Class 13 Objectives

• Upon completion of this lesson, the student will be able to
  – analyze the clinical manifestations of severe liver impairment.
  – state the normal clotting mechanisms and the role vitamin K plays in blood clot formation.
  – state the cause(s) of DIC and list the S&S.
Portal Hypertension

- Fibrosis of the liver structures causes an increased resistance to blood flow within the liver, therefore an elevation in the portal venous pressure
  - This increase in pressure can cause esophageal varices and hemorrhoids and 3rd spacing of fluid into peritoneal cavity (ascites)
- “Hepatic encephalopathy” can occur due to the toxic effects of altered metabolism
  - Cerebral edema & ICP can result from severe cases

Ascites

- A common feature of liver failure.
- Basic mechanisms include:
  - An increase in portal hypertension
  - Sodium and water retention
  - Decreased blood oncotic pressure secondary to a low serum albumin level

Cirrhosis

- Focal or diffuse inflammation and liver cell necrosis that causes severe changes in the structure and function of liver cells
- Inflamed liver cells compress the liver lobule and cause increased resistance to blood flow and portal hypertension
  - Liver tissue is regenerated, but not in the normal fashion
  - Fibrotic changes are irreversible, causing liver dysfunction
Cirrhosis

- **Alcoholic:** results from long-term alcohol abuse; most common cause in the USA
- **Biliary:** caused by a < in bile flow; commonly caused by long-term obstruction of bile ducts
- **Cardiac:** caused by long-term right-sided CHF
  - results in < oxygenation of liver cells
- **Postnecrotic:** result from hepatoxins, chemicals, or infection with Hepatitis B or C
  - massive death of liver cells & associated with cancer

Viral Hepatitis

- Inflammation of the liver followed by the necrosis of hepatic cells
  - Caused by infection with one or more hepatoviurses
    - Types: A, B, C, D, E & G
    - Little is known about the blood-borne "G"
  - Hepatic inflammation may occur d/t toxins, autoimmunity, and metabolic disorders

Viral Hepatitis

- HAV is found primarily in contaminated food and water
  - Transmitted by the enteric route (oral-fecal)
  - Poor hand washing or unsanitary food preparation
  - During the viremic phase of acute infection it can be spread via blood exposure (unusual)
  - Virus infects the liver and is excreted via the feces
  - Most contagious before presentation of S & S
  - Prevalence of immunity to HAV has decreased to < 25% of US adults (DiCarlo, 1999)
Hepatitis A Virus

- Hepatitis A antibodies show up in the blood 2-6 weeks following exposure & remain indefinitely in the blood
- Clinical manifestations: fever, chills, brown urine, anorexia, irritability, clay-colored feces, N&V, headache
- Liver function tests & coagulation tests are abnormal

Hepatitis B Virus

- HBV is transmitted via blood & body fluids
  - “Infected adults have a 50% chance of developing acute symptoms, but only a 10% chance of developing chronic infection” (DiCarlo, 1999)
  - In the US, 60% of hepatitis B virus infections are sexually transmitted
    - unprotected sex with multiple partners
  - A vaccine has been available since 1982
    - immunity develops in more than 90%

Hepatitis B Virus

- Hepatitis antigen-antibody complexes can be detected from 1-10 weeks after exposure to the virus
- Incubation period for HBV can last from 6 weeks to 6 months; clinical S & S of the acute phase are the same as HAV
- Patients have an > chance of “fulminant hepatic failure”…a sudden degeneration of the liver & loss of all normal liver functions
Hepatitis C Virus

- HCV is a blood-borne type of hepatitis
  - Formerly known as non-A, non-B hepatitis
  - Common among hemophiliacs & IV drug abusers
  - 40% of the cases are idiopathic
  - Incubation period of 6-7 weeks and acute infection results in a 30-40% chance of jaundice
  - 70% will develop some form of chronic hepatitis (DiCarlo, 1999)
  - Sexual transmission accounts for 15-20% of the infections in the US (DiCarlo, 1999)

Other Types of Viral Hepatitis

- HDV is also known as the "delta virus"
  - It is a blood-borne virus that must coexist with HBV in order to exert its viral activity
  - This covirus heightens the course and outcome of illness with HBV
- HEV is the "enteric" form of non-A, non-B hepatitis
  - is generally seen in underdeveloped countries

Precautions

- Use of gloves while handling all items contaminated with client’s body secretions
- Use of disposable patient care items, such as thermometers, dishes, eating utensils
- Use of private bathroom and room for clients who are incontinent of feces.
- Double bagging and labeling of linen or any hospital equipment that is contaminated with feces or blood (Hartshorn, 1997, p. 462)
Clotting Factor Defects

• Review normal function of clotting factors
• Inherited disorders: deficiencies of clotting factors
  – Hemophilia’s
  – Willebrand disease
• Acquired cases
  – Deficient synthesis of clotting factors by liver
  – Liver disease, dietary deficiency of Vitamin K
    • Factor 7 is first to decline then factor 2 and 10
  – Thrombocytopenia may occur due to splenomegaly liver disease and portal hypertension

Clotting Cascade

• Coagulation cascade consists of enzymatic reactions among the clotting factors
• Each coagulation factor is turned into its active form by the previous factor until the end product is “fibrin.”
  – Fibrin is not normally present in the circulation, but is necessary for clotting

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Hemophilia A and B

Hemophilic carrier

Disseminated Intravascular Coagulation

• Acquired complex clinical syndrome
  – Due to > proteolytic activity in the blood caused by > release of thrombin & plasmin
  – Acute, severe, life-threatening process
  – Massive hemorrhage and thrombosis
  – Becomes a chronic, low-grade condition
    • Minor lab abnormalities with sub acute hemorrhage and microcirculatory thrombosis
    • May involve many organs

Signs and Symptoms

• Decreased BP & peripheral pulses
• Purpura: ecchymosis or petechiae
• Cyanosis and bleeding
• Intraabdominal bleeding
• Hypoxemia
• Dyspnea
• Decreased LOC
• Oliguria
• Seizures
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