Alteration in Oxygenation

Hematologic Disorders
- A reduction in the mass of circulation of RBC’s, a deficiency in the quantity of hemoglobin and/or hematocrit or an alteration in the structure of the RBC’s
- Decrease in RBC production
- Blood loss
- Increase destruction of RBC’s

Related to decrease of oxygen in body and decrease in

One of first signs is pallor, fatigue and weakness

Anemia Diagnostic Data
- Increase in destruction of RBC → elevated bilirubin which leads to jaundice
- CBC
  - E – down
  - Hgb – down
  - Hct – down
  - Ret – up, higher level of immature RBC’s
- Iron levels – amount of iron combined with protein in serum
- TIBC – Total iron binding capacity – measurements of all the proteins available to bind the iron – this will be high if iron deficient
- Serum Ferritin – major iron storage protein directly related to storing iron – IDA – will be low bc you are using all the storage, not getting enough in diet, it used up all the storage
- RBC Indices
  - *MCV – mean corpuscular volume
    - *Macrocytic – high or large cell, will be elevated
      - B12 or pernicious anemia
      - Folic acid deficiency
    - *Micro – small cell
  - MCH – mean corpuscular hemoglobin
    - % of hemoglobin in RBC
  - *MCHC – mean corpuscular hemoglobin concentration
    - Indicated by color
      - *Normal concentration adequate chromic
      - *Pale (hypochromic)
  - Iron Deficiency Anemia
    - Small cell, pale in color
Body is making more RBC’s, microcytic hypochromic
  - B12 and Folic Acid Deficiency – Macrocytic normochromic

Anemia Diagnostic Data

- Bone Marrow Aspiration
  - Used to diagnose
    - Aplastic anemia – whites, reds and platelets
    - Thrombocytopenia
  - TCP – low platelet count
  - Where do you get it – long bones, iliac crest or sternum, hurts like hell (get lidocaine, but it doesn’t work)
  - At risk for bleeding and infection
    - Use a sterile procedure to prevent infection
    - Use direct firm pressure post procedure to prevent bleeding

- Schillings Test
  - Radioactive – PO
  - Nonradioactive – IM
  - 24 hour urine collection
  - Only a small amount of radioactive B12 will be excreted in the urine
  - No B no P, if you don’t have the B12, you won’t see it in the urine, because the body is trying to suck it all in

Iron Deficiency

- I’m not getting it in, or my body is not doing what it should with it
- Whatever body is storing, it is not getting it

Iron Deficiency Anemia

- Red is normal or decreased, but there is not enough I2 carrying capacity in the cells
  - Glossitis – inflammation of the tongue
  - Cheilosis – cracking or fissure in the mouth
  - PICA
  - Fatigue
  - Parasthesia – feels like hand or foot went to sleep, numbness and tingling

- Main Goal with nutritional deficiency
  - Malnutrition – not eating what you should be

Pernicious (Vitamin B12 Deficiency)

Pernicious Anemia

- Megaloblastic = macrocytic – impaired DNA synthesis
• Intrinsic Factor – if you have IF, you will be able to absorb B12 if taken PO by pill or diet
• Pernicious – no intrinsic factor – some kind of immune response that says I don’t have IF, it’s not there or not working bc of the auto immune response, if I don’t have it, I can’t absorb it, PO doesn’t work, that’s why it is given by IM injection – decrease in HCL in stomach with this, no IF → no HCL, no HCL → can’t secrete the IF, no IF in HCL → can’t absorb iron
• Pinkish cells that are big, MCV is up
• S/S
  o Ataxia – neurologic damage, trouble walking and being clumsy

**Hemolytic**
• Destruction of RBC’s
• Intrinsic – got it from parents
• Extrinsic – RBC’s are normal but got damages, pesticides or toxins
• RBC is destroyed, but everything attached to it remains
• Go to spleen bc that’s where the most macrophages live
• S/S
  o Hepatosplenopmegaly – working on overdrive, enlargement of spleen and liver, trying to get rid of broken down RBC’s
  o Jaundice – needs to be conjugated to pass in liver and stool
  o Renal problems – bc hgb molecule is left over in serum and gets lodged in kidneys and causes damage, pieces of RBC’s left over in circulation and stuck in renal tubules
  o Lack of O2 to bones

**Sickle Cell**
• We all have hgb A, sickle cell ppl have HBS, becomes thick and viscous, RBC’s
• Can have trait or disease, crisis causes more sickle cells to occur
• Stressors
  o Teach them to stay away from something that will cause this
    ▪ Hypoxia – high elevations, skiing, planes
    ▪ Cold or hot, extremes
    ▪ RBC’s become sickled and is immediate pain, need immediate O2, pain relief, antibiotics
  o Sickle cells have short life span compared to regular RBC’s
• S/S
  o Body is destroying cells
  o Cure problem, and THEN get rid of the sickled cells, not flowing properly
  o Vessels are spasming and it hurts
  o Affects organs with high O2 demand
• Tests
- Sickle S test – drop blood into solution to see if it gets cloudy, but does not tell you if it is the trait or the disease
- Hgb Electrophoresis – says if it is trait or disease

Study guide in manual on p. 32 – do it

Case Study
- Michael Davis
- 12 Hgb, Hct 36, Hct should be 3 times Hgb
- Know all the numbers for this test and final
- Know RBC
- Values
- .2-1.3 bili

Stressors – precipitating factors
- Cold
- Infection
- Fever
- Soar throat
- Denied falls or injuries
- Pain – due to sickling not infection
- Throat and blood cultures – know what infected him to give right drugs
- Aqua K pad – heating pad helps relieve sickling pain

Nursing diagnosis
- Pain
- Oxygenation
- Infection

Penicillin – don’t save it, take it even if you feel better

Folic acid – increase

Drink – good hydration

Notify doc – recurring or didn’t go away

Aplastic
- Missing all blood types, very rare
- Congenital or chromosomal – born with it
- Acquired – drugs, anticonvulsants, chemo
• *Missing reds – worry about O2
• *Missing Whites – infection
• *Missing platelets – bleeding

S/S

• Headache – could be affecting brain cells
• Normocytic, normochromic – everything is lacking

Treatment

• Fatal
• Cytoxin – chemo agent, trigger to make RBC’s

**Hemophilia**

• Diagnostic
  o If not bleeding they should be normal
  o Should have normal platelet count
  o Clotting factor might be off but platelets are normal
  o Prolonged PTT (factor 3) in williebrands
  o Ptt is factor 3
  o 8 – A
  o 9 – B
  o Willi – lacking factor 8 and von will factor
  o Fem – A
  o Fem and male – VW
  o VW – platelets involved

Treatments

• Different treatments for hemophilia vs ID

Medications

• *Procrit – helps tell body to produce more rbc’s, booster, can cause htn, rare but serious SE
• Fe – should be taken on empty stomach, blocks the absorption, but with just C, it will absorb
• Liver, red meats
• Don’t give any dairy products
• Review angiotensin
• Procrit
  o RBC will go up
  o H and H will go up
• Soft toothbrush would be good
Goal

- Decrease O2 requirements
- Sleep 8-10 hours of sleep
- Alternate rest with activity
- Avoid smoking – vasoconstriction
- Teach about family planning based on
- Avoid vit e

Planning Teaching

p. 37-38 in manual

Thrombocytopenia Purpura

- Petichial – rash like when tim drinks and pukes too much and pops bv’s in face
- ITP – they didn’t know the cause, now called immune cause they know it is an auto immune disorder
- Body recognizes your own platelets are not yours and it tries to get rid of them
- Megacaryocyte – precursor to platelets

Data

- Body is not producing enough platelets
- Pt and ptt – bleeding times

Treatments

- Steroids – Suppresses the response in the spleen and suppresses the antibody formation
- Spleen – take it out
- Danazol – decreases the immune response
- Worried about bleeding

Teaching

- No straight razor
- No crazy activities or something that can lead to cuts or pics
- Swimming a good sport, no contact sports
- READ the text
- X linked – mom carries

S/S

- hemarthrosis
**Blood Transfusion**

do blood dyscrasias study guide p. 32

look at transfusion reactions for at least 1 Q

1. Platelets, albumin and clotting factor replacement
2. ALWAYS Saline – hung with blood with 0.9% so you don’t run the risk of clotting, could cause RBC hemolysis otherwise
3. Blood Consent
   a. Know the blood is going to the right person
   b. 2 signatures
   c. Get their consent and not recently medicated but alert and oriented
4. 1 unit over 2 hours, max 4,
   a. No more than 4 – it can grow bacteria if it is out too long
5. Symptomatic anemia – PRBC – packed
6. TCP = platelets
7. Abl – brbc
8. Hemm
9. Ha – alb
10. – 8, 9 cryoprecipitates

Acute hemolytic – weak, jaundice, fatigue, dyspnea, fever, chills, febrile*

Allergic reactions – severe anaphylacsys, urticaris, anxiety, brochospasms,

Sepsis – fever chills

2 wks later

UA to chk for protein or blood in urine after hemplytic reaction

Autotranfusion bene – your own blood, no worry about antibody or antigen response, stop transfusion if there are any reactions

Send blood back to blood bank so they can test it and see what they missed because they did cross checks