OSPE

microBiology 434

Hepatitis

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.

Q1: What are the possible causes for his presentation?

Viral hepatitis – acute cholecystitis – Malaria – leptospirosis – typhoid

Q2: 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

Investigations: [Given]

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

Q3: Based on these findings what is the most likely diagnosis? Hepatitis A – B – C – E

Q4: What further investigations would you like to order? Hepatitis Serology

Q5: Based on the Hepatic Serological findings Below what is the diagnosis? Hepatitis A

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

Q6: Briefly outline the management of this patient.

Supportive – stop work to prevent transmition – contact tracing – follow up [clinical & 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.

Q1: What type of infectious agents can be transmitted through blood transfusion? (List 4 infections).
HBV – HCV – HIV – HTLV – Malaria – syphilis

Q2: 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?
When the question asks you to interpret the results you should comment on each test individually and specify if the patients result.

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

- the patient is not infected with HBV / the patient was never exposed to HBV / Not infected with HIV / not infected with HTLV [human T-cell lymphotropic virus]
- the patient is infected with **HCV** * **the patient is Asymptomatic** *

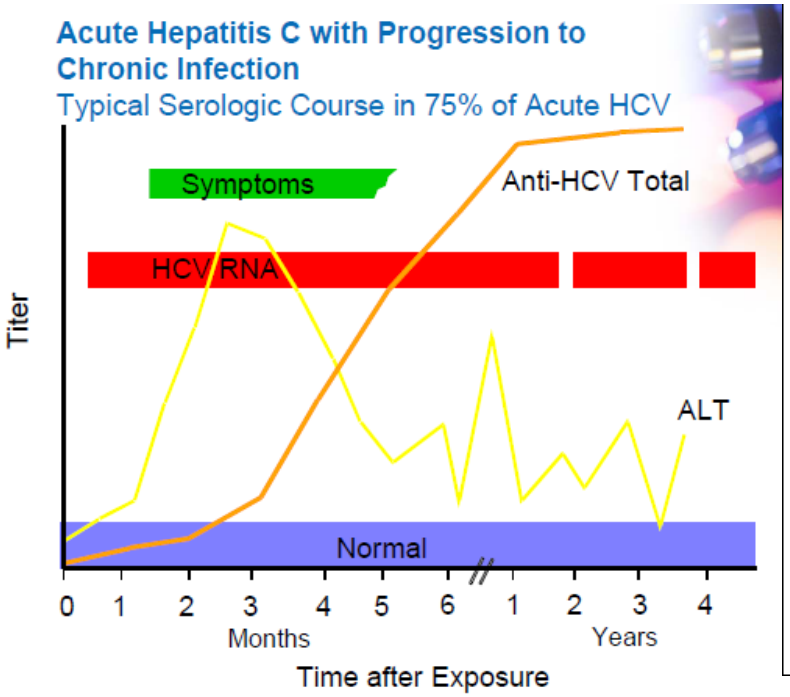
Q3: What do you do next? Repeat test and serology - LFTs

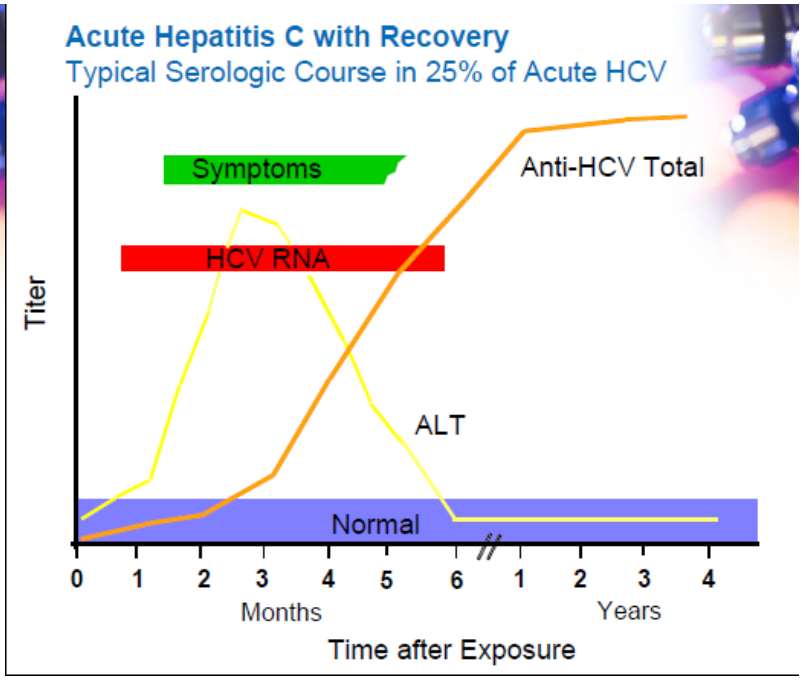
Q4:How would you interpret the results ordered by the GP? Practice on this one ☺, Have fun.

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-HCV	**Positive**	-
HBsAg	Negative	-
Anti-HBc	Negative	-
Anti-HBs	Negative	-

Q5:How do you diagnose HCV infection ?

- Screening for (Anti-HCV) by **ELISA**
- Confirmatory test by recombinant immunoblot assay **(RIBA)**
- Molecular assay [for detection of RNA → For early detection]





+ve RNA – anti-HCV → indicate infection

High ALT → indicate liver damage

+ve anti-HCV \ -ve RNA → recovery

Low ALT

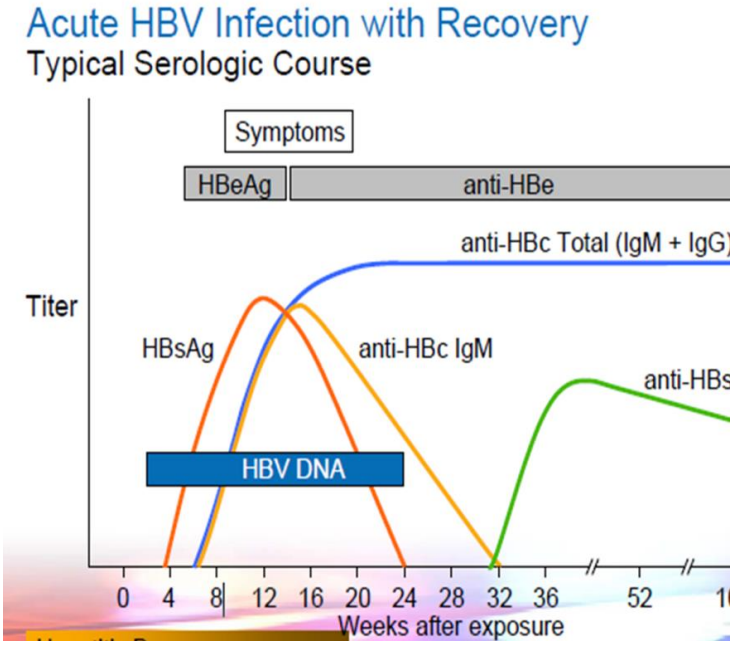
The General practitioner arrange for him to see hepatologist who examine him and review his results. He further added PCR with genotype for Hepatitis C.

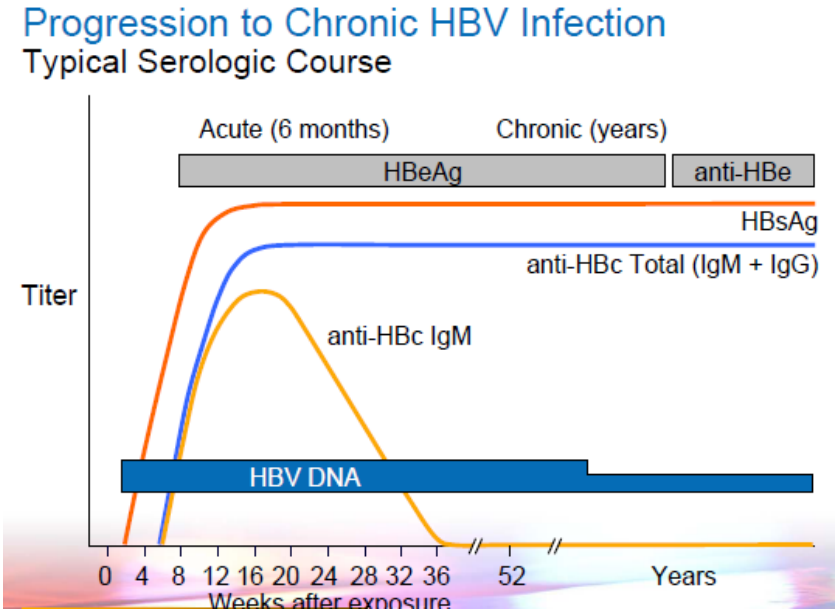
Q6: What is the significance of these tests & how they can help in the management:

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





Serologic Markers

HBs Ag+	Acute infection or chronic carrier
Anti-HBs Ab+ (qualitative, quantitative)	Recent or past infection, immunization
Anti-HBc IgM+	Acute infection
Anti-HBc Total+	Acute or past infection
HBe Ag+	Chronic carrier with viral replication
Anti-HBe Ab+	Chronic carrier without viral replication

Q1: How would you interpret these results?

- the patient has chronic Hepatitis B with low infectivity
- the patient is not infected with HCV \ HIV

Q2: On the lights of these Laboratory results how would you manage the newborn?

- **Post exposure prophylaxis:**
  - Hep B immunoglobulin [HBIG] within 12 hours of birth
  - First Dose of HBV vaccine

Q3: Is there a risk of transmission of HBV to the newborn?

- **10-20%** of women seropositive for HBsAg transmit the virus to their neonates in the absence of immunoprophylaxis.
- In women who are seropositive for both HBsAg and HBeAg vertical transmition is 90%.
- In patients with acute hepatitis B vertical transmition is 10% when infection occurs in the first trimester and 90% if it is in the third trimester

HBsAg **(+)** mother → **10-20%**
HBeAg **(-)**

HBsAg **(+)** mother → **90%**
HBeAg **(+)**

Q4: 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 labor and you were among the staff involved in the delivery. During a repair of the episiotomy, you accidentally prick your finger with a needle stained by the patient blood.

Q5: What should you do?

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

Q6: 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%

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.

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	Four 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.**

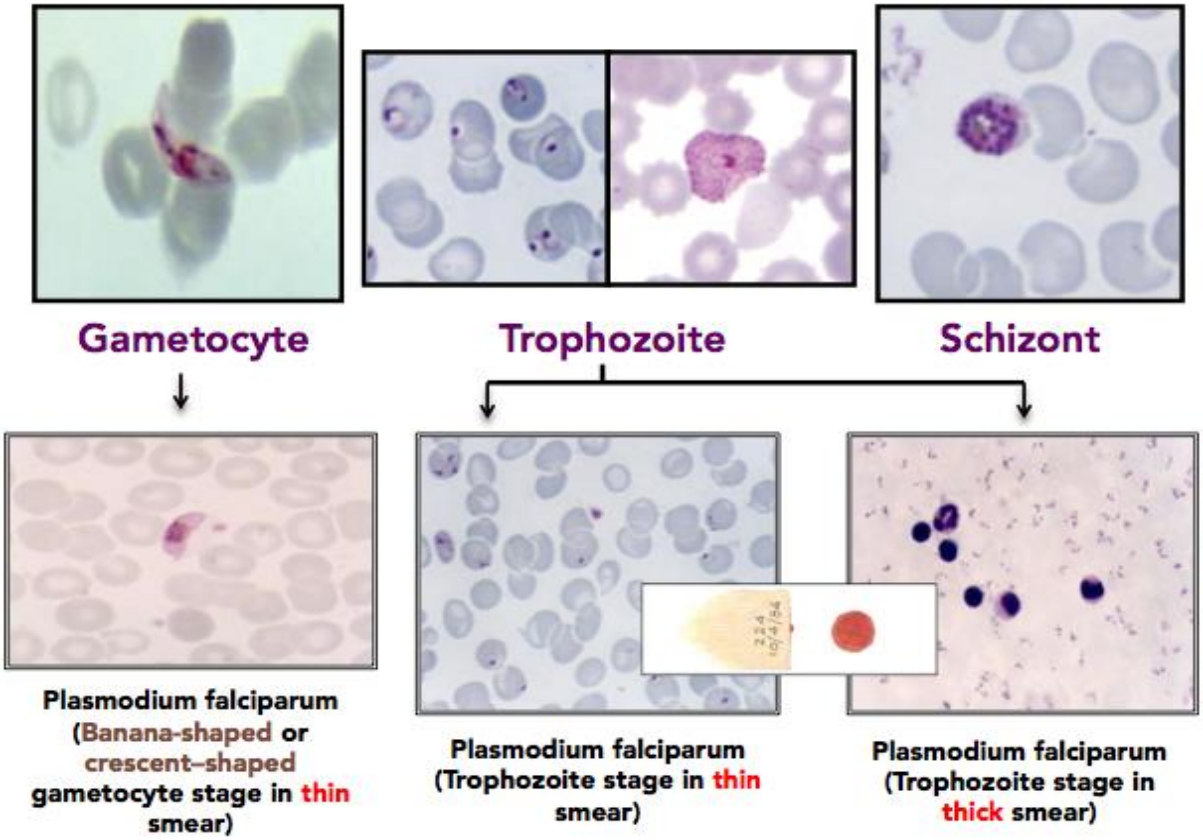
Blood Parasites

Common methods for parasitological diagnosis of malaria:
1: Light microscopy.
2: Rapid diagnostic tests (RDTs).

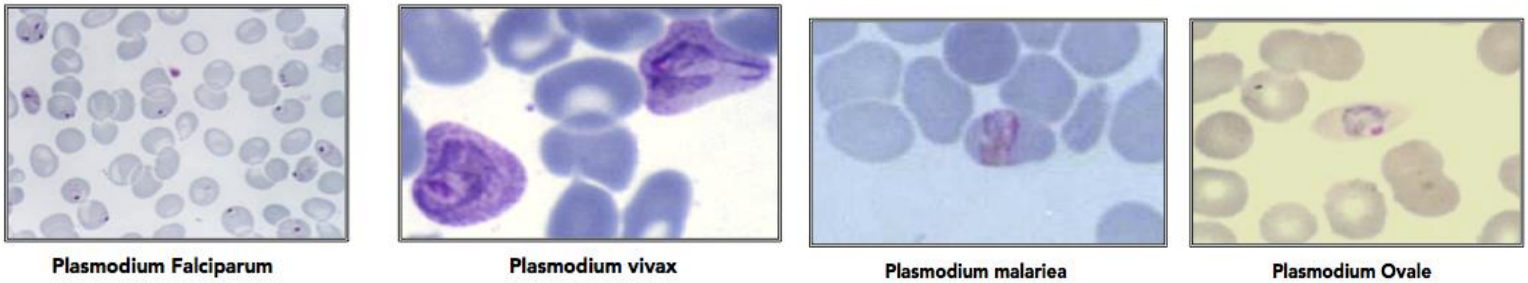
1- Light microscopy.

- **The first step is preparing blood film:**

- **Three developmental stages are seen in blood films:**



- **Species of malaria are identified by its characteristic microscopic appearance:**



2- Rapid diagnostic test.

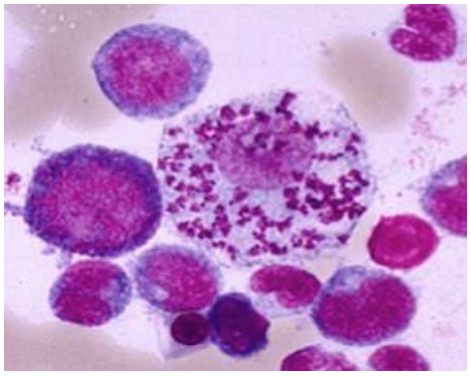
- **Detects malaria antigen.**
- **Products come in a number of formats:**
  - Plastic cassette.
  - Card.
  - Dipstick.
  - Hybird cassette-dipsticks.

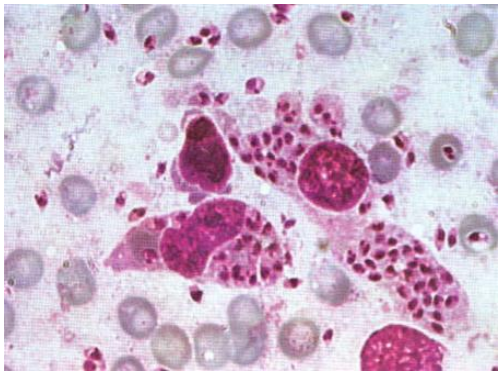
- **NEGATIVE RESULTS**

- **POSITIVE RESULTS**

- **INVALID RESULTS ***

- Wait 15 minutes before reading the results.
- If no control lines appear → repeat the test.

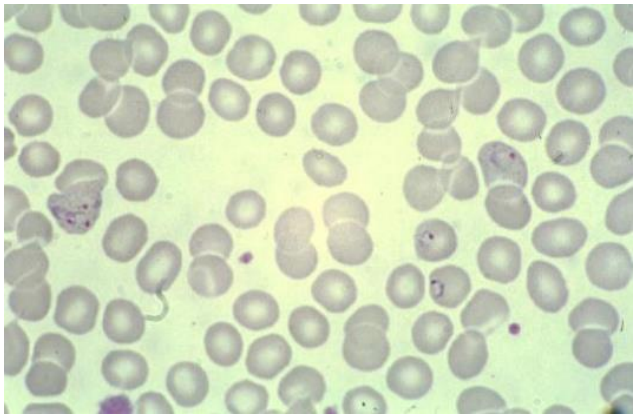




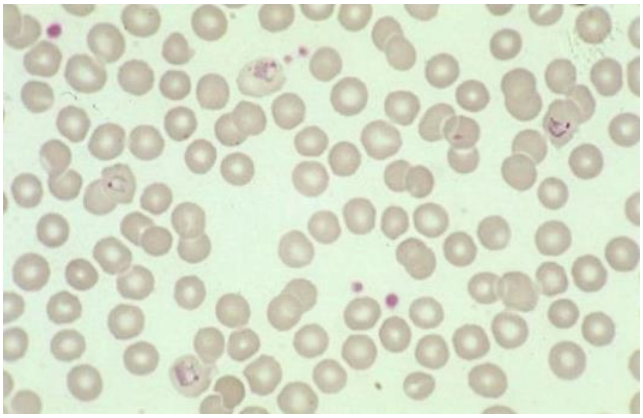
Leishmania, amastigote stage in a bone marrow smear

Test yourself

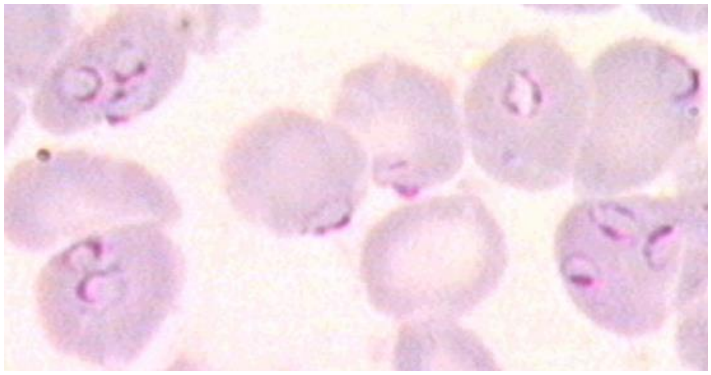
(You can find the answers in the next page)



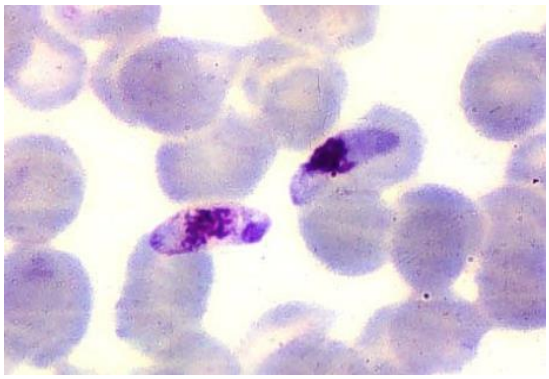
1- A 25 year-old male from India, who came 3 months ago was admitted in KKUH with a history of severe anemia and intermittent high grade fever for the last two months not responding to antibiotics. WHAT IS THE DIAGNOSIS?



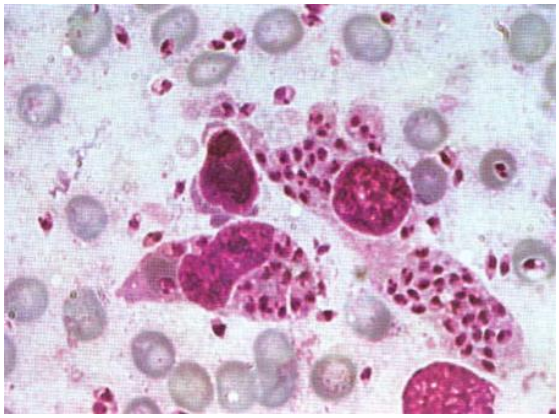
2- A businessman who makes frequent trips to Thailand , presents with intermittent fever. WHAT IS THE DIAGNOSIS?



3- A student in KSU who returned three weeks from vacation in Africa, he developed intermittent fever last week and lost consciousness a short time ago. WHAT IS THE DIAGNOSIS?



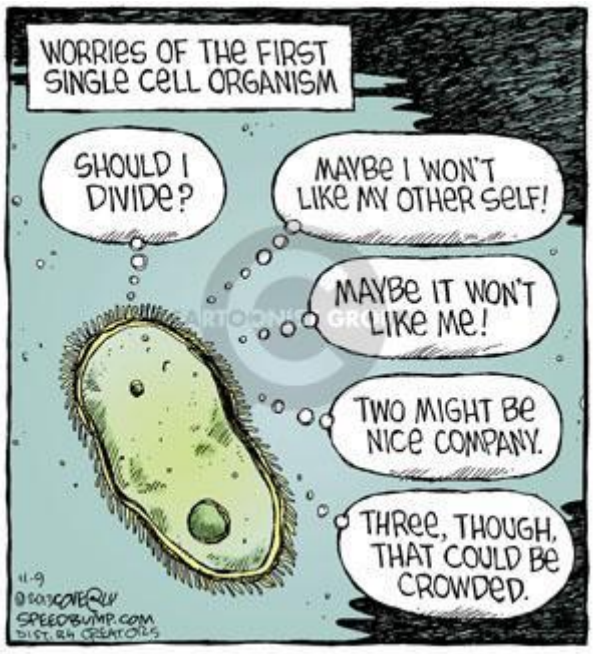
4- The patient was then treated with schizontocidal antimalarial drugs, a follow-up blood film is shown. ARE THERE ANY PARASITES? WHAT STAGE ?



5- A 7 year old child presented with anemia, hepatosplenomegaly and fever. Not responding to antimalarials and antibiotics. Bone marrow smear is shown. ARE THERE ANY PARASITES? WHAT STAGE ?

Answers:

1- Diagnosis: Malaria or Plasmodium vivax
2- Diagnosis: Malaria or Plasmodium vivax
3- Diagnosis: malaria or Plasmodium falciparum
4- Plasmodium falciparum, gametocyte stage
5- Leishmania, amastigote stage



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Good luck.