

pulmonary embolism in pregnancy [created by Paul Young 09/10/07]

Diagnosis of deep vein thrombosis

- Compressive ultrasound is noninvasive and has been found to have a sensitivity of 97% and a specificity of 94% for the diagnosis of symptomatic, proximal DVT in the general population. The test has no radiation exposure and no known risks to mother or fetus.

Diagnosis of pulmonary embolism

- Clinical presentation and routine laboratory information, such as chest pain, tachypnea, dyspnea, hypoxia, arterial blood gasses, electrocardiography, and chest radiography are often the first indications that PE is present.
- It is reasonable to start with bilateral lower-extremity ultrasound, and if this test is positive, to treat for VTE. In the face of negative ultrasonography, however, further testing is warranted for evaluation of suspected PE.

Ventilation-perfusion scanning

- VQ scanning remains the first imaging modality for diagnosis of PE. The amount of radiation exposure varies based on the isotope used, but VQ scanning can be performed safely during pregnancy.
- Encouraging fluid intake and having the patient void frequently for 4 to 6 hours after the test can minimize radiation exposure. Technetium 99m is excreted renally and collects in the bladder, increasing radiation exposure to the fetus by the proximity of the radioactive material. Technetium 99m also is excreted in breast milk, so women who undergo this test after delivery should substitute formula for breast milk for 2 days.

Computed tomography scanning

- Helical CT scanning has provided an alternative diagnostic tool for the visualization of PEs. CT scanners continue to offer improved technology, scanning times, visualization, and sensitivity.
- The radiation exposure is comparable to that of VQ scan and is within the amount considered to be safe in pregnancy.

Pulmonary angiography

- Pulmonary angiography remains the gold standard for diagnosing PE, but it is used less and less in clinical practice.

Magnetic resonance imaging and magnetic resonance angiography

- The use of MRI to diagnose acute PE has been explored but is not recommended for routine diagnosis of PE. MRI and magnetic resonance angiography with gadolinium enhancement has been studied, and some studies have shown sensitivities as high as 100% and specificities of 95%, although small PEs were not detected in this study.
- Gadolinium has not been proved to be safe in pregnancy, and its use should be avoided during pregnancy, if possible.

General

- The mainstay of therapy for acute VTE in pregnancy is heparin. Heparin does not cross the placenta and is considered the first-line agent for PE in pregnancy. Because it does not cross the placenta, heparin does not carry risks for teratogenesis and fetal hemorrhage, although bleeding at the uteroplacental junction is possible.
- Like unfractionated heparin, LMWHs do not cross the placenta and believed to carry no increased risk for fetal hemorrhage or teratogenesis

Unstable pulmonary embolism

- In the case of massive PE, anticoagulation may be insufficient to manage the patient. Hemodynamic instability and right heart strain may ensue and may lead to death. Supportive care and intravenous anticoagulation should be instituted without delay. Subsequent treatment options are controversial and include IVC filter placement, thrombolytics, and embolectomy.

ivc filters:

- IVC filters have been used in pregnancy, and their indications are the same as for the nonpregnant population. Patients with such indications include:
(1) patients with acute VTE and contraindications to anticoagulation,
(2) patients who have an episode of acute VTE while appropriately anticoagulated, and
(3) patients who are critically ill and at risk for recurrent embolism in whom recurrent embolism is likely to be fatal

diagnosis

general

- Venous thromboembolism (VTE) is a significant cause of morbidity and mortality during pregnancy. The clinical evaluation alone cannot confirm or refute a diagnosis of VTE in the nonpregnant population, and diagnosing VTE during pregnancy is more challenging.

epidemiology

- VTE is a rare but potentially life-threatening condition that affects pregnant women five times more frequently than nonpregnant women of similar age. It has been reported to occur in 1 of 1000 to 1 of 2000 pregnancies

pathophysiology

- Pregnancy is associated with a hypercoagulable state. This hypercoagulability is multifactorial and probably is caused by a combination of venous stasis and altered levels of circulating clotting factors during pregnancy and the puerperium.
- Protein S levels, both total and free protein S, have been shown to decline with increasing gestation, although protein C activity seems to be unaffected.
- Circulating levels of multiple clotting factors, including factors I, II, VII, VIII, IX, and X, have been shown to be elevated in pregnancy and the puerperium

treatment

drugs:

- Intravenous heparin is the initial treatment of choice for PE and is the best therapy immediately before delivery because of its short half-life. Subcutaneous unfractionated heparin and low-molecular-weight heparins (LMWH) have risks and benefits but can be used during pregnancy.
- Coumarin derivatives are teratogenic and are contraindicated during some stages of pregnancy, but are safe for use in lactating women, as are unfractionated heparin and LMWH.
- Unstable PE during pregnancy is difficult to treat because of a paucity of data regarding the use of thrombolytic therapy, embolectomy, and inferior vena cava (IVC) filters during pregnancy. Initial data indicate that thrombolytic therapy may result in lower rates of fetal loss than does embolectomy.

clinical manifestations

- The classic symptoms of VTE are less specific during pregnancy than during the non-pregnant state.
- Leg swelling and pain, dyspnea, tachypnea, tachycardia, and palpitations are common among normal pregnant women. All of these symptoms can occur in a normal pregnancy, and the symptoms tend to increase toward term. Clinical suspicion must remain high, and the appropriate diagnostic workup should ensue.
- The diagnosis of VTE during pregnancy often is impaired by a reluctance to expose a pregnant patient and her fetus to ionizing radiation.