KULLIYYAH OF MEDICINE & HEALTH SCIENCES
(Student's copy)

Course	Medical Parasitology
Semester/Year	3/ 2
Topic	Blood Protozoa III
Date	
Time	
Student's Name/ ID	
Lecturer Name	Lee Ii Li

Overview

Epidemiology of Malaria in Malaysia

Malaria cases in Malaysia have been on the decline from 12,705 cases in 2000 to 4,725 cases in 2012. For the past decade (2000 – 2012), malaria cases has reduced from 3,918 cases to 1,097 cases in Peninsular Malaysia, from 3,011 cases to 1,571 cases in Sarawak and from 5,776 cases to 2052 cases in Sabah. There has also been a reduction in the number of malaria deaths from 35 in 2000 and to 16 deaths in 2012. Overall, the data showed almost half reduction in malaria cases in Malaysia. This is a good indication as we are moving towards the eradication of this disease by 2020. Source: Vector Borne Disease Sector, Ministry of Health

Notification of malaria

Malaria is a notifiable disease under the Communicable Diseases Control Act 1988 which mandates notification within 7 days. However, to ensure early investigation and institution of control measures, all practitioners are to notify malaria cases within **24** hours to the nearest health office.

National Strategic Plan for Elimination of Malaria (2011-2020)

In 2011, the Malaria Control Programme was re-oriented from control to elimination, and MOH formulated the National Strategic Plan for the Elimination of Malaria (NSPEM) (2011 – 2020) with the objective of eliminating locally acquired human-only malaria by 2020.

Seven strategies outlined in the NSPEM (2011 – 2020):

1. strengthen Malaria Surveillance System
2. intensify control activities using Integrated Vector Management approach
3. ensure early detection of cases and prompt treatment
4. heighten preparedness and early response to outbreak
5. enhance awareness and knowledge on malaria towards social mobilisation and empowerment

6. strengthen human resource capacity and
7. conduct relevant researches.

The incubation period of malaria is variable; the average being 10–14 days, but may be as short as 7 days or, in exceptional cases, up to 20 years as in *P. malariae* infection[1]. Symptoms occur within 6 weeks of the traveller leaving an endemic area in more than 90% of *P. falciparum* infections, and within 1 year in *P. vivax* infection. For *P. knowlesi*, symptoms occur 9-12 days after a person has visited or worked in a forested or forest-tinge area. There may be a relatively short prodromal period of tiredness and aches.

The early symptoms of malaria are non-specific and similar to the symptoms of a minor systemic viral illness e.g. headache, lassitude, fatigue, abdominal discomfort, muscle and joint aches, usually followed by fever, chills, perspiration, anorexia, vomiting and worsening malaise.

Table : Clinical Features, Laboratory Findings and Complications of Severe & Complicated Malaria[1, 2]

Clinical features	• Impaired consciousness or unrousable coma • Prostration (*generalized weakness so that the patient is unable to walk or sit up without assistance*) • Failure to feed/ not tolerating orally • Convulsion • Deep breathing, respiratory distress (*acidotic breathing*) • Circulatory collapse or shock, systolic blood pressure < 90 mm Hg (***please refer to physician for local figure*) in adults and < 50 mm Hg in children • Clinical jaundice and evidence of other vital organ dysfunction • Haemoglobinuria • Abnormal spontaneous bleeding • Pulmonary oedema (*radiological*)
Laboratory findings	• Hypoglycaemia (*blood glucose < 3.0 mmol/l*) • Metabolic acidosis (*plasma bicarbonate < 18 mmol/l*) • Severe normocytic anaemia (*Hb < 8 g/dl, packed cell volume < 24%*) • Haemoglobinuria • Hyperparasitaemia (*> 20,000/µl for P. knowlesi or > 100,000/ µl for other Plasmodium species*) • Hyperlactataemia • Renal impairment
Complications	• Cerebral malaria • Anaemia • Respiratory distress / Acute Respiratory Distress Syndrome (ARDS) • Renal failure • Hypoglycaemia • Circulatory collapse (shock) • Coagulopathy

Reference:

1. Geoffrey P. Malaria. Protozoal tropical infections 2005; Medicine 33:8:39-43.
2. World Health Organization. Guidelines for the treatment of malaria Second edition 2010.

The risk of acquiring malaria differs substantially from region to region and from traveller to traveller, even within a single country as it depends on several factors such as transmission intensity, duration of stay in the endemic area and the efficacy of preventive measures. Often, the risk to the indigenous population is used as a guideline for the risk to the traveller. Travellers with the highest estimated relative risk for infection are those going to West Africa and Oceania. Travellers going to other parts of Africa, South Asia, and South America have a moderate estimated relative risk for infection. Travellers with lower estimated relative risk are those going to Central America and other parts of Asia. All travellers should seek medical attention in the event of fever during or after return from travel to areas with malaria.

Caution:
Patient with severe splenic dysfunction or pregnant women should avoid traveling to endemic areas.

Malaria prevention consists of a combination of mosquito avoidance measures and chemoprophylaxis. The mosquito avoidance measures include insect repellent, wearing long sleeves, long pants, sleeping in a mosquito-free setting or using an insecticide-treated bednet. The use of *diethyltoluamide* (DEET) 20-50% in lotions, spray or roll-on formulation is safe and effective when applied to the skin of adults and children. Although *diethyltoluamide* may be used in children > 2 months, it should be used with caution. Because of their increased surface-area-to-body-mass ratio, children may be at increased risk for toxicity due to greater skin absorption. Low-concentration products should be used and applied sparingly. No anti-malarial drug is 100% protective and must be combined with the use of personal protective measures.

Malaysia has come a long way in the prevention and control of malaria since the introduction of the Malaria Eradication Programme in 1960. In 2011, we finally reached the significant milestone of having less than 1 case per 1,000 populations and thereby entered the elimination phase. The National Malaria Elimination Strategic Plan was introduced in the same year with the target of "malaria free" status by 2020.

Topic Learning Outcomes (TLOs)

Students should be able to:

1. enumerate blood protozoa that cause public health problems in Malaysia
2. describe the clinical features of malaria
3. describe malaria chemoprophylaxis
4. propose preventive or control measures to reduce the problems of malaria
5. describe the preventive and control programme of malaria in Malaysia

References:

1. Franklin A.N. & Harold W. (1998). **Basic and Clinical Parasitology** (6th Edition) New York Prentice Hall.
2. Viqar, Z., & Loh, A.K. (1996) **Handbook of Medical Parasitology** (3rd Edition).
3. Management Guideline for Malaria in Malaysia 2013, MOH.

Using the references provided and other possible resource materials in the library, answer the following questions.

1. Enlist **FIVE (5)** *Plasmodium* spp. that cause public health problems in Malaysia

2. One of the seven main strategies for the elimination of malaria is early detection of cases and prompt treatment. Name the first line treatment for all *Plasmodium* species.

3. Name the **MOST** common presentation of malaria.

4. Describe the classical paroxysm of malaria.

5. Define uncomplicated malaria.

6. Define severe and complicated malaria.

There are two types of chemoprophylaxis, namely suppressive (blood schizontisides) and causal (tissue schizontisides) prophylaxis.

7. List **FOUR (4)** suppressive chemoprophylaxis.

8. Describe causal prophylaxis.

9. List **TWO (2)** causal chemoprophylaxis.

10. List groups of people where malaria remains significant.

a.

i.

ii.

iii.

b.

i.

ii.

iii.

c.

i.

ii.

iii.

11. List other groups of people where malaria remains significant.

i.

ii.

ii.

12. Make a list or preventive or control measures to reduce malaria

a. Primary prevention

i.

ii.

iii.

b. Secondary prevention

c. Tertiary prevention

14. Describe the preventive and control program of malaria in Malaysia.

a. Vector control

b. Screening of parasite among population at risk

i.

ii.

c. Treatment

i.

ii.

iii.