

NURS 821 Advanced Pathophysiology

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Lecture 5 Alterations in Blood Formation and Hemostasis

Alterations in Blood Formation and Hemostasis

Part 3 Anemias Due to Increased
RBC Destruction and Alterations
in Clotting

Hemolytic Anemia

- Extrinsic
- Etiology
 - Mechanical damage to RBCs
 - Poor circulatory environment
 - Abnormal bone marrow
- Classification
- General clinical manifestations

Intrinsic Hemolytic Anemias

- RBC membrane abnormalities
 - Hereditary spherocytosis
 - Acquired immune hemolytic anemia
 - G6PD

Intrinsic Hemolytic Anemias

- RBC Membrane Abnormality (cont'd)
 - Thalassemia
 - Etiology-autosomal dominant disorder of alpha or beta chain synthesis of Hgb A
 - Incidence-
 - Beta-more common; found in Mediterraneans, esp. Italians and Greeks
 - Alpha-found in Chinese and Asians
 - Pathophysiology
 - Clinical manifestations

Intrinsic Hemolytic Anemias

- Increased RBC rigidity
 - Sickle Cell Anemia
 - Definition-inherited autosomal recessive hemoglobinopathy;
 - Etiology-substitution of valine for glutamic acid in beta chain of Hgb
 - Incidence-African Americans, Puerto Ricans, Middle Eastern
 - Pathophysiology-hypoxia, acidosis, dehydration promote sickling-clumping in microcirculation
 - Clinical manifestations

Steps in Hemostasis

- Vessel spasm
- Platelet plug forms-platelets adhere, forming a wall
- Blood coagulation
- Clot retraction
- Clot dissolution

Blood Clot Formation

- Blood coagulation-
- Intrinsic pathway (vessel injury) and or extrinsic pathway (tissue injury) activation
- Conversion of prothrombin to thrombin, fibrinogen to fibrin

Components Essential to Clotting

- Calcium and Vitamin K essential components!
- Intact liver critical to effective clotting:
 - Vitamin K synthesized by intestinal bacteria, bile salts needed for absorption, stored in liver
 - Prothrombin production
 - Plasminogen inactivation.

Clot Dissolution

- Begins immediately after formation
- Purpose:
 - Re-establish blood flow
 - Tissue repair

Hypercoagulability States

- Platelet hyperreactivity-increased aggregation
- Stagnation of blood flow
- Accelerated clotting system activity
- Hypertriglyceridemia, neoplasia, drugs

Potential Hypercoagulability States

- | | |
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| <ul style="list-style-type: none">• Platelet hyperreactivity<ul style="list-style-type: none">• ASCVD• DM• Smoking• Hyperlipidemia, hyper-cholesterolemia• Increased platelets | <ul style="list-style-type: none">• Accelerated clotting system activity<ul style="list-style-type: none">• Pregnancy and post-partum• Oral contraceptive use• Postsurgical state• Immobility• CHF• Malignancies |
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