

# ACQUIRED BLEEDING AND DENTAL MANAGEMENT

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# ACQUIRED BLEEDING DISORDERS

MAY OCCUR AS A RESULT OF:

- DISEASES (PRIMARY/IDIOPATHIC THROMBOCYTOPENIA)
- DRUGS (COUMADIN/PLAVIX/ASA/ETC)
- RADIATION
- CHEMOTHERAPY FOR CANCER



# PATHOPHYSIOLOGY OF BLEEDING

## 4 PHASES OF BLEEDING/CLOT DISSOLUTION

- VASCULAR PHASE
- PLATELET PHASE
- COAGULATION PHASE
- FIBRINOLYTIC PHASE



# VASCULAR PHASE

- IMMEDIATELY AFTER INJURY LOCALIZED VASOCONSTRICTION OCCURS
- RETRACTION OF ARTERIES/VEINS
- BUILDUP OF EXTRAVASCULAR PRESSURE
- DAMAGE TO VESSEL ENDOTHELIUM TRIGGERS RELEASE OF PLATELETS



# PLATELET PHASE

- PLATELETS ARE CELL FRAGMENTS FROM MEGAKARYOCYTES
- PLATELETS LAST 8-12 DAYS IN CIRCULATION
- 30% OF PLATELETS LIE IN MICROVASCULATURE/SPLEEN AND SERVE AS A RESERVE
- PLATELETS SERVE IN MAINTENANCE OF VASCULAR INTEGRITY, FORMATION/STABILIZATION OF PLATELET PLUG
- SUBENDOTHELIAL TISSUES EXPOSED ALLOW FOR PLATELETS TO “STICK”
- ADP RELEASED BY DAMAGED ENDOTHELIUM INITIATES AGGREGATION OF PLATELETS

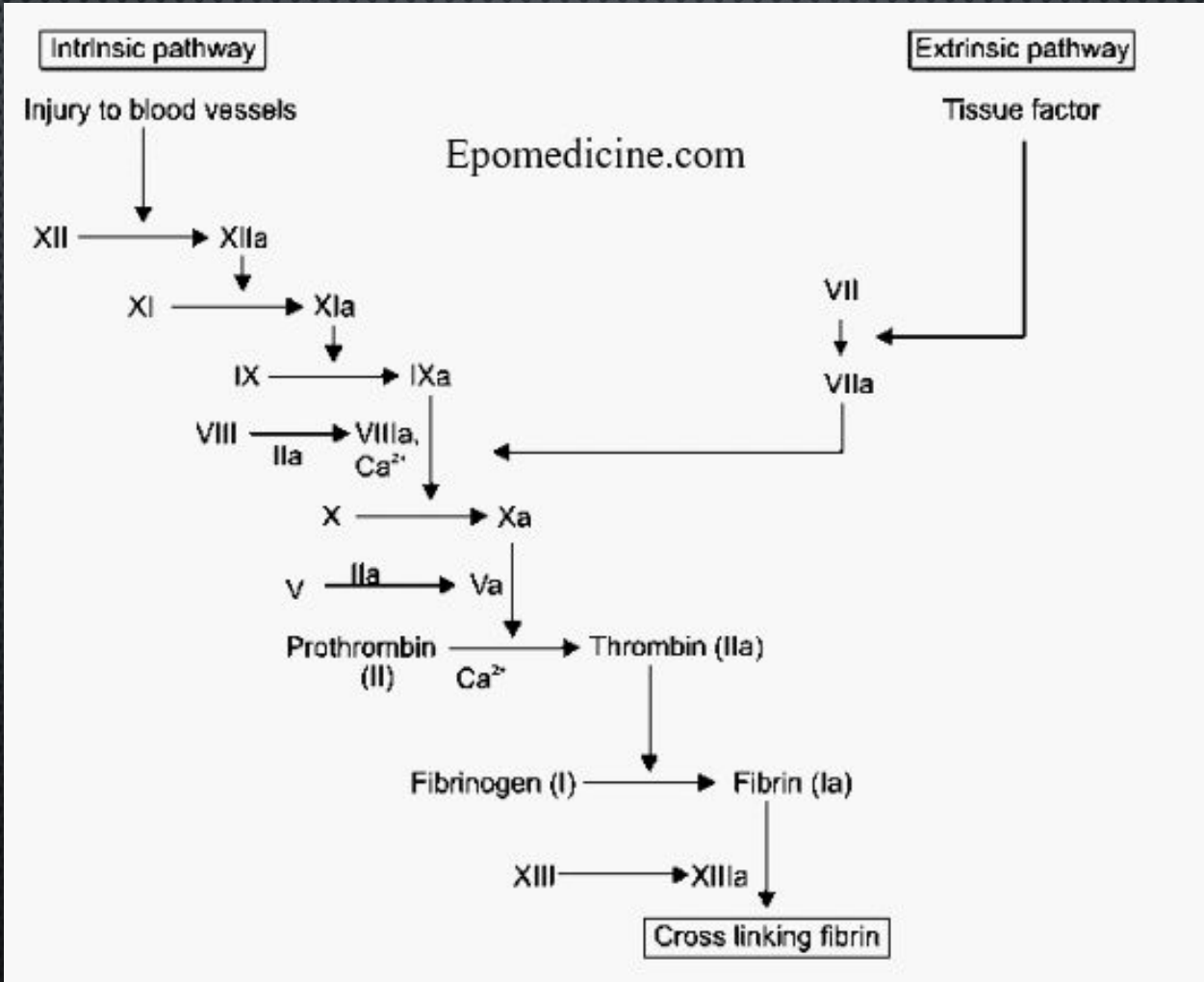


# COAGULATION PHASE (FIBRIN CLOT)

- TIME FROM INURY TO COAGULATION (FIBRIN CLOT) ~ 9-18 MINS
- COAGULATION PROCEEDS THROUGH 2 PATHWAYS
  - INTRINSIC (SLOWER AND TRIGGERED BY SURFACE CONTACT)
  - EXTRINSIC (FASTER PATHWAY TRIGGERED BY TISSUE FACTOR)



# COAGULATION SYSTEM





# FIBRINOLYTIC PHASE

- FIBRINOLYSIS NEEDED TO PREVENT COAGULATION AWAY FROM SITE OF INJURY AND TO DISSOLVE THE CLOT AFTER HOMEOSTASIS ACHIEVED
- PROCESS INVOLVES PLASMINOGEN (PROENZYME FOR PLASMIN) WHICH IS ACTIVATED BY tPA (TISSUE PLASMINOGEN ACTIVATOR)
- PLASMIN EXERTS ITS EFFECTS ON FIBRIN BY BINDING TO FIBRIN AND BREAKING UP THE CLOT INTO SMALLER FRAGMENTS CALLED FIBRIN DEGRADATION PRODUCTS (FDP)



# CLINICAL TESTS FOR BLEEDING

- ACTIVATED PARTIAL THROMBOPLASTIN TIME (APTT)
- PROTHROMBIN TIME (PT)
- PLATELET COUNT



# ACTIVATED PARTIAL THROMBOPLASTIN TIME

- APTT
  - TEST OF INTRINSIC PATHWAY (FACTORS VIII, IX, XI AND XII) AND COMMON PATHWAY (V/X, PROTHROMBIN/FIBRINOGEN)
  - BEST SCREENING TEST FOR COAGULATION DISORDERS
  - NORMAL APTT ~ 25-35 SECS



# PROTHROMBIN TIME

- PROTHROMBIN TIME
  - USED TO CHECK THE EXTRINSIC PATHWAY (FACTOR VII) AND COMMON PATHWAY (V, X, PROTHROMBIN, FIBRINOGEN)
  - MOST COMMON TEST USED FOR THE INTERNATIONAL NORMALIZED RATIO (INR) FOR PATIENTS TAKING COUMARIN-LIKE DRUGS
  - NORMAL RANGE 11-15 SECS



# PLATELET COUNT

- TEST USED TO SCREEN FOR BLEEDING PROBLEMS RELATED TO THROMBOCYTOPENIA (LOW PLATELET COUNT)
- NORMAL RANGE 150,000 TO 450,000/MICROLITER
- <50,000 PATIENTS WILL BLEED EASILY AND MAY PRESENT WITH SKIN/MUCOSAL PURPURA
- <20,000 PATIENTS WILL SPONTANEOUSLY BLEED



# ANTICOAGULANT DRUGS

- HEPARIN (IV)
  - USED IN HIGH DOSES (5000 U) TO TREAT THROMBOEMBOLISM
  - NOT AN ANTICOAGULANT BY ITSELF (INDIRECT INHIBITORS)
  - HEPARIN SERVES AS A CATALYST FOR PLASMA ANTITHROMBIN III (ANTICOAGULANT) ~ INHIBITS FACTOR XA AND THROMBIN EQUALLY
  - USED FOR TREATMENT OF DVT AND PE
  - HALF LIFE OF 60-90 MINUTES



# ANTICOAGULANTS

## DIRECT THROMBIN INHIBITORS

- DIRECT THROMBIN INHIBITORS
- DO NOT REQUIRE A PLASMA COFACTOR
- USED FOR DVT, HIP REPLACEMENTS, STROKE PREVENTION
- ORAL FORM (DABIGATRAN ~ PRADAXA)
  - PREVENT STROKE IN PATIENTS WITH AFIB
  - NO INR MONITORING
  - NOT AFFECTED BY FOODS
  - HALF LIFE OF ~ 12-15 HOURS



# ORAL ANTICOAGULANTS (DIRECT FACTOR X INHIBITORS)

- DIRECT FACTOR X<sub>A</sub> INHIBITORS (REVERSIBLE)
- INHIBITS PLATELET ACTIVATION AND FIBRIN CLOT FORMATION
- RIVAROXABAN (XARELTO)
- APIXABAN (ELIQUIS)
- LOW RATE OF MAJOR BLEEDING COMPLICATIONS
- TREATMENT FOR DVT, PE, AFIB
- HALF LIFE 5-15 HOURS



# ORAL ANTICOAGULANTS

- WARFARIN (COUMADIN)
- INHIBITS BIOSYNTHESIS OF VITAMIN K DEPENDENT PROTEINS (FACTORS VII, IX, X AND PROTHROMBIN)
- MONITORED WITH INR (PROTHROMBIN TIME RATIO)
- TREATMENT FOR AFIB, EMBOLISM, HEART VALVES, VENOUS THROMBOSIS, ETC
- THERAPEUTIC RANGE OF 2.0-3.0 INR
- EFFECTIVE HALF LIFE OF COUMADIN ~ 40 HOURS



# ANTIPLATELET DRUGS

- **ASPIRIN (ASA)**
  - ANTI-THROMBOTIC, IRREVERSIBLY INHIBITS PLATELET COX/THROMBOXANE SYNTHESIS
  - IMPAIRS PLATELET SECRETION AND AGGREGATION
  - HALF LIFE IN PLASMA ~ 20 MINS
  - ONCE BOUND TO PLATELET ASA WILL REMAIN ACTIVE FOR LIFE OF PLATELET ~ 10 DAYS
- **CLOPIDOGREL (PLAVIX)**
  - ANTI-THROMBOTIC, ACTIVE METABOLITES IRREVERSIBLY INHIBIT ADP RECEPTORS PREVENTING PLATELET ACTIVATION
  - HALF-LIFE 24-48 HOURS



# DENTAL CONSIDERATIONS ASA/CLOPIDOGREL

- MAY SEE PROLONGED BLEEDING WITH ASA OR CLOPIDOGREL OR COMBINATION OF TWO MEDICATIONS
- GENERAL CONSENSUS AND RESEARCH SUGGESTS THAT PATIENTS ARE NOT AT HIGHER RISK FOR PROLONGED BLEEDING WHEN ASA/CLOPIDOGREL ARE USED SIMULTANEOUSLY



# DENTAL CONSIDERATIONS COUMADIN

- HIGH RISK FOR BLEEDING FOLLOWING DENTAL SURGERY WITH COUMADIN
- HIGH RISK FOR THROMBOSIS IF PATIENT DISCONTINUES COUMADIN FOR SURGERY
- LITERATURE REVIEWS SUGGEST ORAL SURGICAL PROCEDURES CAN BE DONE WITH AN INR <3.5
- FOR EVERY INCREASE IN 1 IN THE INR ABOVE 3.5 ~ RISK FOR BLEEDING DOUBLES
- IF PROLONGED BLEEDING ~ GELFOAM/TOPICAL THROMBIN AGENTS OF CHOICE
- VITAMIN K CAN BE USED IN A MEDICAL SETTING FOR EMERGENCY CONTROL OF HEMORRHAGE
- IF ADJUSTING COUMADIN LEVELS PLAN FOR 3-5 DAYS BEFORE INR CHANGES
- INR NEEDS TO BE OBTAINED DAY OF SURGERY
- CONSIDER MEDICAL CONSULT IF PATIENT IS TAKING COUMADIN/ASA CONCURRENTLY
- AVOID PRESCRIBING METRONIDAZOLE/ERYTHROMYCIN/CLARITHROMYCIN ~ LIKELY WILL INCREASE INR WITH USE



# DENTAL CONSIDERATIONS PRADAXA

- DIRECT THROMBIN INHIBITORS (PRADAXA)
- SHORT HALF LIFE, PHYSICIAN MAY RECOMMEND DISCONTINUING FOR 1 DAY PRIOR TO SURGERY



# DENTAL CONSIDERATIONS FACTOR XA INHIBITORS

- ELIQUIS/XARELTO
  - PLAN ON MORE BLEEDING
  - NO ADJUSTMENTS OF DOSAGE OR DISCONTINUING TYPICALLY NEEDED



# CONSIDERATIONS

- THOROUGH MEDICAL HISTORY
- MEDICAL CONSULTATION IF MULTIPLE ANTICOAGULANT/ANTIPLATELET MEDS USED
- AVOID USE OF NSAIDs IN THE POSTOPERATIVE PHASE TO AVOID SYNERGISTIC EFFECTS WITH ANTICOAGULANT MEDS
- DENTAL ARMAMENTARIUM ~ GEL FOAM, TOPICAL THROMBIN, SURGICEL, ELECTROCAUTERY