal and non-puerperal, is up to 80% and the 10-year readmission rate is of the order of 60%.

Postnatal depression

Diagnosis

Key features of depression are:
- Tearfulness
- Irritability
- Anxiety
- Poor sleep

- It can easily be missed if specific enquiries are not made, especially with milder cases. New mothers with depression are often embarrassed by their feelings and reluctant to admit to sadness at a time when they feel they are expected to be happy.

Screening for depression
- NICE suggests the following questions are used to screen for depression both antenatally and at 4–6 weeks and 3–4 months postnatally:
  - During the past month, have you often been bothered by feeling down, depressed, or hopeless?
  - During the past month, have you often been bothered by having little interest or pleasure in doing things?
- If the woman answers ‘yes’ to both of these:
  - Is this something you feel you need or want help with?
- Other screening questionnaires like the Edinburgh Postnatal Depression Scale (EPDS) are also helpful in identifying postnatal depression, and are routinely used by health visitors in many services.

Treatment and recovery
- Mild to moderate depression may respond to self-help strategies and non-directive counselling, “listening visits” by a health visitor. Moderate to severe depression usually requires treatment with antidepressant medication and/or psychotherapy (CBT). Breast-feeding is not a contraindication for antidepressant treatment, but drugs with low excretion in breastmilk, such as sertraline, are preferred.
- Women who have experienced postnatal depression have a high, >70%, lifetime risk of further depression and a 25% risk of depression following subsequent deliveries. For this reason, women who present in pregnancy with a history of postnatal depression are likely to benefit from closer postnatal follow-up.

- **Post-partum ‘baby blues’**
- Over 50% of women experience a brief period of emotional instability starting around 3 days after delivery and resolving spontaneously within 10 days, characterized by:
  - Tearfulness
  - Irritability
  - Anxiety
  - Poor sleep
- This usually responds to support and reassurance.

Maternal Collapse:

Classification of possible causes of maternal collapse in systematic way. Classification of possible causes of Maternal Collapse in a Systematic way:

Head: Eclampsia, epilepsy, cerebrovascular accident, vasovagal response

Heart: Myocardial infarction, arrhythmias, peripartum cardiomyopathy, congenital heart disease, dissection of thoracic aorta

Hypoxia: Asthma, pulmonary embolism, pulmonary oedema, anaphylaxis

Haemorrhage :Abruption, uterine atony, genital tract trauma, uterine rupture, uterine inversion, ruptured aortic aneurysm.

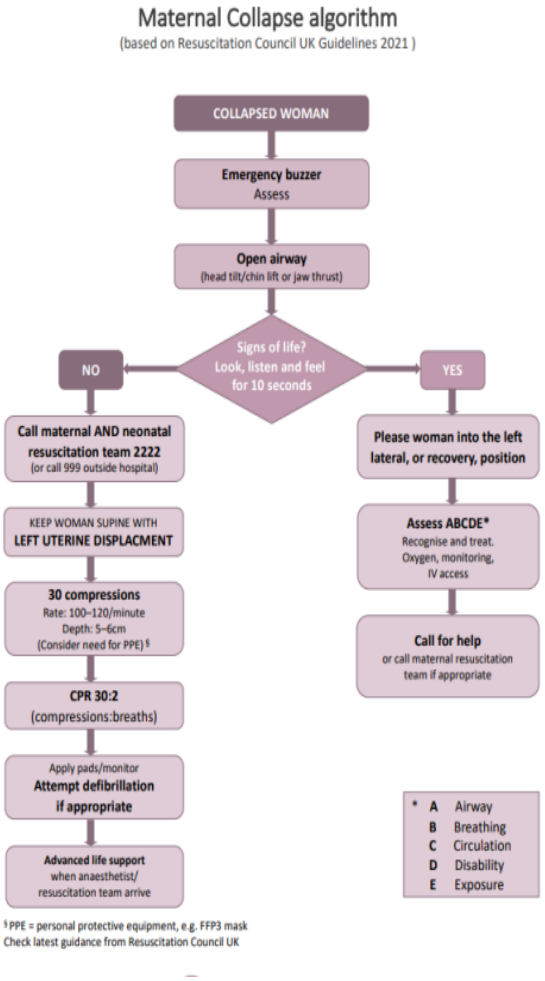
Whole body and Hazards: Hypoglycaemia, amniotic fluid embolism, septicaemia, trauma, complications of anaesthesia

Initial Management of Maternal Collapse

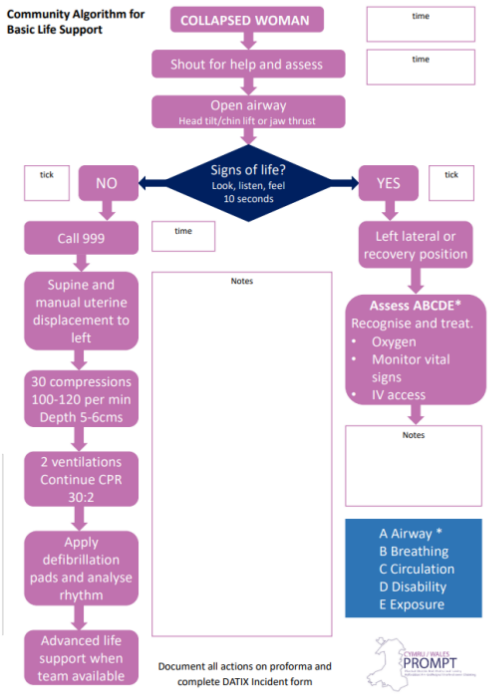
• Follow Basic Life Support Algorithm:/Maternal Collapse Algorithm

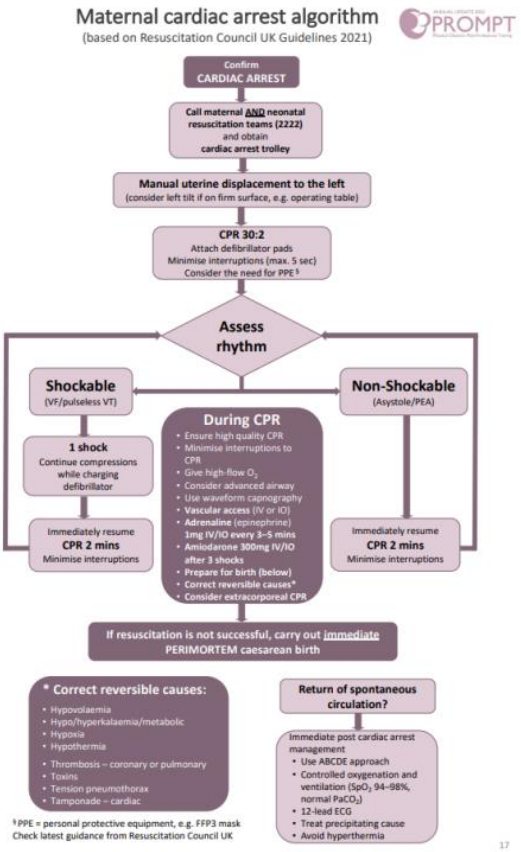
. Agonal gasps (isolated or infrequent gasping in the absence of other breathing in an unconscious person) occur commonly in the first few minutes after a cardiac; they are an indication for starting CPR

immediately and should not be confused with normal breathing.



Appendix B Community Algorithm for Maternal Collapse.





4.1 Primary Obstetric Survey

This initial assessment should produce a working assessment and should enable treatment of the cause of the collapse to commence. Perform obstetric survey in logical manner starting at head and working down.

Primary Obstetric Survey:	
Head	How responsive is woman? Is she alert, responsive to: voice, painful stimuli or unresponsive (AVPU)?
Heart	Capillary refill? Pulse and rhythm? Blood pressure? Is there a murmur?
Chest	Good bilateral air entry? Respiratory rate? Oxygen saturation? What do breathe sounds like? Trachea central? Complaining of chest pain
Abdomen	Acute abdomen (rebound and guarding)? Tenderness (uterine or non-uterine)? Is the fetus alive? Is there a need for a laparotomy to expedite birth?
Vagina	Is there bleeding? What is stage of labour? Is there an inverted uterus
Legs	Evidence of deep vein thrombosis (DVT)?

Post Resuscitation • Following birth if the resuscitation is successful the woman will be transferred to theatre to complete the operation and for stabilization.

• Assessment and resuscitation of the infant will be managed by the neonatal team.

• The ongoing management of the maternal collapse will require close collaboration within the multi-disciplinary team and will be dependent upon the cause of the collapse following the relevant guideline

. • The woman will be nursed in the environment most appropriate for her condition i.e. HDU on the Labour Ward, ITU, ICU or a specialist tertiary unit.

• In the unfortunate event of a maternal demise please follow the guideline for the Local Management of a Maternal Death (Perimortem Caesarean Section (PMCS): If no return of spontaneous circulation (ROSC) within 4-5 minutes of cardiac arrest, initiate delivery of the fetus, as this improves maternal survival prospects)

Induction of Ovulation:

- Ovulation induction is a treatment to stimulate development of a single dominant follicle in patients with anovulation (failure to ovulate), helping restore fertility.
- **Goals and candidates**
- The primary goal is to enable ovulation in women with anovulatory disorders. Patients who benefit include those with:
  - **Anovulation with normal hormonal milieu** (e.g., polycystic ovary syndrome)
  - **Unexplained infertility**
  - **Hypogonadotropic hypogonadism** (requiring exogenous gonadotropins)
- **Treatment options**

  First-line oral agents are used for anovulation with normal gonadotropin levels:
  - **Letrozole** (off-label): first-line for polycystic ovary syndrome — reduces estrogen production via aromatase inhibition, stimulating FSH secretion and ovulation; associated with higher live birth rates compared to clomiphene
  - **Clomiphene citrate**: alternative oral agent; blocks hypothalamic estrogen receptors to increase FSH and LH release; has higher rates of multiple gestation than letrozole

  Pulsatile GnRH: used for functional hypothalamic amenorrhea; stimulates FSH and LH release to trigger follicle maturation

  Exogenous gonadotropins (recombinant FSH, LH, and/or hCG): indicated for:
  - Anovulation due to hypogonadotropic hypogonadism (low FSH/LH production)
  - Inadequate response to oral agents (second-line for polycystic ovary syndrome)

- **Important risks**
  - **Multiple pregnancy**: occurs with all ovulation induction methods; risk is higher with clomiphene than letrozole
  - **Ovarian hyperstimulation syndrome (OHSS)**: a potentially serious complication specific to exogenous gonadotropin therapy, characterized by ovarian enlargement, fluid accumulation in the abdomen, and systemic effects (nausea, fluid retention, renal dysfunction, and thrombosis)
- **Treatment pathway**
- If pregnancy is not achieved after 6 cycles of oral ovulation induction, or if there are anatomical causes of infertility, referral to reproductive endocrinology for assisted reproductive technology (such as in vitro fertilization) is appropriate.

Cervical Screening:

Overview

- Cervical cancer is the third most common cancer of the female genital tract in the US. Persistent infection with high-risk HPV genotype is the primary cause. All asymptomatic individuals with a cervix between 21–65 years of age should be screened at regular intervals; the American Cancer Society recommends starting at age 25.

Screening Modalities

- Three primary options are available:

Modality	Frequency	Age Groups
Cytology-alone (Pap smear)	Every 3 years	21–29 years; 30–65 years
Primary HPV testing	Every 5 years	30–65 years
HPV/Pap cotest	Every 5 years	30–65 years

- For women aged 21–29 at average risk, Pap smear every 3 years is the standard. Women aged 30–65 may choose any of the three modalities.
- Endocervical sampling and p16 immunohistochemistry may be considered in select situations.

Cytologic Findings

- The Papanicolaou (Pap) test evaluates cervical cells under microscopy. Normal Key findings include:

Normal squamous epithelial cells are present.

Abnormal Findings:

Low-Grade Squamous Intraepithelial Lesion (LSIL) – koilocytes with perinuclear halos and slight nuclear enlargemen

High-Grade Squamous Intraepithelial Lesion (HSIL) – irregular nuclear contours, high nuclear-to-cytoplasmic ratio, clumped chromatin:

Atypical Squamous Cells of Undetermined Significance (ASC-US) – enlarged nuclei (2–3× normal size) without HPV features.

Management of Abnormalities

- Management has shifted from result-based to **individualized risk-based approaches**. Options include:
  - **Expedited treatment** (conization, LEEP, laser cone biopsy)
  - **Diagnostic excision** (colposcopic biopsy)
  - **Surveillance** with follow-up testing
- Exception: Abnormalities in individuals < 25 years of age and certain cytology results require specific protocols. Individuals with high-grade precursor lesions remain at high risk for invasive cancer even after treatment and require follow-up for at least 25 years.

Prevention Measures

- **Primary prevention**: HPV immunization and barrier protection during sexual intercourse
- **Secondary prevention**: Adherence to cervical cancer screening recommendations

Special Populations

- **HIV-positive individuals** undergo modified screening with annual Pap smears; patients < 30 years may move to 3-yearly screening if 3 consecutive tests are normal. Patients ≥ 30 years should also undergo HPV screening and may transition to 3-yearly screening if HPV-negative or if 3 consecutive Pap smears are normal.