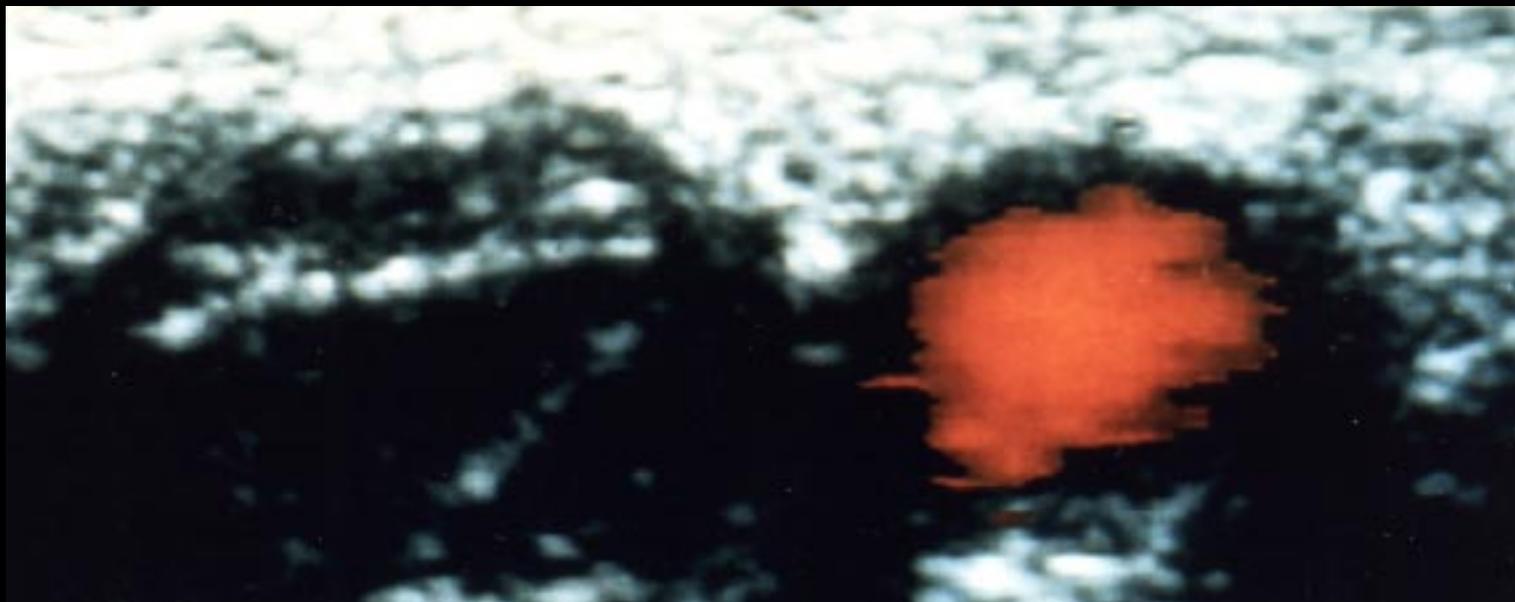
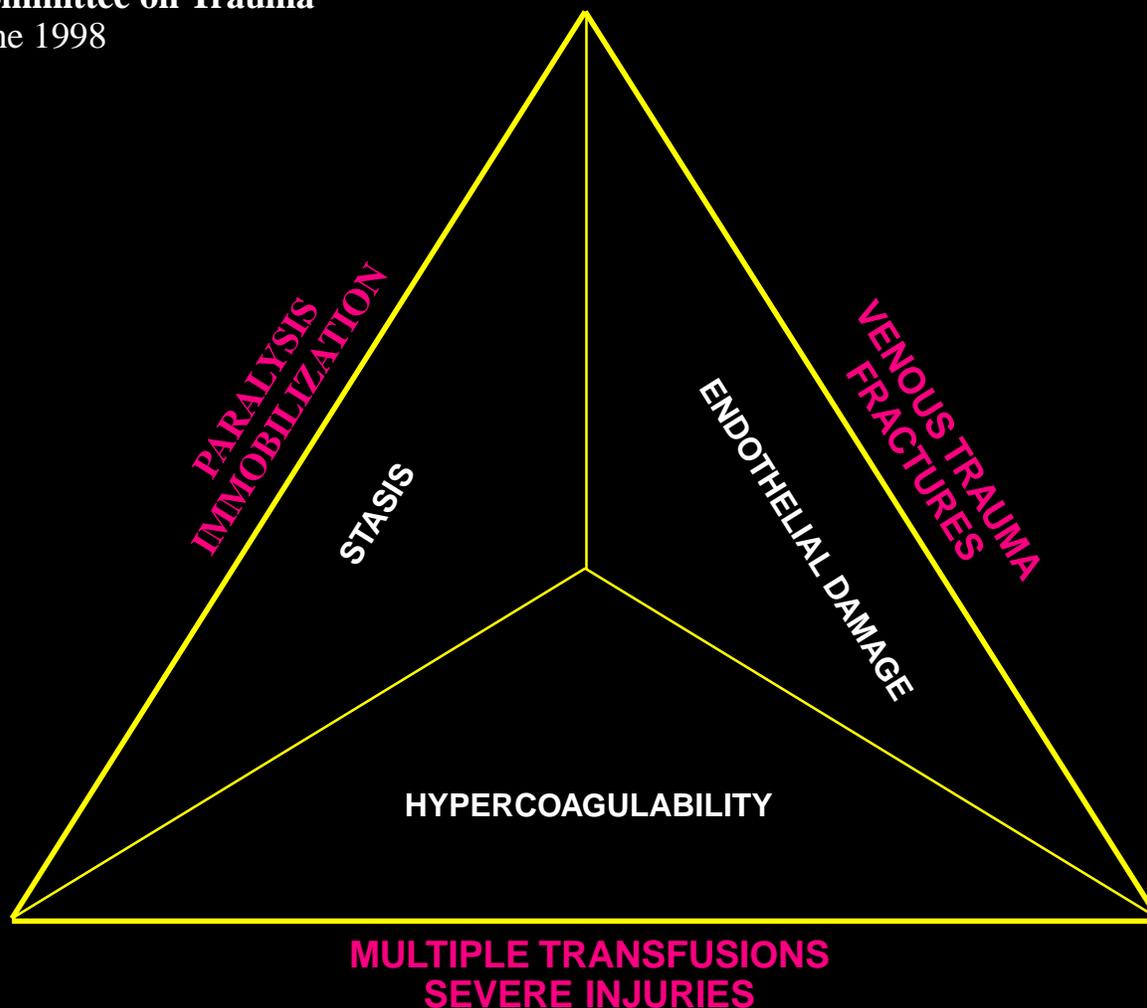


# Prevention of Thromboembolic Complications in Injured Patients

American College of Surgeons  
Committee on Trauma  
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## Incidence:

Posttraumatic deep venous thrombosis (DVT): 10%–20%  
Posttraumatic pulmonary embolism (PE): 1%

## Complications:

Permanent postphlebotic syndrome, including pain and swelling  
Chronic venous insufficiency  
Respiratory failure and/or death secondary to PE

## Trauma Risk Factors for Thromboembolism:

Age >40 years  
Pelvic/femoral/tibial fracture  
Venous injury  
Femoral venous catheter present >24 hours  
Spinal cord injury with deficit  
Severe closed head injuries (Glasgow Coma Scale score <8)  
Anticipated need for prolonged immobilization (>3 days)

## Medical Risk Factors for Thromboembolism:

Age >50 years  
Obesity  
Previous history of DVT  
Pregnancy or recent postpartum state  
Malignant disease  
Hypercoagulable state (antithrombin, protein C/S deficiency)  
Recent myocardial infarction/congestive heart failure

## Diagnosis:

*Note: Most episodes of posttraumatic thromboembolism are clinically silent!*

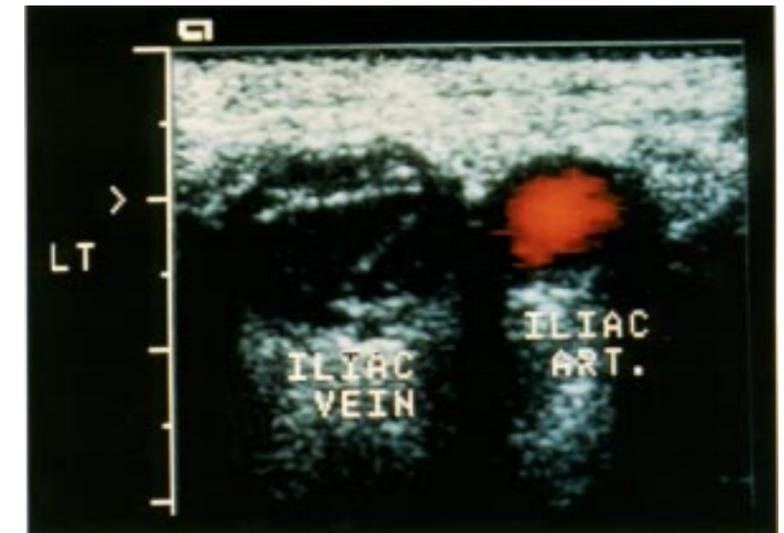
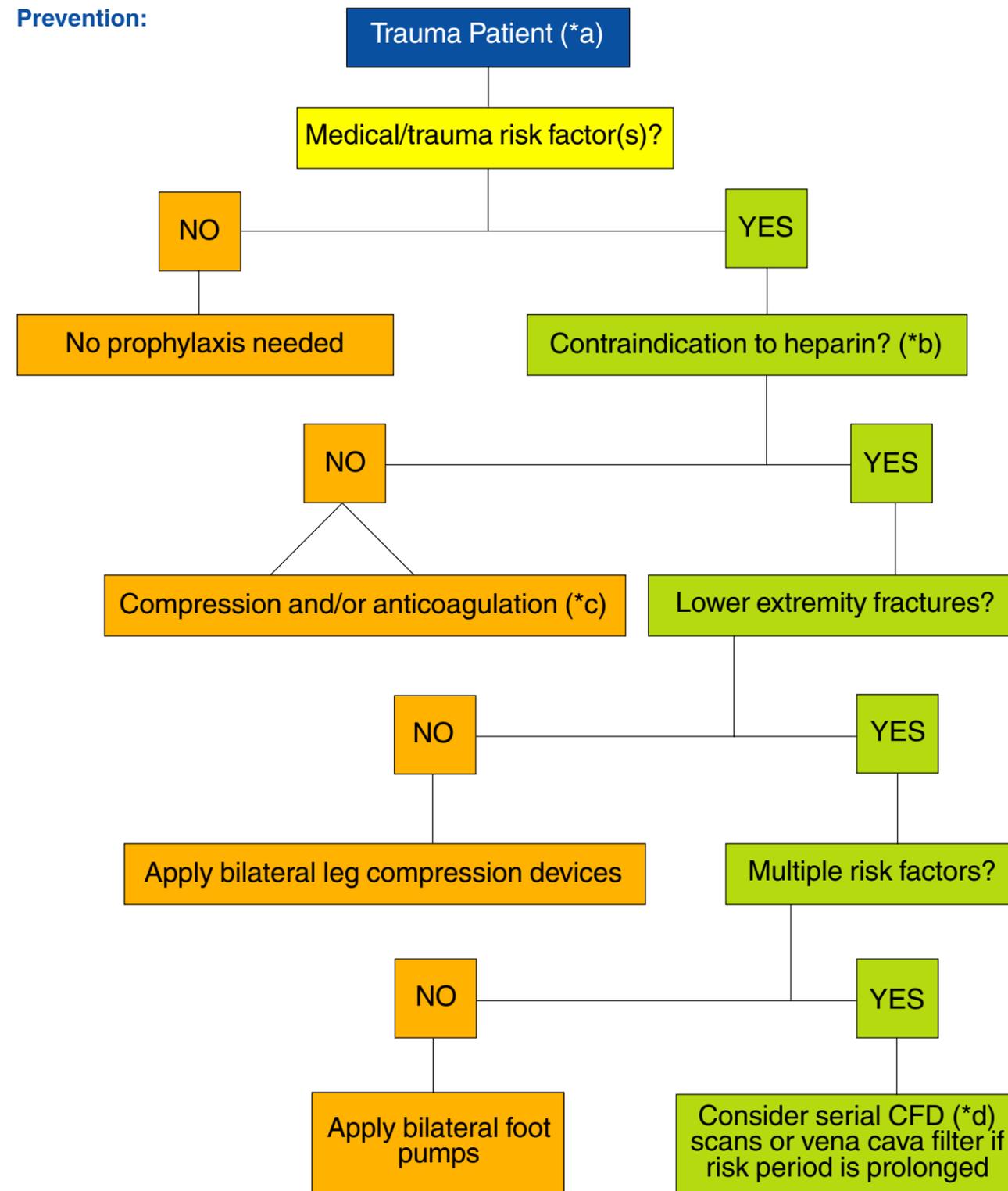
DVT: Color-flow duplex sonography (CFD); *see the Figure*

Venography only when CFD is inconclusive

PE: Pulmonary angiography

Ventilation/perfusion scans rarely helpful in trauma patients

## Prevention:



Example of CFD scan showing acute DVT in the iliac vein. Note the adjacent iliac artery.

\*a. General indications for trauma patients over the age of 18 years. Although children are generally considered at low risk for thromboembolic complications, older teens with paraplegia should also be considered candidates for prophylaxis.

\*b. The current contraindications to anticoagulation after trauma include head injury with intracranial hemorrhage; unstable spinal cord injuries; uncorrected coagulopathy; ongoing hemorrhage; known heparin allergy; or the use of an epidural catheter for analgesia or anesthesia.

\*c. Anticoagulants may include low molecular weight heparin (LMWH; molecular weight around 5,000 daltons given subcutaneously every 12 hours); adjusted-dose unfractionated heparin given intravenously or subcutaneously; or low doses of sodium warfarin (Coumadin). While subcutaneous heparin (5,000 units every 12 hours) appears to offer no protection in the trauma patient, LMWH has been shown to be both safe and effective in preventing posttraumatic thromboembolism. Currently, there are no data on the use of combined mechanical and pharmacologic prophylactic methods in injured patients. All methods of prophylaxis should be initiated within 36 hours of injury.

\*d. CFD = Color-flow duplex sonography.