King Saud University
College of Medicine
Department of Medical Education and the Department of Pathology

MICROBIOLOGY PRACTICAL

YEAR TWO, GNT BLOCK

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This practical class is designed and Prepared by:

Prof. Samy A. Azer (Medical Education)
Dr. Ali Somily (Microbiology)
Prof. Abdul Mageed Kambal(Microbiology)
Dr. Malak Al-Hazmi (Microbiology)
Dr. Fawzia Al-Otaibi (Microbiology)

PART 1

Objectives:

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

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.

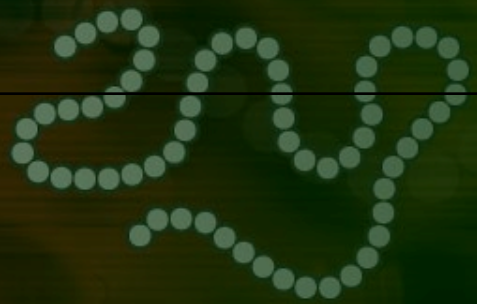
QUESTIONS

1. **What are the possible causes for his presentation?**
   a) Viral hepatitis
   b) Acute Cholecystitis
   c) Malaria
   d) Leptospirosis
   e) Typhoid
2. **What investigations would you like to order for him? Explain how these investigations would help you.**
   a) CBC & ESR
   b) Blood Film for Malaria
   c) Liver function tests
   d) Viral Hepatitis screening
   e) Blood Culture

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 U/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)
Blood film for Malaria = -ve.	Bilirubin 86 µmol/L (3-17)
Blood culture is negative.	



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

Viral Hepatitis

A

B

C

4. **What further investigations would you like to order?**

Hepatitis serology

5. **The serologic results were as follows:**

TEST	RESULT
Anti-HAV-IgM	Positive
HBsAg	Negative
Anti-HCV	Negative

6. **Based on the serologic results, what is the diagnosis?**

……Hepatitis A ……

7. **Briefly outline the management of this patient.**

- Supportive
- Not working
- Contact tracing
- 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.

QUESTIONS

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

- Hep B
- Hep C
- HIV
- HTLV

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
HBsAg	Negative
Anti-HBc	Negative
Anti-HCV	Positive
HIV-Ag/Ab	Negative
Anti-HTLV	Negative

What do you do next?

- Repeat tests and Serology
- LFTs

3. **The results added by the general practitioner 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	-
HCV	Positive	-
HBsAg	Negative	-
Anti-HBc	Negative	-
Anti-HBs	Negative	-

4. How do you diagnose HCV infection?

a. Serological assay

- Screening for (Anti-HCV) by ELISA
- Confirmatory test by recombinant immunoblot assay (RIBA)

b. Molecular assay

What other laboratory test needed?

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 and how they can help in the management:

Test	Significance	How it can help?
1. RT-PCR	1-Qualitative: - or + (HCV-RNA) 2-Quantitative: viral load	1. Confirm the Dx 2. Monitor response to Rx
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	Result
HBsAg	positive
HBeAg	negative
Anti-HBe	positive
Anti-HBc IgM	negative
Total Anti-HBc	positive
HIV Ag/Ab	negative
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:

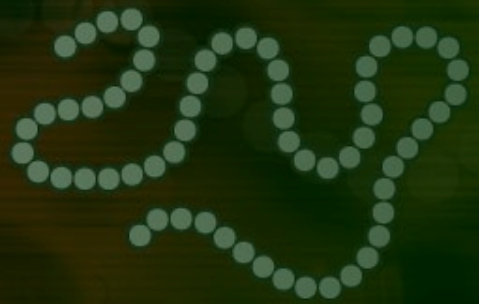
a) Hepatitis B immune globulin (HBIG) within 12 hours of birth.

b) First dose of HBV vaccine.

3. Is there a risk of transmission of HBV to the newborn?

HBsAg (+) mother → 10~20%
HBeAg (-)

HBsAg (+) mother → 90%
HBeAg (+)

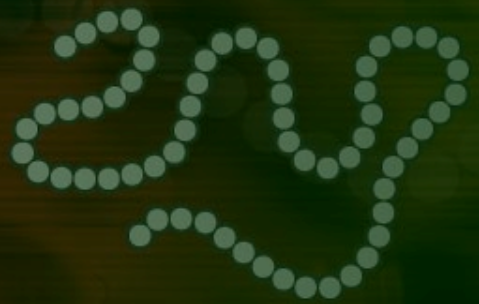


4. **What further management would you offer to the mother?**

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 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.

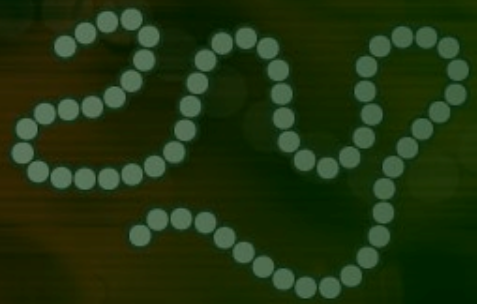


TABLE 3. Recommended postexposure prophylaxis for exposure to hepatitis B virus

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	Initiate HB vaccine series
Previously vaccinated			
Known responder**	No treatment	No treatment	No treatment
Known nonresponder††	HBIG x 1 and initiate revaccination or HBIG x 2§§	No treatment	If known high risk source, treat as if source were HBsAg positive
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	Test exposed person for anti-HBs 1. If adequate,¶¶ no treatment is necessary 2. If inadequate,¶¶ administer vaccine booster and recheck titer in 1–2 months

* 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.

2. What is the risk of infection to you?

the risk of developing serologic evidence of HBV inf

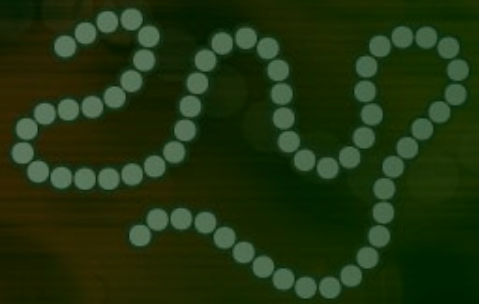
if the blood (+) HBsAg

(+) HBeAg → 37~62%

the risk of developing serologic evidence of HBV inf

if the blood (+) HBsAg

(-) HBeAg → 23~37%



Interpretation of the Hepatitis B Panel Tests

Tests	Results	Interpretation
HBsAg	negative	
anti-HBc	negative	susceptible
anti-HBs	negative	
HBsAg	negative	
anti-HBc	positive	immune due to natural infection
anti-HBs	positive	
HBsAg	negative	immune due to hepatitis B
anti-HBc	negative	vaccination
anti-HBs	positive	
HBsAg	positive	
anti-HBc	positive	acutely
IgM anti-HBc	positive	infected
anti-HBs	negative	
HBsAg	positive	
anti-HBc	positive	chronically
IgM anti-HBc	negative	infected
anti-HBs	negative	
HBsAg	negative	four
anti-HBc	positive	interpretations
anti-HBs	negative	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.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THANK YOU