**Viral hepatitis**

**Characterized by**

1-common cause of Jaundice .

2- considered in any patient with abnormal L.F.T ( viral study )

3-cause similar clinical and pathological features

4-frequently asymptomatic & anicteric .

5- differ in their tendency to cause acute and chronic infections .

**Clinical features of acute infection**

1- prodromal illness → precedes jaundice

2-GIT feature (Vomiting and diarrhea ) .

3- Dark urine and pale stools may precede jaundice.

4- few physical signs. (tender liver, splenomegaly and cervical lymphadenopathy )

5- Jaundice may be mild and the diagnosis by abnormal L.F.T.

6- Symptoms rarely last longer than 3-6 weeks .

**Investigations**

1-ALT , AST ↑↑↑ , ALP rarely exceeds twice the upper limit of normal .

2-↑↑ bilirubin ↑↑PT indicates the severity ( liver damage )

3- Relative lymphocytosis ( white blood cell count usually normal ).

4- Serology confirm viral aetiology.

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| **Complications of acute viral hepatitis** |

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| * Acute liver failure * Cholestatic hepatitis (hepatitis A) * Aplastic anaemia * Chronic liver disease and cirrhosis (hepatitis B and C) * Relapsing hepatitis |

**Management**

NO hospitalization , No specific dietary modifications , NO alcohol , No sedative , No narcotic taken

Liver transplantation rarely need .

**Hepatitis A**

RNA, highly infectious , faecal-oral route. Excretion of the virus in faeces for about 2-3 weeks before the onset of symptoms and then for a further 2 weeks after the onset and symptoms . common in children up to 30% of adults will have serological evidence of past infection but give no history of jaundice. common in areas of overcrowding and poor sanitation. chronic carrier state does not occur

**Investigations** (Only one HAV antigen has been found)

1. Anti HAV IgM diagnostic of acute onset & present transiently in the blood during incubation period . It falls in about 3 months .
2. Excretion in the stools occurs for only 7-14 days after the onset of the clinical illness
3. Anti-HAV IgG →not diagnostic value due to
4. previous HAV infection
5. indicates immunity to HAV

**prevention**

active 1) vaccine (active ) close contacts, the elderly, pregnant women , People travelling to endemic areas , major disease , chronic hepatitis B or C infection .

passive 2) serum Immune globulin can be effective in school outbreak or nursery

**prognosis**

-chronic infection does not occur

-0.1% Acute liver failure

-In adults a cholestatic phase with elevated ALP levels ( cholestatic hepatitis )

**Hepatitis B DNA particle**

HBV Ag consists of 1-core containing (found in the liver ) HBV DNA and HBV DNA polymerase enzyme needed for virus replication.2-HBs Ag (surface antigen ) 3- HBe Ag

Humans are the only source of infection.

HB Ag is the most common causes of chronic liver disease leading to 1-cirrhosis 2-carcinoma.

Vertical transmission is the most common cause of infection in the perinatal period and carries the highest risk (90% risk for chronic infection )

Horizontal transmission cause 10 % risk chronic infection by 1- Injection 2- Infected blood products 3- Tattoos 4- Sexual (homosexual and heterosexual) .

**Investigations**

Serology : HBV contains several antigens make immune responses to their .

* HBsAg appears in the incubation period & before the prodromal phase & usually lasts for 3-4 weeks and can persist for up to 5 months. HBS antibody (IgG) appears after about 3-6 months and persists for many years or permanently. Negative test for HBsAg make the diagnosis unlikely but not impossible .
* HBc Igm antibody appears at same time with HBsAg & it is diagnostical for HBV infection specially when HBsAg not present so in acute infection , we get HBs Ag +ve with anti HBc Antibody +ve . (positive anti HBs Antibody IgG indicate either previous infection or vaccine )
* In chronic infection there is 1-HBs antigen + ve in blood 2- IgG HBc antibody 3-HBe antigen or antiHBe antibody with HBe antigen –ve
* HBeAg is an indicator of viral replication. appear transiently at the onset of the illness, followed by the production anti-HBe antibody . The HBeAg reflects active replication of the virus in the liver . persist HBsAg more than 6 months indicate chronic infection .

HBcAg found in the liver ( not in the blood ) but anti HBc IgM Ab appear early in the illness & rapidly reach high titre – early diagnosis of HBs Ag , Anti-HBc (IgG) Ab appear later .

Anti-HBc (IgM) can reveal an acute HBV infection specially when the HBsAg has disappeared .

**Viral load**

HBV-DNA can be measured by polymerase chain reaction (PCR) in the blood . **excess** of 105 copies/mL in the presence of active viral replication → indicated presence of **e** antigen . while low viral replication, viral loads are less than 105 copies/mL indicate present of , HBsAg- and anti-HBe-positive. The exception is in patients who have a mutation in the pre-core protein, which means they cannot secrete e antigen into serum . Such individuals will be anti-HBe-positive but have a high viral load and often evidence of chronic hepatitis also classified as having e antigen-negative chronic hepatitis .

Measurement of viral load is important in 1-monitoring antiviral therapy 2-identifying patients with pre-core mutants

**Management**

1-Acute hepatitis B → supportive treatment with monitoring for acute liver failure(less than 1% ) Full recovery occurs in 90-95 , 5-10% develop a chronic infection .

2- chronic infection → Treatments are still limited (no drug is able to eradicate hepatitis B infection completely) indication for treatment →presence high viral load with active hepatitis, as demonstrated by elevated ↑↑ serum transaminases and/or histological evidence of inflammation and fibrosis. The oral antiviral agents are more effective in reducing viral loads in patients with e antigen-negative chronic hepatitis B than in those with e antigen-positive chronic hepatitis B .

**Interferon-alfa** effective in selected patients with 1- low viral load 2-↑↑ serum transaminases twice the upper limit of normal . it acts by augmenting a native immune response . In HBeAg-positive chronic hepatitis, 33% lose e antigen after 4-6 months of treatment.

Interferon is contraindicated in cirrhosis, as it may cause a rise in serum transaminases and precipitate liver failure .

For high levels of viraemia and/or low transaminase levels, not candidates for interferon , use the following 1- Lamivudine 2- Adefovir 3- Other drugs (Tenofovir & emcitabine ) 4- Entecavir and telbivudine 5 - Liver transplantation

**Prevention**

-most infectious patients with markers of continuous replication as HBeAg, and high levels of HBV-DNA .

-least infectious patient when only anti-HBe is present with low levels of virus .

-vaccine contain HBsAg can produce active immunisation in 95% of normal individuals .

-vaccine offered for special risk patients

* Parenteral drug users
* Men who have sex with men
* Close contacts of infected individuals
  + Newborn of infected mothers
  + Regular sexual partners
* Patients on chronic haemodialysis
* Patients with chronic liver disease
* Medical, nursing and laboratory personnel

-The vaccine is ineffective in those already infected by HBV. vaccine given intradeltoid muscle at 0 , 1 , 6 months .

Infection can also be prevented or minimised by the intramuscular injection of hyperimmune serum globulin prepared from blood patient with anti-HBs. This should be given within 24 hours, or at most a week of exposure

-Vaccine can be given together with hyperimmune globulin (active-passive immunisation).

-Neonates born to hepatitis B-infected mothers should be immunised at birth and given immunoglobulin. then Hepatitis B serology should then be checked at 12 months of age.

**Prognosis**

**1-**Acute hepatitis B →Full recovery occurs in 90-95% . remaining 5-10% develop a chronic infection which usually continues for life, although later recovery occasionally occurs .

**-**90% of neonate infected mother got chronic hepatitis .

-Recovery from acute HBV infection occurs within 6 months and is characterised by the appearance of antibody to viral antigens. Persist of HBeAg beyond 6 months indicates chronic infection.

-Combined HBV and HDV infection causes more aggressive disease.

**2-**Chronic infection

1. asymptomatic and develop complications such as cirrhosis and hepatocellular carcinoma .
2. cirrhosis and hepatocellular carcinoma after many years **.** Cirrhosis develops in 15-20% over 5-20 years. it is higher in those who are e antigen-positive.

**Hepatitis D**

-RNA , not independent , required HBV for replication and has the same sources of infection .

- Infection either simultaneously with HBV, or can superinfected chronic HBV lead to progressive course (chronic hepatitis then cirrhosis ).

- It has same sources and modes of spread of HBV .

**Investigations**

HDV contains a single antigen cause antibody (anti-HDV). Delta antigen appears transiently in the blood , in practice diagnosis depends on detecting anti-HDV.

Simultaneous infection ( with HBV ) lead to low titres of anti-HDV of IgM while Superinfected chronic HBV leads to the production of high titres of anti-HDV IgM .

Prevention : prevent B prevent D .

**Hepatitis c**

This is caused by an RNA flavivirus. Acute symptomatic infection with hepatitis C is rare. Most patients with infection only identified when develop chronic liver disease. 80% of exposed individuals to the virus will become chronically infected and late spontaneous viral clearance is rare. Hepatitis C is the cause of what used to be known as 'non-A, non-B hepatitis', a syndrome of acute hepatitis often with jaundice seen after a transfusion of blood or blood products .

Hepatitis C infection identified in asymptomatic individuals screened because they have risk factors for infection (Intravenous drug misuse ,Unscreened blood products ,Vertical transmission , Needlestick injury , Iatrogenic parenteral transmission, Sharing toothbrushes) or screened patients having abnormal L.F.T.

**Investigation :-**

1. Serology and virology : it contains many antigens that give rise to antibodies in an infected person used in diagnosis. It takes 6-12 weeks for antibodies to appear in the blood while hepatitis C RNA can be identified in the blood as early as 2-4 weeks after infection . Active infection is confirmed by the presence of serum hepatitis C RNA in anyone who is antibody-positive.
2. Genotype : There are six common viral genotypes .
3. LFTs may be normal or show fluctuating serum transaminases. Jaundice is rare and only usually appears in end-stage cirrhosis.
4. liver biopsy to staging degree of liver damage .

**Management** The aim of treatment is to eradicate infection

The treatment of choice is (α-interferon given weekly subcutaneously +oral ribavirin )

side-effect of ribavirin is haemolytic anaemia. Side-effects of interferon are significant flu-like symptoms, irritability, and depression

Liver transplantation for cirrhotic but recurrence of hepatitis C almost always occur.

**Prevention** : no active , no passive protection .

Progression of chronic hepatitis to cirrhosis occurs over 20-40 years.( Risk factor as male gender, immunosuppression , HIVand heavy alcohol misuse)

**Hepatitis E**

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| RNA virus which is endemic in India and the Middle East. |

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| clinical presentation are similar to that of hepatitis A. spread via the faecal-oral route. in most cases, it presents as a self-limiting acute hepatitis and does not cause chronic liver disease. |

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| It differs from hepatitis A in that infection during pregnancy that lead to development of acute liver failure with high mortality.  Investigation : In acute infection, IgM antibodies to HEV are positive.  Prevention : no passive or active immunization .   |  | | --- | | **Other forms of viral hepatitis** |  |  | | --- | | Non-A, non-B, non-C (NANBNC) or non-A-E hepatitis used to describe hepatitis due to a virus that is not HAV, HBV, HCV or HEV.  Other viruses: Cytomegalovirus , Epstein-Barr virus , Herpes simplex , chickenpox, measles, rubella and acute HIV. | |