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Venous Thromboembolism

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Venous Thromboembolism

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What is VTE?

Pathophysiological Processes.

Signs and symptoms of VT

VTE Treatment

Implication for Nursing

References

Introduction

- Venous Thromboembolism (VTE)
- VTE refers to a condition where blood clots are formed mostly in the deep veins of the lower extremities (Stone et al., 2017).
- VTEs can also be formed in the upper extremities and less mobile regions of the body(Stone et al., 2017).
- Ranks third in cardiovascular diagnosis after heart attack and stroke (American Heart Association, 2017)
- Very fatal condition globally and in the united states.
- Accounts for up to 100,000 deaths in a year in the United States (CDC, 2020)
- It costs up to 10 billion dollar yearly to the U.S health care system (CDC, 2020)

Risk Factors

- Trauma
 - Surgery
 - Hospitalization
 - Decreased mobility
 - Diabetes
 - Heart Diseases
 - Lung Diseases
 - Sedentary lifestyle
 - Cancer
 - Cancer Treatments
 - Personal History of VTE
 - Family history of VTE
 - Age 55 and older
 - Smoking
 - Pregnancy
 - Recently gave birth
 - Use of Estrogen Hormonal therapy
 - Use of birth controls containing Estrogen.
 - Overweight
 - Arteriosclerosis
 - Hyperlipidemia
 - Hypertension
- Adapted from (American heart association, 2020).

Underlying Pathophysiology

- Three main insults.
 - Summarized in Virchow's Triad;
- 1. Venous injury**
 - damage to veins of the endothelium
 - Activation of clotting cascade(Stone et al., 2017) .
 - 2. Venous Stasis**
 - Poor venous return to the heart
 - Poorly functioning venous valves
 - venous blood pools in extremities
 - Occurs mostly in lower legs (Stone et al., 2017) .
 - 3. Hypercoagulable state**
 - Conditions that causes the blood to become thicker.
 - An abnormal condition (Stone et al., 2017) .

Pathophysiology

- Blood clot also known as a thrombi
- Most frequent areas of formation in order are; the calf veins, Femoral and popliteal vein, Iliac Vein
- Collapsed valves and areas of bifurcation has decreased blood flow and are usually perfect sites for VTE genesis due to venous stasis.
- A small fraction of VTEs arise from the upper extremities, mostly due to inserted advanced lines/ central venous catheters, cardiovascular devices, trauma and malignancy (Elisha et al., 2015)
- Clot formation may trap platelets and grow larger.
- When the clot is large enough and blood flow is greatly obstructed, demonstration physiological signs, it is called a DVT (Elisha et al., 2015).
- When clot breaks off, it is called an Emboli(Elisha et al., 2015)..
- An emboli travels the venous path and lodges in any narrow vessel forming a Deep Vein Thrombosis (DVT).
- 95% of emboli reaches the right side of the heart, where it is pumped to the lungs. (Stone et al., 2017)
- Emboli lodged in the blood vessel(s) of the lungs is called Pulmonary Emboli (PE) (stone et al., 2017).

Table 1. Statistical Prevalence and mortality of VTE in the United States adapted from the center of disease control (CDC, 2020).

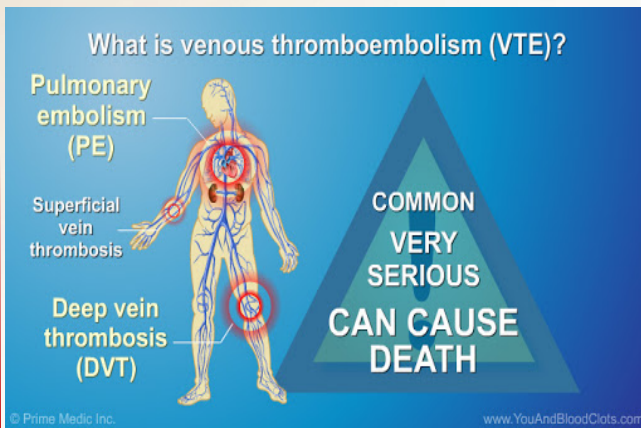
900,000 people could be affected (1 to 2 per 1,000) each year in the United States.	33% of people Diagnosed with VTE will have recurrence within 10years
10 to 30% of people will die within one month of diagnosis.	60,000-100,000 Americans die annually from VTE

PE

- Shortness of breath
- Coughing and bloody sputum.
- Faster than normal heart rate. Heart rhythm could be abnormal.
- Feeling of doom
- Chest pain.
- Low Mixed Venous Oxygen (SVO2)
- Ventilation-perfusion mismatch (V/Q mismatch) (Elisha et al., 2015).
- Alveolar Dead Space ventilation due to wedge formed by emboli in lung capillary (Elisha et al.).

DVT

- Swelling extremities where emboli is lodged, mostly legs and a smaller fraction arms.
- Gradually increasing pain at the affected area/limb region.
- Hyperpigmentation or redness to affected extremity.
- Affected area becomes warm to touch (Elisha et al., 2015).



Diagnosis of VTE

PE

- Chest Radiography (X-ray)
 - Computer Tomography (CT) with Angiogram of the chest
 - D-Dimer to exclude PE
 - Echocardiogram
- (Clarke et al., 2016)

DVT

- Ultrasound of the suspected extremity (CDC, 2020)

High Risk VTE

- Early initiation of therapy is Vital
- Intravenous Anticoagulants
- Heparin IV infusion. Titrated and closely monitored dosage and infusion.
- Argatroban infusion for individuals sensitive to Heparin .

Subcutaneous Anticoagulant

- Heparin
- Lovenox
- Arixtra / Fondaparinux

Oral Anticoagulants

- Warfarin/ coumadin
- Eliquis/Apixaban
- Xarelto/Rivaroxaban

Other Considerations

- Adequate Hydration
- Adequate nutrition
- Psychological support.

(Stone et al., 2017)

Surgical option

- Thrombolysis : surgical instillation of thrombolytic to directly dissolve clot.
 - Thrombectomy: Surgical removal of blood clot.
 - Surgical placement of stent to keep vessel patent
 - Inferior Vena cava Filter (IVC) placement: Medical filtering device placed in blood vessel at the inferior vena cava to filter out blood clots from entering the Right heart and eventually getting pumped out to the lungs. Useful for individuals with recurrent blood clots who are poor candidates for anticoagulant therapies.
- (Watson et al., 2016).

Prevention of DVT

- Mindful of risk factors and follow up with your PCP
- See Implication for nursing

- Detailed assessment of patient's history
- Pre-existing clotting disorders
- Detailed physical assessment and documentation of painful and swollen extremities.
- Follow up on unexplained painful and swollen extremities.
- Rapid assessment and follow up on sudden, unexplained shortness of breath, tachycardia, hemoptysis
- Close examination of medication list upon admission and discharge
- Early mobilization
- Early initiation of mechanical VTE prophylaxis; Compressions stockings, Sequential compression devices.
- Early initiation of medical anticoagulants for immobilized patients when possible.
- Early removal of central catheters when no longer needed.
- Educate patients about VTEs, risk factors, prevention and treatment
- Carefully assess postoperative patients for resumption of anticoagulant when appropriate.
- Some cancer patients are at higher risk of bleeding, so use anticoagulant with caution.
- Use of birth control medications increase the likelihood of blood clots
- Educate patients of mobility during flights to increase venous return and prevent blood clots.
- Educate patients taking home anticoagulants (Coumadin) on foods to avoid, and importance of frequent INR lab test.
- Educate patients on the risk of bleeding while on anticoagulants

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