NUR 500
Drugs Affecting the Blood Outline

Drugs that prevent or treat Thrombus

a. Antiplatlet
b. Anticoagulant
c. Fibrinolytics

Drugs that act on blood

a) Anthhemophillic (Factor VIII)
b) Systemic hemostatics

MECHANISM THAT ARREST BLEEDING (p 592)

Hemostasis (Blood clotting)– the process that spontaneously stops the bleeding in damaged blood vessels

STEPS :

1.Blood vessels constrict to slow blood flow from the injured area
2. Platelet plugs form to temporarily seal the leaking small arteries and veins
3. Blood coagulates to plug openings within the damaged vessels and wound to prevent further bleeding

1. **DRUGS THAT PREVENT OR TREAT THROMBUS:**

DRUGS THAT PREVENT OR TREAT THROMBUS	**Action**	**Example**
1. ANTIPLATELET	• Inhibit platelet aggregation • Used for arterial thrombi	(Oral) Aspirin Clopidogrel (Plavix) Dipyridamole
2.ANTICOAGULANT	• Interferes with one or more of the clotting factors in the clotting cascade • Used for venous thrombi	Parenteral (Heparin, warfarin(Coumadin)
3. FIBRINOLYTICS (Thrombolytics)-	• Degrade fibrin strands and are used to help dissolve an existing clot.	Alteplase (tPa) and Streptokinase

2. DRUGS THAT ACT ON BLOOD

DRUGS THAT ACT ON BLOOD	**Action**	**Example**
1. ANTIHEMOPHILLIC (Factor VIII)	Treatment or prevention of Hemophilia A	Factor VIII
2. Systemic Hemostatics	Hasten clot formation and help manage care for clients at risk for bleeding, including post surgical intervention where bleeding risk may be high	Aminocaproic Acid, Tranexamic Acid, Aprotinin

Risks associated with the use of antiplatelets , anticoagulants and thrombolytics
Bleeding – impaired ability to clot, or internal bleeding from numerous sites
Hypersensitivity reactions

1. ORAL ANTIPLATES

Aspirin: also known as ASA;
Action: inhibits prostaglandin synthesis;

Lower doses (80 – 325 mg daily): inhibits cyclooxygenase (an enzyme necessary for the synthesis of thromboxane A2 (TA2) which promotes platelet aggregation and vasoconstriction ; Aspirin suppresses this action
Higher doses: anti-inflammatory, analgesic and antipyretic

Concerns related to Aspirin Use
GI irritation or bleeding (Prostaglandin is inhibited)
Potential to trigger bronchoconstriction in a client with Asthma
Renal insufficiency for clients with preexisting renal impairment

NURSING IMPLICATION:
Assessment:
1. Conditions contraindicated for Aspirin Use
   a. (Bleeding ulcers, erosive gastritis, other active bleeding states (intracerebral or intraocular bleeding) , hemophilia, Coagulation or platelet disorders
   b. Anal polyps
   c. History of asthma (may precipitate bronchospasm)

2. Review current medication regimen for significant drug interaction

a. One month after stopping non Aspirin NSAIDS increase risk for Acute MI
b. Cefamandole, Cefoperazone, Cefotetan – increases risk for bleeding
c. Vancomycin –ototoxicity and hearing loss

3. Cardiovascular assessment,

a. Angina, CBC, hematocrit, platelet count and prothrombin time (PT) , or international normalized ratio (INR) for comparison during Aspirin therapy

Nursing Diagnosis

- Impaired comfort
- Ineffective airway clearance related to bronchospasm
- Risk for injury related to dizziness
- Ineffective tissue perfusion related to thrombus formation

Implementation

1. All platelet aggregate inhibitor therapy should be discontinued if platelet count is less than 80,000 cells/mm3
4. Monitor for bleeding, or excessive bruising
5. For invasive therapy, monitor catheter insertion sites, arterial and venous puncture sites, cut down sites, and needle puncture sites

PATIENT EDUCATION:

1. Non enteric coated Aspirin form should be taken after meals or with food to minimize gastric irritation
2. Take any of the oral dosage form with a full glass of water and do not lie down for 15- 30 minutes after taking
3. Discard Aspirin if it has strong vinegar like odor
4. Monitor for and report signs of bleeding
5. Inform physician, Dentists and other health care providers of antiplatelet and anticoagulant therapy before invasive procedures
6. Do not discontinue medication without consulting the prescriber, may place at higher risk for thrombotic episodes (MI, CVA, DVT)
7. Apply direct pressure on cuts and abrasions
8. Avoid alcohol because the risk of bleeding may be increased
9. Avoid participating in activities with a substantial risk of injury and contact prescriber immediately if injury occurs

NURSING CONSIDERATIONS

1. Aspirin should be avoided in clients with nasal polyps or history of Asthma, as it may precipitate a severe episode of Bronchospasm
2. Aspirin should be held 5 days before major surgery
3. Risk for Acute MI may be increased for up to 1 month after stopping non Aspirin NSAIDS

2. ANTICOAGULANTS (p602)

Prevents intravascular thrombosis by decreasing blood coagulability. Has no direct effect on a blood clot that has already formed or on ischemic tissue injured by an inadequate blood supply because of the clot. Reduces the events of thrombosis and therefore prolongs life in clients with high risk for thromboembolic events

MAIN GROUPS OF ANTICOAGULANT DRUGS:

1. Parenteral Anticoagulant Drugs

a. Heparin
b. Low Molecular Weight (LMW) Heparin (Deltaparin, Enoxaparin, Tinzaparin)
c. Antithrombin III

2. **Oral Anticoagulant Drugs**

a. Warfarin (Coumadin)

Heparin

- Rapidly acting
- It will not dissolve existing clots but can prevent the extension of existing clots
- Anticoagulant of choice for use during pregnancy because it does not cross the placenta and affect the clotting mechanism in the fetus

Indication: prevention and treatment of all types of thrombi; does not have fibrinolytic activity; prevention of blood clot in surgery of the heart or blood vessels, during blood transfusion, DIC and hemodialysis
ANTIDOTE: Protamine Sulfate

Warfarin (Coumadin)

Interferes with the production of Vit. K dependent clotting factors; requires a few days of therapy to become effective. Lag time between warfarin administration and the decay of Vit K dependent clotting factors is typically 36 – 72 hours making warfarin dosage more complicated than heparin used when long term coagulation is required

ANTIDOTE: Vitamin K, Fresh Frozen Plasma

NURSING RESPONSIBILITIES

1. Monitor for increased risk of bleeding
2. Monitor laboratory values before the drug is administered to ensure that coagulation times are in the therapeutic, not the dangerous range
3. Review current medication regimen for significant drug interaction
4. Assess for signs of overdose , such as Ecchymoses , petechiae, hematomas, nose bleed and unusual bleeding from gums, cuts, wounds and tube insertion sites
5. Check urine and stool periodically for occult blood.

6. Inject the Heparin deep into the fatty tissue above the iliac crest or into the abdominal fat layers. Do not aspirate/ and do not massage the injection site
7. Vitamin K should be readily accessible if bleeding occurs
8. Instruct client that periodic urinalysis, blood counts stool guaiac, and liver function tests should be performed

NURSING CONSIDERATION:

- Internal bleeding will reveal itself a abdominal pain or swelling, back ache, bloody or black tarry stool, dizziness, headache, hematemesis, hematuria, hemoptysis, or joint pain.
- Onset of action of oral anticoagulants is slow, therefore, LMWH is usually given during the first few days of treatment
- **Duration of warfarin therapy:** 3-6 months (DVT) ;
- Lifelong (Atrial fibrillation or prosthetic heart valves)
- **Termination:** gradually over 3-4 weeks period to prevent rebound thromboembolic complications

3 – FIBRINOLYTICS (THROMBOLYTICS)

Alteplase / Streptokinase

Used to treat acute thromboembolic disorders by dissolving clots
Alters the hemostatic capability more profoundly than anticoagulant

- Used in hospital setting only
- Dissolve clots via the endogenous fibrinolytic system converting plasminogen in the blood to plasmin (an enzyme with fibrinolytic activity, digests or dissolves fibrin clots)

Indication:
Life threatening conditions like MI, thromboembolic CVA, and Pulmonary Embolism
Contraindication:
Risk of uncontrollable bleeding because of preexisting conditions such as aneurysm or arteriovenous malformation, active bleeding, brain tumor, CVA, Intracranial or intraspinal surgery within the last 2 months, recent thoracic surgery or CNS trauma; severe uncontrolled hypertension because of the risk of cerebral hemorrhage.

NURSING RESPONSIBILITIES

1. Before fibrinolytic therapy, coagulation tests are performed
2. Observe for allergic reaction
3. Monitor Vital signs, and bleeding, frequently; inform Physician if bleeding occurs
4. Observe for internal bleeding: bloody sputum, hematuria , hematemesis, dark stool, flank and abdominal pain , neurologic and mental status changes
5. Therapy should be discontinued if bleeding occurs that is not controlled by local pressure

4 – ANTIHEMOPHILLIC (Factor VIII)

Indications: treatment or prevention of Hemophilia A
Contraindications: Concurrent administration of Aminocaproic or Tranexamic Acid because it would increase the risk of thrombotic complications

Nursing Responsibilities:

1. Monitor for Adverse effects during IV therapy (flushing, hypotension, symptoms of allergic response)
2. Slow the rate of flow or stop infusion until the symptom of flushing, headache, and alterations of blood pressure and pulse disappear
3. Refrigerate the factor concentrate until ready for use but do not freeze it
4. Do not refrigerate after reconstitution because the active ingredient may precipitate
5. Warm the concentrate and diluent to room temperature before reconstitution

Patient Education:
Instruct the client to wear a Medic Alert to alert the medical personal in an emergency situation that Factor therapy may be required
Encourage clients with newly diagnosed Hemophilia to be vaccinated for Hepatitis A& B

5 –HEMOSTATICS

a. SYSTEMIC HEMOSTATICS - hasten clot formation and help manage care for clients at risk for bleeding, including post surgical intervention where bleeding risk may be high

- Acts as a competitive antagonist of Plasminogen; Inhibits fibrinolysis when excessive bleeding occurs
- Antidote for an Overdose of Fibrinolytic Drugs
- Aminocaproic Acid, Tranexamic Acid, Aprotinin

b. Topical Hemostatics - often used during surgical procedures to help limit excessive blood loss

- Absorbable gelatin sponge (Gelfoam)

SYSTEMIC HEMOSTATICS
(Aminocaproic Acid, Tranexamic Acid)

Indications:	Treatment of hyperfibrinolysis induced hemorrhage such as fibrinolytic bleeding after surgery and hematologic disorders
Adverse effect:	Nausea, diarrhea, menstrual difficulties, increased weakness, severe muscle pain, decrease in urination, edema of the feet, or lower legs, unusual weight gain, slow or irregular heart rate, abdominal pain, rash, stuffy nose, tinnitus, bloodshot eyes, thrombosis
Contraindications:	Active intravascular clotting because of risk for serious thrombus formation
Drug Interactions:	Concurrent use of Estrogens or hormonal contraception may increase the risk for thromboembolic events

Nursing Responsibilities:

1. Assess baseline vital signs and coagulation studies initially and periodically during administration
2. Observe for signs of thromboembolic complications (Thrombophlebitis, pulmonary embolus, MI, CVA)
3. Avoid concurrent use with Estrogen (increase the risk of thrombus formation); Antifibrinolytics are mutually antagonistic
4. Dilute before administering IV. Administer slowly to prevent hypotension or bradycardia
5. Discontinue when bleeding stops
6. Inform the client of the purpose of the medication and subjective symptoms to report
7. Observe signs of thromboembolic complications and visual disturbances. Discontinue therapy when visual changes occur
8. Ophthalmologic examinations are suggested before and periodically during therapy.