Surgery

2nd stage
2nd course

BLEEDING DISORDERS

Dr. Bashar Hadi Al-araji

HEMOSTASIS

1. VASCULAR PHASE
2. PLATELET PHASE
3. COAGULATION PHASE
4. FIBRINOLYTIC PHASE

VASCULAR PHASE

WHEN A BLOOD VESSEL IS DAMAGED, VASOCONSTRICTION RESULTS.

PLATELET PHASE

PLATELETS ADHERE TO THE DAMAGED SURFACE AND FORM A TEMPORARY PLUG.

COAGULATION PHASE

THROUGH TWO SEPARATE PATHWAYS THE CONVERSION OF FIBRINOGEN TO FIBRIN IS COMPLETE.

FIBRINOLYTIC PHASE

ANTICLOTTING MECHANISMS ARE ACTIVATED TO ALLOW CLOT DISINTEGRATION AND REPAIR OF THE DAMAGED VESSEL.

HEMOSTASIS

DEPENDENT UPON:

- Vessel Wall Integrity
- Adequate Numbers of Platelets
- Proper Functioning Platelets
- Adequate Levels of Clotting Factors
- Proper Function of Fibrinolytic Pathway

LABORATORY EVALUATION

- PLATELET COUNT
- BLEEDING TIME (BT)
- PROTHROMBIN TIME (PT)
- PARTIAL THROMBOPLASTIN TIME (PTT)
- THROMBIN TIME (TT)

PLATELET COUNT

NORMAL	100,000 - 400,000 CELLS/MM^3
< 100,000	Thrombocytopenia
50,000 - 100,000	Mild Thrombocytopenia
< 50,000	Sev Thrombocytopenia

BLEEDING TIME

- PROVIDES ASSESSMENT OF PLATELET COUNT AND FUNCTION

NORMAL VALUE

2-8 MINUTES

PROTHROMBIN TIME

- Measures Effectiveness of the Extrinsic Pathway
- Mnemonic - PET

NORMAL VALUE

10-15 SECS

PARTIAL THROMBOPLASTIN TIME

- Measures Effectiveness of the Intrinsic Pathway
- Mnemonic - PITT

NORMAL VALUE

25-40 SECS

THROMBIN TIME

- Time for Thrombin To Convert
  Fibrinogen ⟶ Fibrin
- A Measure of Fibrinolytic Pathway

NORMAL VALUE

9-13 SECS

So What Causes Bleeding Disorders?

- **VESSEL DEFECTS**
- PLATELET DISORDERS
- FACTOR DEFICIENCIES
- OTHER DISORDERS

VESSEL DEFECTS

- VITAMIN C DEFICIENCY
- BACTERIAL & VIRAL INFECTIONS
- ACQUIRED

PLATELET DISORDERS

- THROMBOCYTOPENIA
- THROMBOCYTOPATHY

THROMBOCYTOPENIA

INADEQUATE NUMBER OF PLATELETS

THROMBOCYTOPATHY

ADEQUATE NUMBER BUT ABNORMAL FUNCTION

THROMBOCYTOPENIA

- DRUG INDUCED
- BONE MARROW FAILURE
- HYPERSPLENISM
- OTHER CAUSES

THROMBOCYTOPENIA

- DRUG INDUCED

.Alcohol

.Thiazide Diuretics

THROMBOCYTOPENIA

BONE MARROW FAILURE

- Viral Infections
- Nutritional Deficiencies
- Chemotherapy & Radiation Therapy
- Infiltration of Abnormal Cells
  - Aplastic Anemia
  - Leukemia
  - Metastatic Cancer

THROMBOCYTOPENIA

- HYPERSPLENISM
  - Increase in Size Leads to Destruction of Platelets
  - Associated with Portal Hypertension Seen in Patients with Cirrhosis

THROMBOCYTOPENIA

- OTHER CAUSES
  - Lymphoma
  - HIV Virus
  - Idiopathic Thrombocytopenia Purpura (ITP)

THROMBOCYTOPATHY

- UREMIA
- INHERITED DISORDERS
- MYELOPROLIFERATIVE DISORDERS
- DRUG INDUCED

THROMBOCYTOPATHY

- DRUG INDUCED

ASPIRIN

IRREVERSIBLY BINDS TO THE PLATELET FOR ITS ENTIRE LIFESPAN (7-10 DAYS)

THROMBOCYTOPATHY

- DRUG INDUCED

NSAIDS

REVERSIBLY BINDS TO THE PLATELET
FOR A LIMITED TIME PERIOD
(APPROX 6 HOURS)

FACTOR DEFICIENCIES

(CONGENITAL)

- HEMOPHILIA A
- HEMOPHILIA B
- VON WILLEBRAND'S DISEASE

FACTOR DEFICIENCIES

- HEMOPHILIA A (Classic Hemophilia)
  - 80-85% of all Hemophiliacs
  - Deficiency of Factor VIII
  - Lab Results - Prolonged PTT

- HEMOPHILIA B (Christmas Disease)
  - 10-15% of all Hemophiliacs
  - Deficiency of Factor IX
  - Lab Test - Prolonged PTT

FACTOR DEFICIENCIES

- VON WILLEBRAND'S DISEASE
  - Deficiency of VWF & amount of Factor VIII
  - Lab Results - Prolonged BT, PTT

OTHER DISORDERS

(ACQUIRED)

- ORAL ANTICOAGULANTS
  - COUMARIN
  - HEPARIN
- LIVER DISEASE
- MALABSORPTION
- BROAD-SPECTRUM ANTIBIOTICS

OTHER DISORDERS

ORAL ANTICOAGULANTS

Coumarin Prevents Thromboembolic Events & is a Vit K Antagonist. Monitored by PT times.

Heparin Therapy is Monitored by PTT times.

OTHER DISORDERS

- MALABSORPTION
  - Various Intestinal Diseases Will Interfere w/ Bile Acid Metabolism.
  - Bile Acids are Required for Vit K Absorption so You Will See a Deficiency in Vit K Dependent Coagulation Factors (II,VII,IX,X).

OTHER DISORDERS

LIVER DISEASE

- Jaundice Results in Malabsorption of Vit K.

- Liver Disease can Result in Reduced Production of Coagulation Factors (I,II,V,VII,IX,X).

OTHER DISORDERS

- BROAD-SPECTRUM ANTIBIOTICS
  - Change in Intestinal Flora which Might Decrease Vitamin K Production.
  - Vitamin K is Necessary for the Liver to Produce Coagulation Factors II,VII,IX,X.