Obstetrics and Gynecology
Venous thromboembolism in pregnancy

University Of Fallujah
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Lecture : 6

Stage : 4th Year

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Date: 14|10|2025

Learning objectives

1. Know the main risk factor for VTE in pregnancy.
2. Explain the clinical manifestation and diagnosis of DVT and pulmonary embolism during pregnancy.
3. Review the treatments options.
4. Review the peventive measures.

Venous thremboembolism

- Venous thromboembolism (VTE) is the most common cause of direct maternal death in the UK.

- Pregnancy is a hypercoagulable state because of an alteration in the thrombotic and fibrinolytic systems. There is an increase in clotting factors VIII, IX, X and fibrinogen levels, and a reduction in protein S and antithrombin (AT) III concentrations. The net result of these changes is to reduce the likelihood of haemorrhage following delivery.

- These physiological changes predispose a woman to thromboembolism and this is further exacerbated by venous stasis in the lower limbs due to the weight of the gravid uterus placing pressure on the IVC in late pregnancy and immobility, particularly in the puerperium.

Risk factors for thromboembolic disease

Pre-existing:

maternal age (>35 years);

thrombophilia;

obesity (>80 kg);

previous thromboembolism;

severe varicose veins;

smoking;

malignancy.

Associated comorbidity e.g. cancer, heart failure, active systemic lupus erythematosus, nephrotic syndrome, type I diabetes mellitus with nephropathy, sickle cell disease, intravenous drug use)

Specific to pregnancy:

Multiple gestation

Pre-eclampsia

Parity ≥3

Caesarean section, especially if emergency;

Damage to the pelvic veins; sepsis

Prolonged bed rest

Stillbirth

Preterm birth

Post-partum haemorrhage (>1 L/requiring transfusion)

Midcavity forceps or rotational operative delivery

New onset/transient:

Any surgical procedure in pregnancy or puerperium (e.g. appendicectomy, post-partum sterilization)
Bone fracture
Hyperemesis
Ovarian hyperstimulation syndrome
In vitro fertilization (IVF)
Admission or immobility (¸3 days' bed rest)
Current systemic infection (requiring intravenous antibiotics or admission to hospital, e.g. pneumonia, pyelonephritis, post-partum wound infection)
Long-distance travel (>4 hours)

Thrombophilia

Some women are predisposed to thrombosis through changes in the coagulation/fibrinolytic system that may be inherited or acquired.

- hereditary forms of thrombophilia currently recognized include: deficiencies of the endogenous anticoagulants protein C, protein S and AT III; abnormalities of procoagulant factors, factor V Leiden (caused by a mutation in the factor V gene) and the prothrombin mutation G20210A. Heritable thrombophilias are present in at least 15% of Western populations.
- Acquired thrombophilia is most commonly associated with antiphospholipid syndrome (APS).

APS is the combination of lupus anticoagulant with or without anticardiolipin antibodies, with a history of recurrent miscarriage and/or thrombosis. It may (or, more commonly, may not) be associated with other autoantibody disorders such as systemic lupus erythematosus (SLE).

more than 50% of cases of pregnancy-related VTE are associated with a thrombophilia. It is therefore vital that individuals with a history of thrombotic events are screened for thrombophilia. The presence of thrombophilia, with a history of thrombotic episode(s), means that prophylaxis should be considered for pregnancy.

DVT

The commonest symptoms are pain in the calf with varying degrees of redness or swelling. Women's legs are often swollen during pregnancy, therefore unilateral symptoms should ring alarm bells.

The signs are few, except that often the calf is tender to gentle touch. It is mandatory to ask about symptoms of PE as a woman with PE might present initially with a DVT.

DX OF DVT

Compression ultrasound has a high sensitivity and specificity in diagnosing proximal thrombosis in the non-pregnant woman and should be the first investigation used in a suspected DVT. Calf veins are often poorly visualized; however, it is known that a thrombus confined purely to the calf veins with no extension is very unlikely to give rise to a PE.

Venography is invasive, requiring the injection of contrast medium and the use of X-rays. It does, however, allow excellent visualization of veins both below and above the knee

Pulmonary embolism

It is crucial to recognize PE, as missing the diagnosis could have fatal implications. The most common presentation is of mild breathlessness or inspiratory chest pain in a woman who is not cyanosed but may be slightly tachycardia (>90 bpm) with a mild pyrexia (37.5°C). Rarely, massive PE may present with sudden cardiorespiratory collapse

Diagnosis of pulmonary embolism

electrocardiogram (ECG),

chest X-ray

arterial blood gases

investigate the lower limbs for evidence of DVT by ultrasound, and if positive treat with a presumptive diagnosis of PE.

If all the tests are normal but a high clinical suspicion of PE remains, a ventilation perfusion (V/Q) scan or computed tomography pulmonary angiogram (CTPA) should be performed. In both cases the radiation to the fetus is below the threshold considered potentially dangerous to the fetus.

D-dimer is now commonly used as a screening test for thromboembolic disease in non-pregnant women, in whom it has a high negative predictive value. In pregnancy, however, D-dimer can be elevated due to the physiological changes in the coagulation system, limiting its clinical usefulness as a screening test in this situation.

D-dimer is not a reliable diagnostic test of acute PE in pregnancy.

Treatment of VTE

- Management of acute VTE should involve a multi disciplinary team including senior physicians, obste tricians and radiologists.
- Warfarin is given orally and prolongs the prothrombin time (PT). Warfarin is rarely recommended for use in pregnancy (exceptions include women with mechanical heart valves) as it crosses the placenta and can cause limb and facial defects in the first trimester and fetal intracerebral haemorrhage in the second and third trimesters.
- Low molecular weight heparins (LMWHs) are now the treatment of choice. They do not cross the placenta and have been shown to be at least as safe and effective as unfractionated heparin (UFH) in the treatment of VTE, with lower and fewer haemorrhagic complications in the initial treatment of non-pregnant subjects. In addition, LMWH is safe and easy to administer.
- Following delivery, women can choose to convert to warfarin (with the need for stabilization of the doses initially and frequent checks of the international normalized ratio (INR) or remain on LMWH.

- Both warfarin and LMWH are safe in women who are breast feeding.
- Graduated elastic stockings should be used for the initial treatment of DVT and should be worn for 2 years following a DVT to prevent post-thrombotic syndrome
- Pregnant women with severe acute PE should be managed on an individual basis regarding the use of intravenous unfractionated heparin, thrombolytic therapy or thoracotomy and surgical embolectomy.

Prevension of VTE in pregnancy and postpartum
Antenatal
Risk Assessment

- All women should be assessed for VTE risk early in pregnancy, and reassessed during hospital admissions, at 28 weeks, and around delivery and discharge.

Any previous VTE except a single event related to major surgery

HIGH RISK Requires antenatal prophylaxis with LMWH Refer to trust-nominated thrombosis in pregnancy expert/team

- Hospital admission
- Single previous VTE related to major surgery
- High-risk thrombophilia + no VTE
- Medical comorbidities (e.g. cancer, heart failure, active SLE, IBD or inflammatory polyarthropathy, nephrotic syndrome, type I DM with nephropathy, sickle cell disease, current IV drugs user)
- Any surgical procedure (e.g. appendicectomy)
- OHSS (first trimester only)

- INTERMEDIATE RISK Consider antenatal prophylaxis with LMWH

- Obesity (BMI >30 kg/m2)
- Age >35 years
- Parity ≥3
- Smoker
- Gross varicose veins
- Current pre-eclampsia
- Immobility (e.g. paraplegia, PGP)
- Family history of unprovoked or oestrogen provoked VTE in first-degree relative
- Low-risk thrombophilia
- Multiple pregnancy
- IVF/ART

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- Four or more risk factors: prophylaxis from first trimester
- Three risk factors: prophylaxis from 28 weeks

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- Fewer than three risk factors:

Low risk mobilization and avoidance of dehydration

Postnatal assessment and management

- Any previous VTE
- Anyone requiring antenatal LMWH
- High-risk thrombophilia
- Low-risk thrombophilia + FHx

HIGH RISK At least 6 weeks' postnatal prophylactic LMWH

- Caesarean section in labour
- BMI ≥40 kg/m2
- Readmission or prolonged admission (≥3 days)
- in the puerperium
- Any surgical procedure in the puerperium except immediate repair of the perineum
- Medical comorbidities (e.g. cancer, heart failure, active SLE, IBD or inflammatory polyarthropathy; nephrotic syndrome, type I DM with nephropathy, sickle cell disease,
- current IVDU

INTERMEDIATE RISK At least 10 days' postnatal prophylactic LMWH
NB If persisting or >3 risk factors consider extending thromboprophylaxis with LMWH

- Age >35 years
- Obesity (BMI >30 kg/m2)
- Parity ≥3
- Smoker
- Elective caesarean section
- Family history of VTE
- Low-risk thrombophilia
- Gross varicose veins
- Current systemic infection
  Immobility (e.g. paraplegia, PGP, long-distance travel)
- Current pre-eclampsia
- Multiple pregnancy
- Preterm delivery in this pregnancy (24 hours)
- PPH >1 litre
- blood transfusion

Two or more risk factors

INTERMEDIATE RISK At least 10 days' postnatal prophylactic LMWH NB If persisting or >3 risk factors consider extending thromboprophylaxis with LMWH

Fewer than two risk factors

LOWER RISK Early mobilization and avoidance of dehydration

Cesarean Delivery

- For **emergency cesarean sections** → **10 days** LMWH after delivery.
- For **elective cesarean sections** with **>1 additional risk factor**, consider the same regimen → **10 days** LMWH.

5. Timing Around Labor

- LMWH should be **stopped at least 12 hours** before an elective cesarean or prior to labor induction to reduce bleeding risks.
- It can usually be **restarted 4–6 hours** after vaginal delivery or **6–12 hours** after cesarean, if bleeding risk is low