VTE IN GERIATRIC

- Venous thromboembolism (VTE), includes deep venous thrombosis (DVT) and pulmonary embolism (PE), affects about 1 in 1000 persons annually.
- VTE increase with age.
- The diagnosis of VTE is more challenging in the elderly patient,
- clinical presentations are more often atypical than in younger patients
- and the diagnostic properties of some tests appear to be influenced
- by advancing age.
- However, the general approach to diagnosis of VTE in the elderly is much the same as in younger patients.
- While anticoagulant therapies have comparable relative risk reductions
- for prevention of VTE in older compared to younger patients,
- elderly patients are at increased risk of major bleeding and
- particularly intracranial bleeding

- Incidence of VTE
- incidence increases exponentially with advancing age
- (i.e., approximately twofold increase with each decade) rising from
- an annual incidence of 0.03% at age 40 years, to 0.09% at 60 years,
- and 0.26% at age 80 years.
- Risk Factors
- Most patients with VTE have one or more clinical risk factors venous thrombosis.
- **most common risk factors in hospitalized**
- recent surgery, previous VTE, trauma, and immobility, serious illness, including malignancy, chronic heart failure, stroke, chronic lung disease, acute infections, and inflammatory
- bowel disease. major orthopedic surgery,
- fatal PE is a leading cause of in-hospital death.
- **risk factors in outpatients**
- Hospital admission within the past 3 months, malignancy, previous VTE, cancer chemotherapyestrogen therapy, presence of an antiphospholipid antibody, and familial thrombophilia. Less common risk factors are paroxysmal nocturnal hemoglobinuria, nephrotic syndrome, and polycythemia vera..Age is thought to have at least an additive influence on the risk
- of VTE
- The risk of thrombosis is about 50-fold higher in persons with a previous VTE than in the general population, and recurrent thrombosis accounts for about one quarter of all acute episodes of VTE
- .When anticoagulant therapy is stopped after 3 or more months of treatment, the subsequent risk of recurrent VTE in the first year varies from about 2% in patients who had VTE provoked by a transient risk factor, to about 10% in those with an unprovoked VTE or a continuing risk factor for thrombosis. older age may be associated with a higher risk of recurrent VTE after anticoagulants are stopped

PATHOPHYSIOLOGY

- STASIS
- HYPERQUGULOPATHY
- ENDOTHELIAL DAMAGE

- one-third to one-half of first episodes of VTE present as PE, the remainder presenting asDVT.
- about 10% of symptomatic PE are rapidly fatal and about 5% of patients that are treated for PE die of a recurrence (mostly within the first 3 months).
- in the elderly, a larger proportion of episodes of VTE presents as PE and, when PE occurs, it is more likely to be fatal (four times higher than in patients 45 years of age or younger)
- If the initial episode of VTE is a PE, recurrent episodes are also more likely to be a PE than DVT

clinical assessment does allow division of patients into low, moderate, and high probabilities of DVT, corresponding to prevalence of 15%, 25%, and 60%, respectively.

Model for Determining Clinical Suspicion of Deep Vein Thrombosis

VARIABLES	POINTS*
Active cancer (treatment ongoing or within previous 6 mo or palliative)	1
Paralysis, paresis, or recent plaster immobilization of the lower extremities	1
Recently bedridden for more than 3 d, or major surgery within the past 4 wk	1
Localized tenderness along the distribution of the deep venous system	1
Entire leg swollen	1
Affected calf 3 cm greater than asymptomatic calf (measured 10 cm below tibial tuberosity)	1
Pitting edema confined to the symptomatic leg	1
Dilated superficial veins (nonvaricose)	1
Alternative diagnosis is at least as likely as that of deep vein thrombosis	–2
Total points	

*Pretest probability is calculated as follows: total points, ≤0, low probability; 1 to 2, moderate probability; ≥ 3, high probability.

DVT DIAGOSIS

- Venous ultrasonography is highly accurate for the detection of
- proximal vein thrombosis in symptomatic patients, with reported
- sensitivity and specificity approaching 95%. The sensitivity for
- symptomatic calf vein thrombosis is considerably lower and appears
- to be operator dependent. the test is repeated in 7 days to exclude progression of a calf vein thrombosis not identifiedthe
- , venography:if pretest clinical suspicion for DVT is low and the ultrasound shows a localized or if clinical suspicion is high and the ultrasound is normalshould be considered

- D-dimer have a low specificity
- Very highly sensitive D-dimer assays (e.g., sensitivity ≥ 98%; specificity ~40%) have a sufficiently high negative predictive value (≥98%) that a normal result can be used to exclude VTE without the need to perform additional diagnostic testing.
- Moderate to highly sensitive D-dimer assays (sensitivity85% to 97%; specificity 50% to 70%) need to have a negative result combined with another assessment that identifies patients as having a lower prevalence of VTE in order to exclude DVT or PE
- studies have shown that it is safe to withhold anticoagulant therapy in patients who have a normal result on a moderately sensitive D-dimer test in combination with (1) a low clinical suspicion for DVT or (2) a normal result on venous ultrasonography of the proximal veins.
- Baseline D-dimer levels increase with age. Therefore, D-dimer testing are much less specific,
- D-dimer testing has less clinical utility among patients with a high clinical suspicion of VTE

PE DIAGNOSIS

- Dyspnea most common symptom Chest pain usually pleuritic but can be substernal an compressive.Tachycardia relatively common and hemoptysis less frequent.
- Although most patients with PE also have DVT, fewer than 25% have associated clinical features.
- elderly patients are more likely to present with atypical symptoms and signs such as fatigue, dizziness,and syncope.
- WELLS categorized as low or unlikely (prevalence of PE <10%), moderate (prevalence ~ 25%), or high (prevalence of 60%)

diagnosis

- Chest Radiography and Electrocardiographyelectrocardiographic
- (ECG) evidence of right ventricular strain suggests PE.Q1S3T3
- Pulmonary Angiographyis invasive and can usually be replaced by computed tomographic
- pulmonary angiography (CTPA). Pulmonary angiography can be complicated by arrhythmias, cardiac perforation, cardiac arrest hypersensitivity to the contrast medium. in
- 3% to 4%.
- Ventilation–Perfusion Lung ScanningA normal perfusion scan excludes a
- diagnosis of PE,
- when the ventilation scan is norma at the site of a segmental or larger perfusion defect, the prevalence of PE is 85% or higher (termed a “high probability” lung scan, which justifies anticoagulant therapy).
- About half of patients who have PE have a “high probability” lung scan.

Model for Determining a Clinical Suspicion of Pulmonary Embolism

VARIABLES	POINTS*
Clinical signs and symptoms of deep vein thrombosis (minimum leg swelling and pain with palpation of the deep veins)	3.0
An alternative diagnosis is less likely than pulmonary embolism	3.0
Heart rate > 100 beats/min	1.5
Immobilization or surgery in the previous 4 wk	1.5
Previous deep vein thrombosis/pulmonary embolism	1.5
Hemoptysis	1.0
Malignancy (treatment ongoing or within previous 6 mo or palliative)	1.0
Total points	

*Pretest probability is calculated as follows: a total score of ≤ 4 indicates a low probability (also termed "unlikely"); a score of 4.5 to 6 indicates moderate probability; and a score of > 6 indicates high probability.

CON

- CTPA
- is nondiagnostic in 6% of patients, sensitivity is 83%, specificity is 96%, positive predictive value is 86%, and negative predictive value is 95%.
- recent studies suggest that
- less than 2% of patients with a negative CTPA for PE will return with symptomatic VTE during follow-up.
- Compression Ultrasonography serve as indirect evidence of PE.V/Q- and wells are mod then sono and if neg 1 week later repeat sono if CT NL and well are high then 2 sono
- CXR AND V/Q

Subclavian or Axillary Veins

- most frequently chronic indwelling catheter
- after mastectomy and local radiotherapy for breast cancer in young muscular individuals and maybe preceded by repetitive, strenuous activity involving the affected arm and a rare complication of a transvenous cardiac pacemaker.

TREATMENT

- Superficial venous thrombosis usually can be treated conservatively
- with anti-inflammatory drugs. If superficial phlebitis is extensive
- or very symptomatic, a 2- to 4-week course of heparin or lowmolecular-
- weight heparin (LMWH) therapy can be used
- Thrombolytic
- IVC
- LMVH
- DURATIONdepends primarily on the presence
- of a provoking risk factor for VTE (i.e., transient risk factor, no
- risk factor, or cancer), risk factors for bleeding, and patient preference
- (i.e., burden associated with treatment) key consideration in elderly patients is assessment of risk for major bleeding and we generally do not recommend indefinite anticoagulant therapy for a first unprovoked proximal DVT or PE in patients older than 75 years of age because of their increase risk of bleeding.

Findings from Randomized Controlled Trials and Observational Studies that Influence Optimal Duration of Oral Anticoagulant Therapy

- Shortening the duration of anticoagulation from 3 or 6 mo to 4 or 6 wk results in a doubling of the frequency of recurrent VTE during 1–2 yr of follow-up.
- Patients with VTE provoked by a transient risk factor have a lower (about one third) risk of recurrence than those with an unprovoked VTE or a persistent risk factor.
- Three months of anticoagulation is adequate treatment for VTE provoked by a transient risk factor; subsequent risk of recurrence is about 3% in the first year of follow-up.
- After about 3 mo of anticoagulation, recurrent DVT is as likely to involve the contralateral leg; this suggests that systemic rather than local (including inadequate treatment) factors are responsible for recurrences after 3 mo of treatment.
- There is a persistently elevated risk of recurrent VTE after a first episode of VTE; this appears to be about 10% in the first year, and about 30% in the first 5 yr, after 6 or more mo of treatment for an unprovoked proximal DVT or pulmonary embolism.
- Extending duration of anticoagulation beyond 3–6 or 12 mo may delay, but ultimately not reduce, the risk of recurrence if therapy is then stopped.
- After 3 mo of initial treatment of unprovoked VTE with oral anticoagulants targeted at an INR of 2.5 (INR range 2.0–3.0), continuing treatment with:
  —oral anticoagulants targeted at an INR of ~2.5 reduces the risk of recurrent VTE by over 90%;
  —oral anticoagulants targeted at an INR of ~1.75 reduces the risk of recurrent VTE by about 75%;
  —oral anticoagulants targeted to an INR of ~2.5 are more effective than using an INR target of ~1.75, without evidence of increased bleeding.
- A second episode of VTE predicts a higher risk of recurrence and favors indefinite anticoagulation after unprovoked VTE.
- Risk of recurrence is lower (about half) following an isolated calf (distal) DVT than after proximal DVT or PE; this favors a shorter duration of treatment.
- Risk of recurrence off treatment is similar after an episode of proximal DVT or PE.
- About 5% of recurrent episodes of VTE are expected to be fatal.
- Recurrent VTE is usually (about 60% of episodes) a PE after an initial PE, and usually (about 80% of episodes) a DVT after an initial DVT; this effect is expected to increase mortality from recurrent VTE by two- to threefold after a PE compared to after a DVT.
- Risk of recurrence is about threefold higher in patients with active cancer.
- Long-term treatment with low-molecular-weight heparin is more effective than warfarin in patients with VTE associated with cancer, and is a preferred option for such patients for at least 3 mo.
- Estrogen therapy is an important risk factor for first and recurrent episodes of VTE; consequently, if VTE occurred while on estrogen therapy, the risk of recurrent VTE is expected to be lowered by stopping estrogens.
- Risk of recurrence appears to be somewhat higher with antiphospholipid antibodies (anticardiolipin antibodies and/or lupus anticoagulants) and inherited thrombophilias.
- Males appear to have about a 50% higher risk of recurrent VTE than females.
- Other risk factors for recurrences may include: advanced age; elevated levels of clotting factors VIII, IX, XI and homocysteine; elevated D-dimer levels after stopping anticoagulant therapy; venal caval filters; and residual deep vein thrombosis on ultrasound; currently, these factors do not have clear implications for duration of treatment.
- The risk of anticoagulant-induced bleeding is highest during the first 3 mo of treatment and stabilizes after the first year.
- Risk of bleeding differs markedly among patients depending on the prevalence of risk factors (e.g., advanced age; previous bleeding or stroke; renal failure; anaemia; antiplatelet therapy; malignancy; poor anticoagulant control).
- About 10% of episodes of major bleeding are fatal.
- The risk of major bleeding in younger patients (e.g., younger than 60 yr) that do not have risk factors for bleeding and have good anticoagulant control (target INR 2–3) is about 1% per year. The risk of major bleeding is expected to be at least 10-fold higher in patients with multiple risk factors for bleeding.

Primary Prevention of Venous Thromboembolism

- low, moderate, or high risk for VTE, and the choice
- of prophylaxis should be tailored to the patient's risk of VTE and of bleeding
- In the absence of prophylaxis, the frequency
- of fatal postoperative PE ranges from 0.1% to 0.4% in patients undergoing elective general surgery and from 1% to 5% in patients undergoing elective hip or knee surgery, emergency hip surgery, major trauma, or spinal
- Prophylaxis is cost-effective cord injury. for most moderate and high-risk groups.