Liver diseases

Dr. Sabah Alheeti

Liver dysfunction may be attributed to a number of causes, including lifestyle habits and other acquired infections and conditions. The patient with liver disease presents a significant management challenge for the dentist because the liver plays a vital role in metabolic functions, including secretion of bile needed for fat absorption, conversion of sugar to glycogen, and excretion of bilirubin, a waste product of hemoglobin metabolism. Impairment of liver function can lead to abnormalities in the metabolism of amino acids, ammonia, protein, carbohydrates, and lipids (triglycerides and cholesterol). Many biochemical functions performed by the liver, such as synthesis of coagulation factors and drug metabolism, may be adversely affected in the dental patient with acute or chronic liver disease. So, along with impaired drug metabolism, significant bleeding may be a dental problem. Viral hepatitis and alcoholic liver disease are two of the more common liver disorders.

HEPATITIS

DEFINITION

Hepatitis is inflammation of the liver that may result from infectious or other causes. Examples of hepatitis with infectious causes are viral hepatitis, infectious mononucleosis, secondary syphilis, and tuberculosis.
Noninfectious hepatitis can result from excessive or prolonged use of toxic substances (e.g., drugs [acetaminophen, alcohol, halothane, ketoconazole, methyldopa, methotrexate]; more commonly, alcohol).

ETIOLOGY

Acute viral hepatitis is the most common form of infectious hepatitis. Five distinct viruses—types A, B, C, D, and E—are associated with this disease. Diagnostic markers of viral hepatitis include elevation of

a) aspartate aminotransferase,
b) alanine aminotransferase,
c) gammaglutamyl transferase,
d) white blood cell count, and
e) prothrombin time

❖ Types Of Viral Hepatitis

	Viral Hepatitis A	Viral Hepatitis B	Viral Hepatitis C	Viral Hepatitis D	Viral Hepatitis E
Agent	Hepatitis A virus (HAV); ssRNA; No envelope	Hepatitis B virus (HBV); dsDNA; envelope	Hepatitis C virus (HCV); ssRNA; envelope	Hepatitis D virus (HDV); ssRNA; envelope from HBV	Hepatitis E virus (HEV); ssRNA; no envelope
Route of Transmission	Fecal-oral	Parenteral, Vertical, Sexual.	Parenteral	Parenteral	Fecal-oral
Age affected	Children	Any age	Adults	Any age	Young adults
Carrier state	Nil	Common	Present	Nil (only with HBV)	Nil
Incubation period	10-50 days (avg. 25-30)	50-180 days (avg. 60-90)	40-120 days	2-12 weeks	2-9 weeks
Chronic infection	No	Yes	Yes	Yes	No
Specific Prophylaxis	Ig and Vaccine	Ig and Vaccine	Nil	HBV vaccine	Nil

PATHOPHYSIOLOGY AND COMPLICATIONS

- Hepatitis viruses replicate in hepatocytes and ultimately damage the host cell.
- HBV infection produces high serum titers that may reach 10^{8} to 10^{11} virions/mL.
- In contrast, HAV produces a viremia that may reach 10^{5} virions/mL in blood but 10^{6} to 10^{10} genomes/g in stool.

- Icterus (jaundice) is associated with hepatitis in
  - approximately 70% of cases of HAV,
  - approximately 30% of cases of HBV infection, and
  - approximately 25% of cases of HCV and HEV.

This is caused by an accumulation of bilirubin in the plasma, epithelium, and urine. Jaundice usually becomes clinically apparent when the plasma level of bilirubin approaches 2.5 mg/100 mL (normal is less than 1 mg/100 mL). If plasma bilirubin does not reach this level, the patient is anicteric(without jaundice), thus explaining nonicteric hepatitis.

Most cases of viral hepatitis, especially types A and E, resolve with no complications. While HBV, HCV, and HDV may persist and can replicate in the liver when the virus is not completely cleared from the organ. The consequences of hepatitis include

- Recovery,
- Persistent infection (or carrier state),

- Dual infection, chronic active hepatitis,
- Fulminant hepatitis,
- Cirrhosis,
- Hepatocellular carcinoma, and
- Death

CLINICAL PRESENTATION

Signs and Symptoms

• Patients classically exhibit three phases of acute illness.

A) The prodromal (preicteric) phase,

□□which usually precedes the onset of jaundice by 1 or 2 weeks,

□□consists of

- abdominal pain,
- anorexia,
- intermittent nausea,
- vomiting,
- fatigue,
- myalgia,
- malaise, and
- fever.
- With hepatitis B, 5% to 10% of patients demonstrate serum sickness–like manifestations, including arthralgia or arthritis, rash, and angioedema

B)The icteric phase

□□onset of clinical jaundice,

□□Many nonspecific prodromal symptoms may subside, but gastrointestinal symptoms (e.g., anorexia, nausea, vomiting, right upper quadrant pain) may increase, especially early in the phase.

□□Hepatomegaly and splenomegaly frequently are seen.

□□This phase lasts 2 to 8 weeks and is experienced by at least

• 70% of patients infected with HAV,

• 30% of those acutely infected with HBV, and

• 25% to 30% of patients acutely infected with HCV.

C) During the convalescent or recovery (posticteric) phase,

□□symptoms disappear, but hepatomegaly and abnormal liver function values may persist for a variable period.

□□This phase can last for weeks or months, and recovery time for hepatitis B and C is generally longer.

□□HBV infrequently is associated with clinical syndromes, including polyarteritis nodosa, glomerulonephritis, and leukocytoclastic vasculitis.

Laboratory Findings

- *The serum transaminases(ALT, AST) are elevated*

- *elevated levels of serum bilirubin, alkaline phosphatase (heat fraction), gammaglutamyl transpeptidase, and lactate dehydrogenase,*
- *increased white blood cell count and prothrombin time.*
- *Antigen/antibody serologic tests are required for identifying the viral agent and for distinguishing acute, resolved, and chronic infections.*
    I. Hepatitis A is diagnosed by the presence of elevated IgM anti-HAV
    II. *The first markers to appear in blood are HBsAg, HBeAg, and HBV DNA, followed by antibodies against the core antigen (IgM anti-HBc and IgG anti-HBc).*
    III. *Screening for HCV is performed by Anti-HCV*
    IV. *antibody against HDV (anti-HDV) and anti-HEV tests*

MEDICAL MANAGEMENT

Prevention Through Active Immunization:

Risk for viral hepatitis is reduced through active immunization. Currently, two vaccines are available for
HAV, two for HBV, one for combination hepatitis A and B, and one for combination hepatitis B/ Haemophilus influenzae type b conjugate for infants.

Following a percutaneous or permucosal exposure, the blood of the source (and exposed) person should be tested for HBsAg, anti–hepatitis C virus (HCV), and human immunodeficiency virus (HIV). CDC Guidelines for Exposure to Blood.

a. To reduce the risk of transmission of hepatitis viruses, the CDC has published postexposure protocols for percutaneous or permucosal exposure to blood. Implementation of these protocols is dependent on the virus present in the source person and the vaccinated state of the exposed person .
b. Briefly, a vaccinated individual who sustains a needle stick or puncture wound contaminated with blood from a patient known to be HBsAg positive should be tested for an adequate titer of anti-HBs if those levels are unknown.
c. If levels are inadequate, the individual immediately should receive an injection of ***HBIG*** and a ***vaccine booster dose***
d. If the antibody titer is adequate, nothing further is required.
e. If an unvaccinated individual sustains an inadvertent percutaneous or permucosal exposure to hepatitis B, immediate administration of HBIG and initiation of the vaccine are recommended.

TREATMENT

• As with many viral diseases, basic therapy is palliative and supportive.
• Bed rest and fluids may be prescribed, especially during the acute phase.
• A nutritious, high-calorie diet is advised.
• Alcohol and drugs metabolized by the liver are not to be ingested.
• Viral antigen and ALT levels should be monitored for 6 months

• Standard therapy for patients with chronic hepatitis is interferon (IFN) alfa-2b (3 to 10 million units) administered three times weekly for 6 months to 1 year.
• IFN therapy normalizes ALT levels in up to 17% of patients infected with HDV, 30% of those infected with HCV, and 40% of those infected with HBV and reduces the risk for development of hepatocellular carcinoma.
• Adverse effects (e.g., fatigue, flulike symptoms, bone marrow suppression) are common. The addition of lamivudine (a nucleoside analog active against HBV) or ribavirin (a guanosine analog active against HCV) results in a virologic response in an additional 15% to 25%.
• Corticosteroids are usually reserved for fulminant hepatitis.
• Liver transplantation is a last resort for patients who develop cirrhosis

DENTAL MANAGEMENT

Medical Considerations

• Identification of potential or actual carriers of HBV, HCV, and HDV is problematic because in most instances, carriers cannot be identified by history.
• Therefore, all patients with a history of viral hepatitis must be managed as though they are potentially infectious.
• Recommendations for infection control practices in dentistry published by the CDC and the American Dental Association have become the standard of care for preventing crossinfection in dental practice .
• All dental health care workers who provide patient care should receive vaccination against hepatitis B virus.

Patients With Active Hepatitis.

1) No dental treatment other than urgent care (absolutely necessary work) should be rendered unless the patient is clinically and biochemically recovered.
2) Urgent care should be provided only in an isolated operatory with adherence to strict standard precautions.
3) Aerosols should be minimized and drugs metabolized in the liver should be avoided as much as possible.
4) If surgery is necessary, preoperative prothrombin time and bleeding time should be obtained and abnormal results discussed with the physician.
5) The dentist should refer the patient who has acute hepatitis for medical diagnosis and treatment.

Dental Drugs Metabolized Primarily by the Liver

Local anesthetics (appear safe for use during liver disease when used in appropriate amounts)
• Lidocaine (Xylocaine)
• Mepivacaine (Carbocaine)
• Prilocaine (Citanest)
• Bupivacaine (Marcaine)

Analgesics
• Aspirin [*]
• Acetaminophen (Tylenol, Datril) [†]
• Codeine [†]

• Meperidine (Demerol) [†]
• Ibuprofen (Motrin) [*]

Sedatives

• Diazepam (Valium) [†]
• Barbiturates [†]

Antibiotics

• Ampicillin
• Tetracycline
• Metronidazole [‡]

* Limit dose or avoid if severe liver disease (acute hepatitis and cirrhosis) or hemostatic abnormalities are present.
† Limit dose or avoid if severe liver disease (acute hepatitis and cirrhosis) or encephalopathy is present, or if taken with alcohol.
‡ Avoid if severe liver disease (acute hepatitis and cirrhosis) is present.

Patients With a History of Hepatitis

- For those patients who report a positive history of hepatitis, additional historical information occasionally may be of help to the **clinician** in determining the type of disease.
- An additional consideration in patients with a history of hepatitis of unknown type is the use of the clinical laboratory to screen for the presence of HBsAg or anti-HCV.

Patients at High Risk for HBV or HCV Infection.

- Several groups are at unusually high risk for HBV and HCV infection.
- Screening for HBsAg and anti-HCV is recommended for individuals who fit into one or more of these categories unless they are already known to be seropositive.
- In addition, the patient might have undetected chronic active hepatitis, which could lead to bleeding complications or drug metabolism problems

Patients Who Are Hepatitis Carriers.

• If a patient is found to be a hepatitis B carrier (HBsAg positive) or to have a history of hepatitis C, standard precautions are to be followed to prevent transmission of infection.

Basic precautions against transmission of viral hepatitis
Treat all patients as infectious (universal precautions)
Wear gloves for all dental work
Take special care to avoid needle stick injuries
Wear goggles for eye protection
Use disposable instruments and autoclave all others
Be immunized against hepatitis B

• In addition, some hepatitis carriers may have chronic active hepatitis, leading to compromised liver function and interference with hemostasis and drug metabolism.

• Physician consultation and laboratory screening of liver function are advised for determination of current status and future risks.

TREATMENT PLANNING MODIFICATIONS

Treatment planning modifications are not required for the patient who has recovered from hepatitis.

Oral Manifestations and Complications

1-Abnormal bleeding is associated with hepatitis and significant liver damage.

• This may result from

- abnormal synthesis of blood clotting factors,
- abnormal polymerization of fibrin,
- inadequate fibrin stabilization,
- excessive fibrinolysis, or
- thrombocytopenia associated with splenomegaly that accompanies chronic liver disease.

Before any surgery is performed, the platelet count should be obtained, and it should be confirmed that the international normalized ratio (INR) is lower than 3.5.

• If the INR is 3.5 or greater, the potential for severe postoperative bleeding exists.

• In this case, extensive surgical procedures should be postponed.

• If surgery is necessary, an injection of vitamin K usually corrects the problem and should be discussed with the physician.

2- Chronic viral hepatitis increases the risk for hepatocellular carcinoma.

• This malignancy rarely metastasizes to the jaw (fewer than 30 cases in the jaw were reported as of this writing). Oral metastases primarily present as hemorrhagic expanding masses located in the premolar and ramus regions of the mandible.

ALCOHOLIC LIVER DISEASE

A. Potential problems related to dental care:
    1. Bleeding tendency
    2. Unpredictable drug metabolism
B. Oral manifestations:
    1. Bleeding
    2. Ecchymosis
    3. Petechia
    4. Glossitis
    5. Angular chelosis
    6. Impaired healing
    7. Parotid enlargement
    8. Candidiasis
    9. Alcohol breath odor
    10. Bruxism
    11. Dental attrition
    12. xerostomia

C. Prevention of problems:

1. Identify alcoholic patients by history, clinical exam, breath odor, information from friends
2. Consult with physician
3. Lab. Screening should include the following:

- CBC
- ALT, AST
- Platelet count
- PT
- PTT

4. Minimize the use of drugs metabolised by liver
5. If screening tests are abnormal, consider antifibrinolytic agents, FFP, Vit. K, platelets.