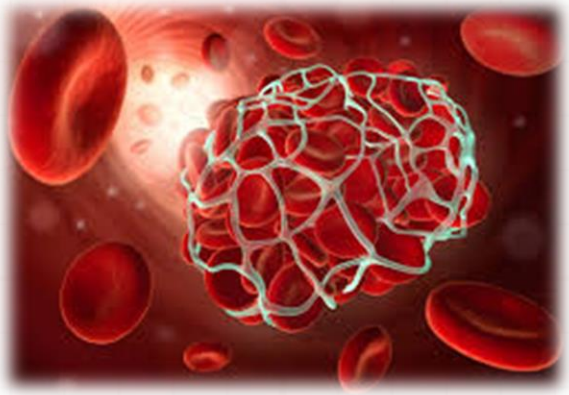


Chapter 36 Anticoagulant and Thrombolytic Drugs

Hemostasis and Thrombosis

- Hemostasis: complex process by which fibrin forms and blood clots
- Thrombosis: formation of a blood clot
- Thrombus: blood clot
- Embolus: thrombus that detaches from a blood vessel wall and travels through the bloodstream
- Pulmonary embolism: goes to the lung and obstructs a pulmonary vessel
- Myocardial infarction occurs if the embolus detaches and occludes a vessel supplying blood to the heart

Oral and Parenteral Anticoagulants

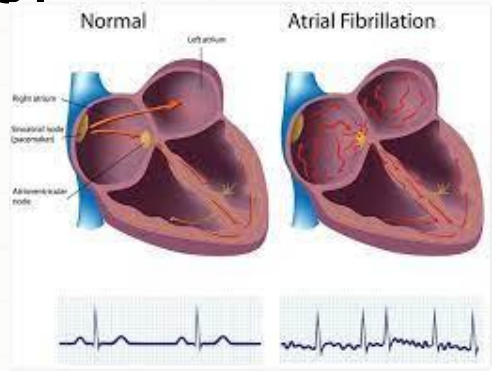
- Anticoagulants: prevent the formation and extension of a thrombus
  - Warfarin: oral anticoagulant
  - Fractionated and unfractionated heparin
- Low–molecular-weight heparins (LMWHs)
  - Produce stable responses when administered at recommended dosages; bleeding less likely to occur

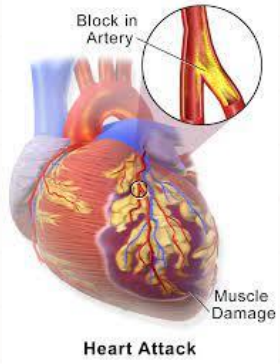
Oral and Parenteral Anticoagulants: Actions

- Warfarin: depletes prothrombin
- Heparin:
  - Inhibits formation of fibrin clots
  - Inhibits conversion of fibrinogen to fibrin
  - Inactivates factors necessary for clotting of blood
- LMWHs: inhibit clotting reactions by binding to antithrombin III

Oral and Parenteral Anticoagulants: Uses #1

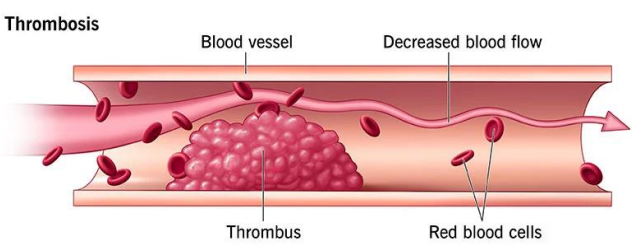
- Used for prevention and treatment of deep venous thrombosis (DVT), atrial fibrillation with embolization, pulmonary emboli
- Used for adjuvant treatment of myocardial Infarction
- Used to prevent thrombus formation after valve replacement surgery, postoperative DVT and PE, clotting in arterial and heart surgery, repeat cerebral thrombosis





Oral and Parenteral Anticoagulants: Uses #2

- Used to treat:
  - Coronary occlusion, acute MI, peripheral arterial embolism
- Used for diagnosis and treatment of:
  - Disseminated intravascular coagulation
- Used for maintaining patency of IV catheters



Oral and Parenteral Anticoagulants: Adverse Reactions

- Bleeding
- Nausea, vomiting, abdominal cramping, diarrhea
- Alopecia
- Rash or urticaria
- Hepatitis, jaundice, thrombocytopenia, blood dyscrasias

Oral and Parenteral Anticoagulants: Contraindications

- Contraindicated in patients:
  - With known hypersensitivity to drugs, active bleeding, hemorrhagic disease, tuberculosis, leukemia, uncontrolled hypertension, gastrointestinal (GI) ulcers, recent surgery of the eye or central nervous system (CNS), aneurysms, severe renal or hepatic disease
  - During lactation

Oral and Parenteral Anticoagulants: Precautions

- Used cautiously in patients with:
  - Fever, heart failure, diarrhea, diabetes, malignancy, hypertension, renal or hepatic disease, psychoses, depression
  - Potential site for bleeding or hemorrhage
- Women of childbearing age: use a reliable contraceptive to prevent pregnancy

Oral and Parenteral Anticoagulants: Interactions #1

Interactant drug	Effect of interaction
Aspirin, acetaminophen, NSAIDs, chloral hydrate	Increased risk for bleeding
Penicillin, aminoglycosides, isoniazid, tetracyclines, cephalosporins	Increased risk for bleeding

Oral and Parenteral Anticoagulants: Interactions #2

Interactant drug	Effect of interaction
Beta blockers, loop diuretics	Increased risk for bleeding
Disulfiram, cimetidine	Increased risk for bleeding
Oral contraceptives, barbiturates, diuretics, vitamin K	Decreased effectiveness of the anticoagulant

Antiplatelet Drugs: Actions and Uses

- Aspirin: prohibits aggregation of platelets for lifetime of platelet
- ADP blockers: alter cell membrane, preventing aggregation
- Glycoprotein receptor blockers: prevent enzyme production; inhibit platelet aggregation
- Antiplatelet drug therapy: treats acute coronary syndrome, myocardial infarction, stroke, and intermittent claudication

Antiplatelet Drugs: Adverse Reactions

- Common adverse reactions:
  - Heart palpitations
  - Bleeding
  - Dizziness and headache
  - Nausea, diarrhea, constipation, dyspepsia

Antiplatelet Drugs: Contraindications and Precautions

- Contraindicated in patients:
  - With known hypersensitivity to the drug, congestive heart failure, active bleeding, thrombotic thrombocytopenic purpura
  - During pregnancy and lactation
- Used cautiously in:
  - Elderly patients, pancytopenic patients, those with renal and hepatic impairment

Antiplatelet Drugs: Interactions

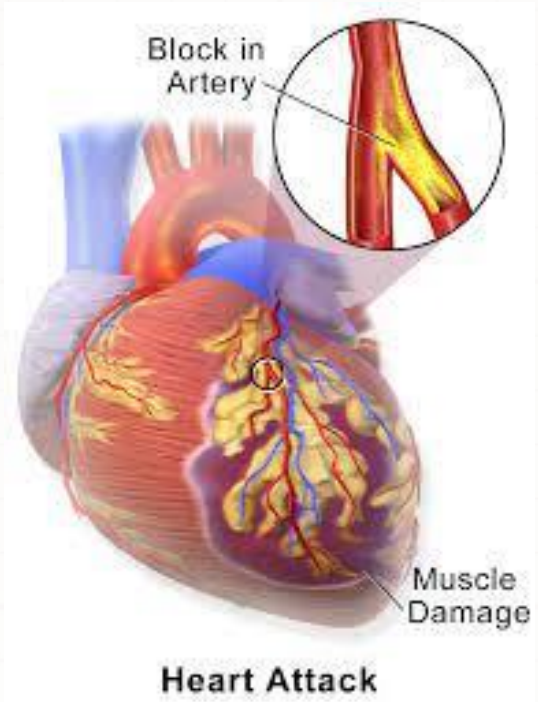
Interactant drug	Effect of interaction
Aspirin and NSAIDs	Increased risk for bleeding
Macrolide antibiotics	Increased effectiveness of anti-infective
Digoxin	Decreased digoxin serum levels
Phenytoin	Increased phenytoin serum levels

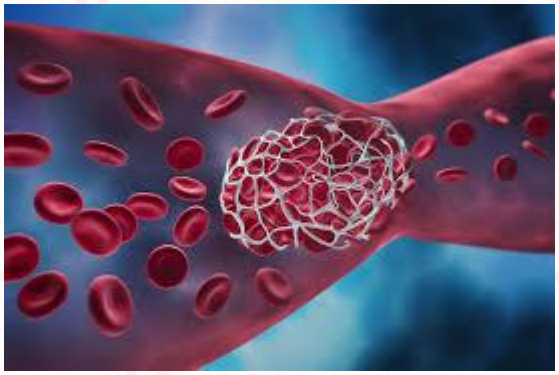
Thrombolytic Drugs: Actions

- Break down fibrin clots by converting plasminogen to plasmin
- Plasmin: enzyme that breaks down fibrin of blood clot
  - Reopens blood vessels after occlusion and prevents tissue necrosis

Thrombolytic Drugs: Uses

- Used to treat:
  - Acute myocardial infarction by lysis of blood clots in coronary arteries
  - Blood clots causing pulmonary emboli and DVT





Thrombolytic Drugs: Adverse Reactions

- Bleeding
  - Internal bleeding: GI tract, genitourinary tract, brain
  - External bleeding: broken skin, such as venipuncture sites and recent surgical wounds
- Allergic reactions

Thrombolytic Drugs: Contraindications and Precautions

- Contraindicated in patients:
  - With known hypersensitivity, active bleeding, history of stroke or aneurysm, recent intracranial surgery
- Used cautiously in patients:
  - Who have recently undergone major surgery
  - With hypertension, diabetic retinopathy, any condition in which bleeding is a significant possibility
  - Currently receiving oral anticoagulants

Thrombolytic Drugs: Interactions

- Increased risk for bleeding when co-administered with medications that prevent blood clots or with an anticoagulant

Nursing Process: Assessment #1

- Preadministration assessment:
  - Obtain drug history and vital signs
  - Examine extremity for color and skin temperature
  - Check for pedal pulses, noting rate and strength of pulses
  - Note areas of redness or tenderness and ask patient to describe current symptoms
  - Obtain complete blood count

Nursing Process: Assessment #2

- Ongoing assessment:
  - Assess patient for signs of bleeding and hemorrhage
  - Monitor for intracranial bleeding by assessing level of consciousness
  - Monitor PT/INR results
  - Monitor for any indication of hypersensitivity reaction

Nursing Process: Diagnosis

- **Risk for Injury** related to excessive bleeding due to drug therapy
- **Individual Effective Self-Health Management** related to inability to communicate drug use if incapacitated
- **Anxiety** related to fear of atypical bleeding during thrombolytic drug therapy

Nursing Process: Planning

- Expected outcome
  - Optimal response to therapy
  - Support of patient needs related to management of adverse reactions
  - Understanding of post-discharge drug regimen

Nursing Process: Implementation #1

- Promoting an optimal response to therapy
  - Oral administration of anticoagulants:
    - Check prothrombin flow sheet; review PT/INR results
    - For rapid anticoagulation: Loading dose of heparin, followed by maintenance dose of warfarin based on PT or INR

Nursing Process: Implementation #2

- Promoting an optimal response to therapy (cont.)
  - Parenteral administration of anticoagulants:
    - Administration of heparin: intermittent IV, continuous IV infusion, or subcutaneous route
    - Inspect needle site for signs of inflammation, pain, and tenderness along pathway of vein
    - Closely monitor blood coagulation tests, complete blood count, platelets, and stool analysis

Nursing Process: Implementation #3

- Administration of thrombolytics:
  - Assess patient for bleeding until therapy is completed; vital signs
  - Administer opioid analgesic for pain management
- Drugs used to maintain IV patency:
  - Inspect needle site
  - Avoid using excessive pressure when the drug is injected into the catheter

Nursing Process: Implementation #4

- Monitoring and managing patient needs:
  - Risk for injury
    - Check for signs of bleeding: drop in blood pressure, rise in pulse rate, urine, stool; visually check nasogastric suction; check toothbrush, gums after oral care

Nursing Process: Implementation #5

- Monitoring and managing patient needs: (cont.)
  - Individual effective self-health management:
    - Educate about food and drug interactions
    - Instruct patient to wear medical identification to indicate receiving anticoagulant or antiplatelet therapy

Nursing Process: Implementation #6

- Monitoring and managing patient needs (cont.)
  - Anxiety:
    - Reassure patient and communicate with family member
    - Assess for signs of bleeding and hemorrhage
    - Monitor vital signs and for signs of allergic reactions

Nursing Process: Implementation #7

- Managing anticoagulant overdosage:
  - Oral anticoagulants
    - Monitor for symptoms of warfarin overdosage:
      - Blood in stool; petechiae
      - Oozing from superficial injuries
      - Excessive menstrual bleeding

Nursing Process: Implementation #8

- Managing anticoagulant overdosage (cont.)
  - Parenteral anticoagulants:
    - After administration of heparin: monitor blood pressure and pulse rate
    - Observe new evidence of bleeding until blood coagulation tests are within normal limits
    - Blood transfusions or fresh frozen plasma may be ordered

Nursing Process: Implementation #9

- Educating the patient and family:
  - Provide full explanation of the drug regimen, possible adverse reactions, and signs of bleeding tendencies
  - Explain the importance of monitoring PT or INR
  - Explain the importance of avoiding taking drugs or changing brands of anticoagulants without informing primary health care provider

Nursing Process: Implementation #10

- Educating the patient and family (cont.)
  - Advise the patient to inform dentist or primary health care provider of therapy with this drug before any treatment
  - Explain the importance of taking the drug at the same time each day
  - Instruct the patient to avoid alcohol unless approved by primary health care provider
  - Provide dietary information

Nursing Process: Implementation #11

- Educating the patient and family (cont.)
  - Explain the necessity of contacting the primary health care provider immediately if evidence of bleeding occurs
  - Explain importance for women of childbearing age to use reliable contraceptive to prevent pregnancy
  - Explain importance of wearing or carrying medical identification

Nursing Process: Evaluation

- Therapeutic drug effect is achieved
- Adverse reactions are identified, reported, and managed successfully
- Patient demonstrates understanding of drug regimen
- Patient verbalizes importance of complying with prescribed therapeutic regimen
- Patient lists or describes early signs of bleeding