Practical
hepatitis

Objectives:

- Understand the use of viral serological studies for the diagnosis of hepatitis A , B & C infections.
- To know measures to prevent hepatitis A & B infections.
- To know the viral serological tests used to screen blood donors.
- Risk of transmission of HBV

Dr. malak said don't write abbreviations in the exam "e.g HBsAg" we should write full name and if we asked about the investigation we should write also the normal and negative results

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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 KKUH because of **repeated vomiting, abdominal pain and fever**. On examination, his temperature **was 38°C, his pulse rate 110/min and BP 120/80mmHg, he was jaundiced and had tenderness in the right upper quadrant of his abdomen.**

What are the possible causes for his presentation? "differential diagnosis "

1-Acute Viral hepatitis 2-Acute Cholecystitis 3-Malaria 4-Leptospirosis 5-Typhoid

All of them are possible **causes for his presentation but according to his** lab result "-Acute Viral hepatitis "

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

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

Investigation:

CBC		LFTs		
Hb =	14.2 g/L	AST	1557 IU/L (12-37)	↑
WBCs=	6100 mm^3	ALT	1879 IU/L (20-65)	↑
Platelet=	271 g/L	ALP	441 IU/L (175-476)	↑
ESR =	4mm/h	Albn	42.3 g/L (30-50)	↑
Malaria Blood film -ve. Blood culture is negative.		Bilirubin	86 µmol/L (3-17)	↑

- CBC is normal
- Malaria blood film negative
- Blood culture negative
- Liver function test all the enzymes are elevated

3. Based on these findings what is the most likely diagnosis?

Viral Hepatitis either (A , B ,or C)

4. What further investigations would you like to order?

Hepatitis serology

5. The serologic results were as follows:

Test	Result
Anti-Hepatitis A virus IgM (Anti-HAV-IgM)	Positive
Hepatitis B surface antigen (HBsAg)	Negative
Anti-Hepatitis C virus (Anti-HCV)	Negative

6. Based on the serologic results, what is the Diagnosis?

Acute Hepatitis A

7.Briefly outline the management of this patient.

- Supportive
- Contact tracing (vaccination of susceptible)
- Not working
- Follow up (Clinical and laboratory)

Case 2:

Mohammed Abdullah is a 34 year old married Saudi male who has donated two units of blood at KKUH for a relative undergoing an operation. Two days later, 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.**

1.What type of infectious agents can be transmitted through blood transfusion? (List 4 infections).

-Hepatitis B -Hepatitis C -HIV -HTLV
-Malaria -Syphilis -Cytomegalovirus

note : all of them transmitted through blood transfusion but in this case Hepatitis C

2. The next day Mohammed came to see his general practitioner with a letter from the Blood Bank. The letter revealed the result shown below. What is your interpretation ?

Test	Result
Hepatitis B surface antigen (HBsAg)	Negative
Antibody to hepatitis B core IgG (Anti-HBc IgG)	Negative
Anti-Hepatitis C virus (Anti-HCV)	**Positive**
HIV antigen/antibody (HIV-Ag/Ab)	Negative
Anti-HTLV	Negative

- Mention the negative and the positive
- patient is suspected to have Hepatitis C

What do you do next?

1- Repeat tests and serology "ELISA" 2- liver function test (LFT)

Confirmatory test: immunoblot assay recombinant immunoblot assay "RIBA" and PCR

3. The results added by the GP are available. See the table below. How would you interpret these results?

Lab. Test	Patient Result	Normal Range
ALT	49	20-65 IU
AST	29	12-37 IU
Bilirubin	4	3-17 mol/L
HIV-Ag/Ab	Negative	-
Anti-Hepatitis C virus (Anti-HCV)	**Positive**	-
Hepatitis B surface antigen (HBsAg)	Negative	-
Antibody to hepatitis B core IgG (Anti-HBc IgG)	Negative	-
Antibody to hepatitis B surface antigen (Anti-HBs)	Negative	-

- Liver function test is normal

4. How do you diagnose HCV infection?

- **Serological assay**

a. Screening for (Anti-HCV) by ELISA

b. Confirmatory test by recombinant immunoblot assay (RIBA)

- **Molecular assay**

5. The General practitioner arrange for him to see hepatologist who examine him and review his results. He further added PCR with genotype for Hepatitis C.
What is the significance of these tests & how they can help in the management:

Test	Significance	How it can help?
1. PCR	1-Qualitative: - or + (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.

Case 3:

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

The results were as follows :

Test	Marker of	Result
Hepatitis B surface antigen (HBsAg)	Infection	positive
Hepatitis B e antigen (HBeAg)	Chronic with viral replication “highly infectious”	negative
Antibody to hepatitis B e antigen (Anti-HBe)	Chronic without viral replication “low infectivity”	positive
Antibody to hepatitis B core IgM (Anti-HBc IgM)	+Acute / -ive chronic	negative
Total Antibody to hepatitis B core (Anti-HBc)	Previous exposure	positive
HIV Ag/Ab		negative
Anti-Hepatitis C virus (Anti-HCV)		negative

1.How would you interpret these results?

Hepatitis B with low infectivity.

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

Post-exposure prophylaxis:

A. Hepatitis B immune globulin (HBIG) within 12 hours of birth.
B. First dose of HBV vaccine

Dr.ali said that we wont be asked on the risk of transmission

3. Is there a risk of transmission of HBV to the newborn? (10% – 90% risk of transmission)

In chronic hepatitis risk of transmission depend on the presence of HBeAg or antiHBe

1. 10~20%→if mother is(+) HBsAg and (+)Anti Hbe or (-)HBeAg
2. 90% → if mother is (+)HBsAg and(+)HBeAg

In acute hepatitis b risk of transmission depend on when the acute infection occur:

1. %10 → if acute hepatitis occurs in first trimester 2. 90% → if acute hepatitis occurs in third trimester

4. What further management would you offer to the mother? Pregnant Hepatitis B carriers should be advised to

- Not donate blood, body organs, other tissue.
- Not 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?

1. What should you do?

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

2. What is the risk of infection to you?

- the risk of developing serologic evidence of HBV infection
  if the blood (+) HBsAg and (+) HBeAg → 37-62%
- the risk of developing serologic evidence of HBV infection
  if the blood (+) HBsAg and (-) HBeAg → 23-37%

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 **IgM anti-HBc** anti-HBs	positive positive **positive** negative	acutely infected
HBsAg anti-HBc **IgM anti-HBc** anti-HBs	positive positive **negative** negative	chronically infected
HBsAg anti-HBc anti-HBs	negative positive negative	Dr.malak said its hard so she wont ask about it 4 interpretations possible *

1. May be recovering from acute HBV infection.
2. May be distantly immune and test not sensitive enough to detect very low level of anti-HBs in serum.
3. May be susceptible with a false positive anti-HBc.
4. May be undetectable level of HBsAg present in the serum and the person is actually a carrier.

Hepatitis B markers

Types	Marker of
Hepatitis B surface antigen (HBsAg)	infection.
Hepatitis B e antigen (HBeAg)	active virus replication, patient is highly infectious
Antibody to hepatitis B e antigen (Anti-HBe)	low infectivity, the patient is less infectious.(patient recovering)
Antibody to hepatitis B core (Anti-HBc)	previous exposure to hepatitis B infection.
Antibody to hepatitis B surface antigen (Anti-HBs)	immunity. (patient is immune)

TABLE 3. Recommended postexposure prophylaxis for exposure to hepatitis B virus

Vaccination and antibody response status of exposed workers*	Treatment		
	Source HBsAg† positive	Source HBsAg† negative	Source unknown or not available for testing
Unvaccinated	HBIG§ x 1 and initiate HB vaccine series¶	Initiate HB vaccine series	Same as source is HBsAg positive
Previously vaccinated			
Known responder**	No treatment	No treatment	
Known nonresponder††	HBIG x 1 and initiate revaccination or HBIG x 2§§	No treatment	
Antibody response unknown	Test exposed person for anti-HBs¶¶ 1. If adequate,** no treatment is necessary 2. If inadequate,†† administer HBIG x 1 and vaccine booster	No treatment	

* Persons who have previously been infected with HBV are immune to reinfection and do not require postexposure prophylaxis.

† Hepatitis B surface antigen.

§ Hepatitis B immune globulin; dose is 0.06 mL/kg intramuscularly.

¶ Hepatitis B vaccine.

** A responder is a person with adequate levels of serum antibody to HBsAg (i.e., anti-HBs ≥10 mIU/mL).

†† A nonresponder is a person with inadequate response to vaccination (i.e., serum anti-HBs < 10 mIU/mL).

§§ The option of giving one dose of HBIG and reinitiating the vaccine series is preferred for nonresponders who have not completed a second 3-dose vaccine series. For persons who previously completed a second vaccine series but failed to respond, two doses of HBIG are preferred.

¶¶ Antibody to HBsAg.

Hepatitis:

- Acute = less than 6 months (anti HBc IgM) - Chronic = 6 months or more (anti HBc IgG)

- HCV: detection of the virus by ELISA (because it's more sensitive, but less specific) then confirmed by RIBA (recombinant immuno-blot assay)
- HAV : (self-limited, supportive treatment)

Serology

IgM	IgG	
-	-	Susceptible, Give vaccine
-	+	Immunized, No vaccine indicated
+	+/-	Infection, No vaccine indicated

HBV :

HBs Ag	-	-	-	+	+
HBs Ab	-	+	+	-	-
HBc Ab	-	-	+	+	+
HBe Ag	-	-	-	-	+
HBe Ab	-	-	+	+	-
Results	Susceptible, Vaccine indicated if exposed	Vaccinated (Immune)	Natural (Immune)	Carrier, (Vaccine not indicated)	Chronic, (Vaccine not indicated)

FOR ANY SUGGESTIONS AND PROBLEMS PLEASE CONTACT:
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