

# Lecture 9: Viral Hepatitis

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# Introduction Infection

- **Hepatitis**: inflammation of liver; presence of inflammatory cells in organ tissue
- The causes of hepatitis are varied and include viruses, bacteria, and protozoa, as well as drugs and toxins (eg, isoniazid, carbon tetrachloride, and ethanol).
- **Acute hepatitis**: symptoms last less than **6 months**
- Viral Hepatitis: is inflammation of the liver induced by viral infections
- The clinical symptoms and course of acute viral hepatitis can be similar, regardless of etiology, and determination of a specific cause depends on laboratory tests.

هذا هو تعريف  
على حد سواء  
**acute**  
يعني  
**short term**  
**of inflammation**  
وكانت  
hepatitis  
بشكل عام  
is prolonged  
disease

cut-off point  
نقطة تقاطع  
(7) اشهر

# كان نفسي عنه  
لازم يتجاوز الـ (7) اشهر  
Chronic

- Hepatitis may be caused by at least five different viruses (A, B, C, D, E). Other viruses, such as **Epstein-Barr virus** and **cytomegalovirus**, can also cause inflammation of the liver, but hepatitis is not the primary disease caused by them.

في  
primary  
infection  
المرض ← هو الـ  
hepatitis

يعني هذا الفيروسات الـ  
تسبب يكون الـ  
liver الـ

But rarely they might  
induce liver hepatitis



قبل ما تظهر الاعراض لما يكون المريفاعني ال  
في ال آخر .  
العيروسا ممكن ينقل من

Incubation  
period

ويرفع بعد ما عنهي ال symptoms بفصل  
ايام باسبابه انه ينقل

# Hepatitis A

- HAV is a picornavirus, . It replicates in the liver, is excreted in bile and is then excreted in the faeces of infected persons for about 2 weeks before the onset of clinical illness and for up to 7 days after.
- Hepatitis A virus is spread by the fecal-oral route, and outbreaks may be associated with contaminated food or water.
- Humans appear to be the major natural hosts of hepatitis A virus.
- The major mode of spread of hepatitis A is fecal-oral transmission
- HAV particles can be demonstrated in the faeces by electron microscopy.

→ light microscopy  
و ما يقدر  
==



# Epidemiology

- Hepatitis A is the most common type of viral hepatitis occurring world-wide, often in epidemics.
- The disease is commonly seen in children and young adults.
- Spread of infection is mainly by the faeco-oral route and arises from the ingestion of contaminated food or water.
- Overcrowding and poor sanitation facilitate spread.
- There is no carrier state.
- More than 90% of the adult population in many developing countries shows evidence of previous hepatitis A infection. Travelers from developed countries who enter endemic areas are particularly susceptible.
- Patients are most contagious in the 1 to 2 weeks prior to the onset of clinical disease.

\* بعد اسبوعين  
 ← انتقال  
 symptoms  
 بوقف ال  
 transmission  
 وطبق  
 Carrier  
 State

← بعد اكثر  
 فترة معدية

دليل على → continuous high transmission

وجود  
 ant-hepatitis A antibody

Igg  
 اذا كان

positive  
 معناه هاد الريف  
 رفل عليه هاد الريف  
 سواد كان معناه اعرف انك  
 والجسم كونه صند  
 antibody



⊕ jaundice → yellow discoloration of the skin + mucous membrane  
 ↑ bilirubin / ↑ enzyme

## Clinical Manifestations

- Incubation period of 10 to 50 days
- Followed by the onset of fever; anorexia; nausea; pain in the right upper abdominal quadrant; → general symptom
- Within several days, jaundice. Dark urine and clay-colored stools may be noticed by the patient 1 to 5 days before the onset of clinical jaundice. → specific symptom
- The liver is enlarged and tender → physical examination, put your hand on upper quadrant Right → tenderness (ألم عند اللمس)
- Recovery occurs in days to weeks. Almost all cases (99%) of hepatitis A are self-limiting. Chronic hepatitis such as that seen with hepatitis B is very rare. 1%
- Many persons who have serologic evidence of acute hepatitis A infection are asymptomatic or only mildly ill, without jaundice.

Jaundice ما يكون عند جميع specific symptom زي ال (acute infection) وجود ال  
 بعضا إنه الغير موجود وفيه عندك دليل على وجود ال (acute infection) وهو وجود ال  
 -- nausea, fever ويمكن أن يكون (IgM antibody)



clinical presentation Bilirubin levels are high (more obvious)

# Diagnosis

- Liver biochemistry: A raised serum **AST or ALT**, which can sometimes be very high, precedes the jaundice. In the **icteric stage** the serum bilirubin reflects the level of jaundice.

↑ Bilirubin  
Jaundice

- Haematological tests There is **leucopenia** with a relative **lymphocytosis**.

↓ WBC

- The erythrocyte sedimentation rate (ESR) is raised.
- Viral markers: antibodies to HAV **IgG** antibodies are common in the general population over the age of 50 years, but an anti-HAV **IgM** means an acute infection.

↑ ESR

Inflammation

- Immune electron microscopic identification of the virus in fecal specimens and isolation of the virus in cell cultures remain research tools.**

high ← IgM

PCR

positive ←

high ← bilirubin

recovery ← immune response

↑ Bilirubin  
BM  
Other cells

rarely used for diagnosis

rarely used for diagnosis

# \* Slide 7 / Diagnosis

PCR ← حد فيه راعي عمله في هل الفيروس موجود بالدم ؟  
 - في حالة من ال ( viremia ) يمكن نسبتها عملياً ( 20-30% )  
 في تكون نتيجتها positive

- كذا عملياً الفيروس مكانه بالأصل في ال liver ← كذا نأخذ  
 ممكن نأخذ ( liver aspartate ← وادور على الفيروس في ال Blood  
 liver biopsy )

- ( hepatitis A ) ← في كثير من الأحيان موجود بال Blood  
 دماغاً بال liver ال stool ← كذا نأخذ ممكن نأخذ

PCR +  
the stool

وجوده في ال stool لا  
 في 100% وجود hepatitis  
 لأنه ممكن يكون عدالمرحلة بس لسانيه  
 ال ابيويك بعد ال ( clinical symptom )

ملخص ⇒

- 1) بتركيبن ال cbc
  - 2) liver function test ← أهم اشي
  - 3) specific test
  - 4) انا شاك بالتشخيص بطلب PCR ال stool
- acute ← IgM  
~~chronic~~ ← IgG  
 immune OR previous infection



# Treatment and Prevention

- There is no specific treatment for patients with acute hepatitis A. Supportive measures include adequate nutrition and rest.
- Avoidance of exposure to contaminated food or water are important measures to reduce the risk of hepatitis A infection.
- Passive immunization with Immune serum globulin (ISG), is protective if given before or during the incubation period of the disease.

Active immunization with formalin-killed vaccines induce antibody titers similar to those of wild-virus infection and are almost 100% protective.

① general Ab  
(IVIG)

لـ مستوى عالٍ جودة  
صنا 11 Ab جفناهم  
صن 100 مبرغ

② specific Ig

لـ حسب نوع  
الضرب من يلب عنده

يودي الـ الكوينتية منحه من Ab

وبالتالي الأخطار هيلت بكونوا

at higher risk

بنتم حرمهم و نهم يا ضوه

و هاي  
معلتها  
لا تصعب انه  
اكتشفه قبل  
ظهور الاعراض  
على المريض  
استفادتها  
مثلاً لو صاغره 80  
سنة و فيه بعاولة طفل  
صو hepatitis A  
تمكن اعطيه حدود  
السيطرة الكمية بالوقت  
اطمينة من الضوح



# Hepatitis B

- The viral genome consists of partially double-stranded DNA with a short, single stranded piece. It comprises 3200 nucleotides, making it the smallest DNA virus known.
- The main components of the virus include the core - hepatitis B core antigen (HBcAg) and the pre-core-hepatitis B e antigen (HBeAg), and the envelope of the virus contains the hepatitis B surface antigen (HBsAg)
- Hep B is usually an asymptomatic or limited illness with fever and jaundice for days to weeks. It becomes chronic in up to 10% of patients and may lead to cirrhosis or hepatocellular carcinoma.



# Epidemiology

- The hepatitis B virus is present world-wide with an estimated 300 million carriers. 2 billion people have markers of infection
- 400 million have chronic infection.
- Spread of this virus is either by the intravenous route (e.g. by transfusion of infected blood or blood products, or by contaminated needles used by drug addicts, tattooists or acupuncturists), or by close personal contact, such as during sexual intercourse, particularly in male homosexuals.
- The virus can be found in semen and saliva.
- Vertical transmission from mother to child during parturition or soon after birth is the usual means of transmission world-wide.
- Needle stick injuries, has resulted in a higher risk of hepatitis B in medical personnel.

التهاب الكبد الوبائي  
 العدوى الفيروسية  
 بعد الولادة  
 انتقال الفيروس  
 التهاب الكبد الوبائي

Needle  
 hepatitis

Factor IX  
 or VIII

hepatitis



دون الإصابة بالفيروس  
بعد ملاحظتها  
Hepatitis

③ (20-30%) → acute hepatitis B  
(10%) → chronic hepatitis  
1% → cirrhosis

## Clinical Manifestations

- The incubation period may be as brief as 7 days or as long as 160 days (mean, approximately 10 weeks).
- Acute hepatitis B is usually manifested by the gradual onset of fatigue, loss of appetite, nausea and pain, and fullness in the right upper abdominal quadrant. Early in the course of disease, pain and swelling of the joints and occasional frank arthritis may occur. Some patients develop a rash.

رئى فمك  
التي  
asymptomatic  
or mild  
②

With increasing involvement of the liver, there is increasing cholestasis and, hence, clay-colored stools, darkening of the urine, and jaundice. Symptoms may persist for several months before finally resolving.

① ممكن يمرض ال hepatitis B، والجميع في جهاز المناعة يكمن عليه وما يظهر ان شي على المريض، ممكن يمرض على حدة ثاني ويكون *asymptomatic* وممكن على حدة ثالث وهو *acute infection* ومن ثم يفتحي الفيروس او يمرض على حدة رابع وهو *Chronic infection* ويظل الفيروس موجود ويحمله *continuous low grade damage* او يمرض حدة خامس وهو *Complications* مثل *Cirrhosis* او *Carcinoma*



- Fulminant hepatitis, leading to extensive liver necrosis and death, develops in less than 1%.
- Development of chronic hepatitis occurs in approximately 10% of all patients with hepatitis B infection, hepatocellular carcinoma, in up to 25% of patients.