Learn simply

Deep Vein Thrombosis

Suspect the diagnosis of deep vein thrombosis (DVT)[1]

- Take a detailed history and perform a physical examination[2]
- Be aware of pre-existing risk factors for DVT[3]
- Check CBC, T&S, coagulation studies[4]

Determine pretest clinical probability[5]

Low clinical suspicion

No empiric anticoagulation, check lower extremity ultrasound[6]

- Normal → No DVT, routine care
- Abnormal → The diagnosis of DVT is confirmed → **Therapeutic anticoagulation[9]**

Intermediate clinical suspicion

No empiric anticoagulation, check lower extremity ultrasound[6]

- Normal → Repeat ultrasound in 1 week[7]
  - Normal → No DVT, routine care
  - Abnormal → The diagnosis of DVT is confirmed → **Therapeutic anticoagulation[9]**
- Abnormal → The diagnosis of DVT is confirmed → **Therapeutic anticoagulation[9]**

High clinical suspicion

Start empiric anticoagulation, check lower extremity ultrasound[6]

- Abnormal → The diagnosis of DVT is confirmed → **Therapeutic anticoagulation[9]**
- Normal → MRI[8]
  - Normal → No DVT, routine care
  - Abnormal → The diagnosis of DVT is confirmed → **Therapeutic anticoagulation[9]**

Peripartum anticoagulation[10]

1. Venous thromboembolic events (VTE), which include both deep vein thrombosis (DVT) and pulmonary embolism (PE), complicate 0.5–2.0 per 1000 pregnancies.
2. VTE is one of the leading causes of maternal mortality in developed nations, accounting for 10–20% of pregnancy-related maternal deaths in the United States. DVTs account for 75–80% of VTEs during pregnancy, with PE comprising the remaining 20–25%.
3. Symptoms suggestive of DVT include pain, swelling, and/or redness in the calf or thigh. Physical findings include objective evidence of calf swelling (a difference in calf circumference of ≥2 cm), localized redness, and calf tenderness with or without a palpable thrombotic "cord." Homan's sign refers to pain in the calf in response to active dorsiflexion of the foot.
4. Pain in the calf is regarded as a "positive" Homan's sign and is taken to be suggestive of acute DVT. However, a "positive" Homan's sign is only around 30–40% sensitive, and a "negative" Homan's sign does not exclude the diagnosis. Isolated iliac-vein thrombosis may present with abdominal pain, back pain, and swelling of the entire leg.

1. A personal history of VTE is the single most important risk factor for VTE during pregnancy.
2. The risk of recurrent VTE during pregnancy is increased three–fourfold, and 15–25% of all cases of VTE in pregnancy are recurrent events.
3. The second most important individual risk factor for VTE in pregnancy is the presence of an inherited thrombophilia (such as factor V Leiden mutation, prothrombin gene mutation, protein S/ protein C/antithrombin deficiency) or acquired thrombophilia (antiphospholipid antibody syndrome,, which is present in 20–50% of women who experience VTE during pregnancy and the puerperium.
4. Other risk factors for VTE include advanced maternal age, black race, heart disease, sickle cell disease, diabetes, lupus, hypertension, hemoglobinopathies, smoking, multiple pregnancy, obesity, prolonged immobility (bedrest), trauma, pregnancy (due to its hypercoagulable state), and cesarean delivery (especially an intrapartum emergency cesarean).

5. VTE is fourfold more common in pregnancy than in nonpregnant women. Two-thirds of DVTs occur antepartum, with these events distributed throughout all three trimesters.

1. Deep vein thrombosis in pregnancy should be treated to prevent propagation of the thrombus and PE. If untreated, 25% of patients with DVT will have a PE as compared with 5% of treated patients.
2. Admission is generally warranted for initiation of treatment in pregnancy. Therapeutic subcutaneous low molecular weight-heparin (LMWH) is now the treatment of choice for DVT in pregnancy.
3. The advantages of LMWH over unfractionated heparin (UFH) include a reduced risk of bleeding, predictable pharmacokinetics allowing weight-based dosing without the need for monitoring, and a reduced risk of heparin-induced thrombocytopenia and heparin-induced osteoporotic fractures.
4. A twice-daily weight-adjusted dosing regimen should be used, such as enoxaparin (Lovenox) 1 mg/kg sc q12h. LMWH does not significantly alter PTT, but serum anti-factor Xa activity can be measured.
5. Therapeutic anticoagulation is achieved with a circulating anti-Xa activity of 0.6–1.0 U/mL, however, routine monitoring of anti-Xa activity may not be justified due to the absence of large studies using clinical end points that demonstrate an optimal therapeutic anti-Xa LMWH range or that dose adjustments increase the safety or efficacy of therapy, the lack of accuracy and reliability of the measurement, the lack of correlation with risk of bleeding and recurrence, and the cost of the assay.
6. The management of isolated calf vein thrombosis is controversial, with no established guidelines. Since most iliofemoral thromboses originate from calf vein thromboses, full anticoagulation with LMWH is suggested for symptomatic patients.

1. When LMWH cannot be used or when UFH is preferred (e.g., in patients with renal dysfunction and when delivery or surgery may be necessary), UFH can be administered as an initial IV therapy followed by subcutaneous UFH. IV treatment should be initiated with a loading dose of 80 U/kg followed by an initial infusion of 18 U/kg/h. Serum PTT should be checked every 4–6 hours, and the infusion adjusted to maintain PTT at 1.5–2.5 times control.
2. Once a steady state has been achieved, PTT levels should be measured daily. After 5–10 days, IV heparin can be changed to SC injection (not IM injection because of the risk of hematoma) as follows: begin with 10,000 U SC three times daily and titrate dosage upward depending on the results of the mid-interval PTT; aim for PTT 1.5–2.5 times control. When subcutaneous UFH is used during pregnancy, higher doses and three times daily dosing are usually required to maintain adequate anticoagulation.
3. Alternative therapies (fibrinolytic agents, surgical intervention) are associated with a high incidence of complications in pregnancy and, as such, are best avoided.
4. The use of vena caval filters should be considered only for patients in whom anticoagulation is contraindicated or in whom extensive venous thromboembolism develops within 2 weeks before delivery.
5. Treatment for acute DVT should be continued throughout pregnancy and for at least 6 weeks postpartum (for a minimum total duration of therapy of 3 months).

1. Women receiving therapeutic LMWH may be switched to therapeutic UFH in the last month of pregnancy or if delivery appears imminent due to the shorter half-life of UFH, although the benefit of this approach has not been validated by clinical studies. Alternately, therapeutic LMWH can be discontinued 24 hours prior to induction of labor.

2. The purpose of conversion to UFH is primarily to reduce the risk of an epidural or spinal hematoma with regional anesthesia. The pharmacokinetics of subcutaneous UFH and LMWH are quite similar, though, which may limit the benefit of this approach.

3. The American Society of Regional Anesthesia and Pain Medicine guidelines recommend withholding neuraxial blockade for 24 hours after the last therapeutic dose of LMWH. These guidelines support the use of neuraxial anesthesia in patients receiving dosages of 5,000 units of UFH twice daily, but the safety in patients receiving 10,000 units twice daily or more is unknown. Pregnant women at the highest risk of recurrence (e.g., proximal DVT or PE within 2 weeks) can be switched to therapeutic IV UFH, which is then discontinued 4–6 h prior to the expected time of delivery or epidural insertion.

1. According to the American Society of Regional Anesthesia and Pain Medicine, resumption of therapeutic UFH or LMWH should be delayed for 24 hours after delivery, vaginal or cesarean, in women who have received neuraxial anesthesia.

2. Otherwise, it can be restarted no sooner than 4–6 hours after a vaginal delivery or 6–12 hours after cesarean delivery. Women who require more than 6 weeks of postpartum therapeutic anticoagulation may be bridged to warfarin. Warfarin, UFH and LMWH are all compatible with breastfeeding.

Deep Vein Thrombosis

KAWITA BAPAT