



## Microbiology Practical

### Hepatitis



*Microbiology team 430*

Done By:

Aos Aboabat

Alwaleed AlJohar

Ghadeer Alwuhayed

Hanan Alrabiah

Khawlah Alothman

Hanan Alsalman

## Case 1

Mohammed Khan is a 20 year-old male who has recently arrived from India to work as a food handler in a restaurant in Riyadh. Three weeks after his arrival he was seen in A&E Dept. of KKHU because of **repeated vomiting**, **abdominal pain** and **fever**. On examination, his temperature was 38°C, his pulse rate 110/min and BP 120/80 mmHg; he was **jaundiced** and had **tenderness** in the right upper quadrant of his abdomen.

### QUESTION 1:

What are the possible causes for his presentation?

- Hepatitis.
- Acute Cholecystitis.
- Malaria.
- Leptospirosis.
- Typhoid fever.
- Cirrhosis.
- Hemolytic anemia.

Hepatitis A&E, Malaria and typhoid fever are common in India.

### QUESTION 2:

What investigations would you like to order for him? "Explain how these investigations would help you".

Test	How this investigation will help you?
CBC & ESR	Shows non-specific signs of infections or inflammation
Blood Film for Malaria	To exclude malaria
Liver function test	To assess liver function
Viral Hepatitis screening	To exclude viral hepatitis
Blood Culture	To exclude typhoid fever

Complete blood count [ CBC ]		Liver Function Tests [ LFTs ]	
Pt's result	Note	Pt's result	Note
Hb = 14.2 g/L	Normal (exclude hemolytic anemia)	AST=1557 U/L (12-37)	Very ↑
WBCs = 6100 mm <sup>3</sup>	Increased	ALT=1879 IU/L (20-65)	↑ (specific for liver damage)
Platelet = 271 g/L	normal	ALP=441 IU/L (175-476)	normal
ESR = 4mm/h	normal	Albumin=42.3 g/L (30-50)	normal
Blood film for Malaria = -ve	Exclude malaria	Bilirubin=86 μmol/L (3-17)	Very ↑ (jaundice)
Blood culture is negative	Exclude Typhoid fever		

### QUESTION 3:

Based on these findings what is the most likely diagnosis?

Viral Hepatitis (A, B, & C).

#### **QUESTION 4:**

What further investigations would you like to order?

Hepatitis serology.

**The serologic results were as follows:**

TEST	Result
Anti-HAV-IgM	Positive
HBsAg [Hepatitis B surface antigen]	Negative
Anti-HCV	Negative

If you are asked to interpret the result, you should comment on positive result as well as the negative ones just like the following:

Pt is infected with HAV due to positive result of Anti HVA IgM, but he is not infected by HBV or HCV

#### **QUESTION 5:**

Based on the serologic results, what is the diagnosis?

Acute Hepatitis A.

#### **QUESTION 6:**

Briefly outline the management of this patient.

- Supportive treatment (painkiller & antibiotics).
- Follow up (clinically & laboratory).
- Sick leave for about one week.
- Give vaccine & HIG to contacts.

- HAV vaccine → 2 doses (killed)
- HBV vaccine → 3 doses (recombinant)
- Yellow fever vaccine → LAV.

## **Case 2**

Mohammed Abdullah is a 34 year old married Saudi male who has **donated two units of blood** at KKHU for a relative undergoing an operation. The next day, the Blood Bank called him because of abnormal blood test results and advised him to see his physician.

On arrival to the blood bank, the doctor informed him that his blood is not suitable for transfusion because of the **presence of infection**.

#### **QUESTION 1:**

What type of infectious agents can be transmitted through blood transfusion?

**"Infections that could be transmitted through blood"**

- Hepatitis B
- Hepatitis C
- HIV
- Malaria
- HTLV [Human T-lymphotropic virus] "it's common in Asia"

The next day Mohammed came to see his general practitioner with a letter from the Blood Bank. The letter revealed the result shown below.

Test	Result
HBsAg [Hepatitis B surface antigen]	Negative
Anti-HBc [Anti-Hepatitis B core antigen]	Negative
Anti-HCV [Anti-Hepatitis C virus]	<b>Positive</b>
HIV-Ag/Ab	Negative
Anti-HTLV	Negative

The pt has HCV infection but does not have HBV infection, HIV or HTLV.

#### QUESTION 2:

What do you do next?

- Repeat tests and Serology.
- Liver function tests (LFTs).

The results added by the general practitioner are available. See the table below:

Lab. Test	Patient Result	Normal Range
ALT	<b>55</b>	20-65 IU
AST	<b>60</b>	12-37 IU
Bilirubin	4	3-17 mol/L
HIV-Ag/Ab	Negative	-
<b>HCV</b>	<b>Positive</b>	-
HBsAg	Negative	-
Anti-HBc	Negative	-
Anti-HBs	Negative	-

This patient has a chronic HCV infection; he didn't discover it early and there's an increase in his Liver enzymes.

#### QUESTION 3:

How do you diagnose HCV infection?

- Serological assay.
  - Screening for (Anti-HCV) by **ELISA** (may cause false positive or false negative, so we should do RIBA to confirm)
  - Confirmatory test by **recombinant immunoblot assay (RIBA)**
- Molecular assay. (such as PCR)

#### QUESTION 4:

Other laboratory test that are needed:

PCR with genotype for Hepatitis C.  
(PCR Should be repeated twice if the result is negative)

Treatment of HCV is combination of interferon with ribavirin.



Test	Significance	How it can help?
1. PCR	1-Qualitative: -ve or +ve (HCV-RNA)	Confirm the diagnosis.
	2-Quantitative: viral load	Monitor response to treatment.
2. Genotype	Identify the genotype of HCV.	Guide the choice & duration of therapy.

Genotype 4 is the most common in Saudi Arabia

### Case 3

A 15-weeks pregnant Saudi woman was seen for the first time at the antenatal clinic at KKHU. As part of the antenatal screening, the doctor arranged for blood screening for viral serology.

#### The results:

Test	Result	Notes
<b>HBsAg</b> [Hepatitis B surface antigen]	<b>positive</b>	Pt is infected with HB infection
<b>HBeAg</b> [Hepatitis B "e" antigen]	negative	If it was (+) that means the patient is <b>infectious</b>
<b>Anti-HBe</b> [Antibody to the hepatitis B e antigen]	<b>positive</b>	
<b>Anti-HBc IgM</b>	negative	
<b>Total Anti-HBc</b> [Anti-hepatitis B core]	<b>positive</b>	IgM and IgG antibodies
<b>HIV Ag/Ab</b>	negative	
<b>Anti-HCV</b>	negative	

Hepatitis B infection is easily transmitted from the mother to the baby (vertical transmission)

#### QUESTION 1:

How would you interpret these results?

Hepatitis B with low infectivity. [carrier].

#### QUESTION 2:

On the lights of these Laboratory results how would you manage the newborn?

- Hepatitis B immune globulin (HBIG) within 12 hours of birth. [3 doses]
- First dose of HBV vaccine.

### **QUESTION 3:**

**Is there a risk of transmission of HBV to the newborn?**

- 10-20% of women seropositive for HBsAg transmit the virus to their neonates.
- If HBsAg and HBeAg were both positive, vertical transmission is approximately 90%.
- In patients with acute hepatitis B, 10% of neonates will be infected if occurred in the first trimester and, 80-90% of neonates will be infected if the infection occurred in the third trimester.

### **QUESTION 4:**

**What further management would you offer to the mother?**

**Pregnant Hepatitis B carriers should be advised to:**

- Not donate blood, body organs, and other tissues.
- Not to share any personal items that may have blood on them (e.g., toothbrushes).
- Obtain vaccination against hepatitis viruses A as indicated.
- Be seen at least annually by their regular medical doctor.
- Discuss the risk for transmission with their partner and need for and testing.

Today the mother is admitted in labour and you were among the staff involved in the delivery. During a repair of the epistomy by you accidentally you prick your finger with a needle stained by the patient blood.

### **QUESTION 5:**

**What should you do?**

- Report occupational exposures immediately.
- The hepatitis B vaccination status and the vaccine-response status (if known) should be reviewed.

### **QUESTION 6:**

**What is the risk of infection to you?**

The risk of developing clinical hepatitis -if the blood has both (HBsAg) & (HBeAg) positive- is 22%--31%; the risk of developing serologic evidence of HBV infection was 37%--62%. By comparison, the risk of developing clinical hepatitis from a needle contaminated with HBsAg-positive, HBeAg-negative blood was 1%--6%, and the risk of developing serologic evidence of HBV infection, 23%--37%.

## Interpretation of the Hepatitis B Panel Tests Results Interpretation

Tests	Results	Interpretation
HBsAg anti-HBc anti-HBs	negative negative negative	susceptible
HBsAg anti-HBc anti-HBs	negative positive positive	Immune due to natural infection.
HBsAg anti-HBc anti-HBs	negative negative positive	Immune due to hepatitis B vaccination.
HBsAg anti-HBc <u>IgM anti-HBc</u> anti-HBs	positive positive positive negative	<u>Acutely</u> infected.
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive negative negative	Chronically infected.

## Hepatitis B markers (very IMPORTANT)

Types	Description
<b>HBV DNA</b>	Marker of <b>infection</b> .
<b>(HBsAg) Hepatitis B surface antigen</b>	Marker of <b>infection</b> .
<b>(HBeAg) Hepatitis B e antigen</b>	Marker of <b>active virus replication</b> , the patient is highly infectious; the virus is present in all body fluids.
<b>(Anti-HBe) Antibody</b> to hepatitis B <b>e antigen</b>	Marker of <b>low infectivity</b> , the patient is less infectious.
<b>(Anti-HBc) Antibody</b> to hepatitis B <b>core</b>	Marker of <b>exposure</b> to hepatitis B infection.
<b>(Anti-HBs) Antibody</b> to hepatitis B <b>surface antigen</b>	Marker of <b>immunity</b> .

		HBs Ag	HBs Ab	HBc Ab	HBe Ab	HBe Ag
<b>Infected (acute)</b>		+	-	+ or -	-	+
<b>Carrier</b>	Symptomatic	+	-	+	-	+
	Asymptomatic	+	-	+	+	-
<b>Recovery</b>		-	+	+	+ or -	-
<b>Window period</b>		-	-	+	-	-
<b>Vaccinated</b>		-	+	-	-	-

- **Window period:** (is a period between the disappearance of HBs Ag and the appearance of Anti HBs)  
During the window period, both markers **HBsAg** (Hepatitis B surface antigen) and **Anti-HBs** (antibody against HBsAg) are **negative** (which is due to the fact that, although there are Anti-HBs antibodies present, they are actively bound to the HBsAg).
- **IgM** (antibody) against **HBc** can be **positive**.

**If the patient was infected we will find:**

- 2 Ag which are HBs & HBe
- 1 Ab which is Anti-HBc

**If the patient was a carrier we will find:**

- 2 Ab which are Anti-HBe & Anti-HBc
- 1 Ag which is HBs Ag

Good Luck 😊