Lecture 9 Outline

Miscellaneous Disorders

1. DIC and Related
   1. DIC (Disseminated Intravascular Coagulation)
      1. Is a pathologic form of coagulation that is diffuse rather than localized; characterized by generalized bleeding and shock
         1. Shock: a clinical syndrom in which the peripheral blood is inadequate to return sufficient blood flow to the heart for normal function, particularly transport of oxygen to all organs and tissues
      2. Occurs when certain stimuli are present, initiating coagulation (overwhelms process)
      3. Within vessels there will be clotting and break down
      4. Clotting factors get used up
      5. Tissues get damaged
      6. Clotting within circulation
      7. Mechanisms which trigger DIC
         1. Activate extrinsic (tissue thromboplastin)
            1. Abrupt placentae [=premature detachment of a N placenta]; tissue gets into bloodstream
            2. Retained dead fetus

Any triggers related to pregnancy are due to release of tissue thromboplastin for injured tissue or amniotic fluid entering circulation

* + - * 1. Trauma
        2. Promyelocytic leukemia - granules are like thromboplastin
        3. Cardiac bypass surgery
        4. Carcinoma (tumor may be rich in thromboplastin-like material)
        5. Septicemia [=bacteria in blood] — may be endotoxin release
      1. Activation of intrinsic pathway (endothelial cell damage) — platelet adhesion and XII activation
         1. Immune complex disease
         2. Heat stroke
         3. Septicemia
         4. Burns
      2. Direct activation of X or II
         1. Snake venoms
    1. Severity and manifestations depend on which process is dominant; 3 types
       1. Decompensated
          1. Active hemorrhage with platelets and factors being consumed
       2. Compensated
          1. Have increased coagulation, but balance by increased fibrinolysis
       3. Hypercoaguable
          1. Increased thrombin present with lesser plasmin activation
    2. Diagnosis — there is no one test
       1. Thrombin action (clotting assays) — Indicate whether increased or decreased
          1. PT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
          2. PTT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
          3. Fib: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
          4. TT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
          5. Reptilase: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
          6. Test for fibrin monomers: positive
       2. Plasmin action — Indicate whether increased, decreased, positive, or negative
          1. FDP: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
          2. D-Dimer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
          3. Platelet count: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
          4. Peripheral blood smear will show shistocytes
    3. Treatment
       1. Two forms
          1. Remove stimulus
          2. Regain hemostasis: cryoprecipitate, FFP, may give heparin to stop clotting
       2. Can cause renal shutdown
  1. Primary Fibrinolysis
  2. TTP — Thrombotic Thromocytopenic Purpura
     1. Platelet disorder, not immune
     2. Platelets get used up in platelet clots - missing ADAMTS-13 protein to cleave
     3. Have thrombosis, not bleeding
     4. Hallmarks
        1. Thrombocytopenia
        2. Microangiopathic hemolytic anemia; hemolytic anemia visualized in peripheral blood by fragmented RBC [shistocytes] and other bizarre morphology [poikilocytosis]
           1. Increased retics
           2. nRBCs
           3. Compensatory marrow response
           4. Hemolysis

Increased LDH

bilirubin

Decreased haptogobin

* + - 1. Neurologic abnormalities
      2. Fever
      3. increased azotemia [=increased urea in blood]
    1. Coag studies — Indicate whether normal or abnormal
       1. PT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
       2. PTT: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
       3. Fibrinogen: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

DIFFERENTIATION BY ROUTINE COAGULATION STUDIES

| TEST | TTP | DIC | | | Primary Fibrinolysis |
| --- | --- | --- | --- | --- | --- |
|  |  | Decompensated (Active hemorrhage; consume platelets and factors) | Compensated (increased coagulation and increased fibrinolysis — balanced) | Hypercoagul-able (increased thrombin present with lesser plasmin activation) |  |
| Platelet count | Decreased | Decreased | Normal to decreased | Normal | Normal |
| PT | Normal | Increased | Normal | Normal | Increased |
| PTT | Normal | Increased | Normal | Decreased | Increased |
| Fibrinogen | Normal | Decreased | Normal | Increased | Decreased |
| Thrombin Time | Normal | Increased | Normal to increased | Normal to increased | Increased |
| D-Dimer | Normal | Increased | Increased | Normal to increased | Normal |
| Soluble fibrin monomer (protamine sulfate; ethanol gelation) | Negative | Positive | Positive | Negative | Negative |
| Euglobulinlysis | Normal | Shortened (usually) | Normal to shortened | Normal | Shortened |
| FDP | Normal | Increased | N/A | N/A | Increased |
| Shistocytes | Present | Present | N/A | N/A |  |

1. Circulating Inhibitors
   1. General:
   2. LA:
   3. Specific Factor Inhibitors: