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CASE SERIES

Imported Falciparum Malaria: A case series in a tertiary hospital

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Abstract

Introduction: Malaysia declared its intent to eliminate malaria by 2020, with a phased goal of achieving zero local transmission. Nonetheless, Malaysia is highly susceptible to malaria importation due to geographical proximity to high-burden countries e.g. Thailand, Myanmar and high influx of foreign workers and students from Asia and Africa. *Case Series:* We accumulated all malaria cases diagnosed in a tertiary hospital within a period of two years. Three cases were reported, where all of the patients were foreigners with recent travel history to African countries. All of them were infected by *P. falciparum*, responded to treatment and discharged well. *Discussion:* This case series highlighted the importance of acquiring recent travel history during history taking and having a high index of suspicions on malaria when dealing with feverish patients originated particularly from African countries.

Keywords: malaria, plasmodium falciparum, foreign, imported

INTRODUCTION

In 2011, Malaysia declared its intent to eliminate malaria by 2020, with a phased goal of achieving zero local transmission in West Malaysia by 2015, and East Malaysia by 2020.[1] Over the years number of malaria cases have shown tremendous reduction, nonetheless Malaysia is highly susceptible to malaria importation due to geographical proximity to high-burden countries e.g. Thailand, Myanmar and high influx of foreign workers and students from Asian and African countries. This paper discussed all malarial cases admitted to an urban tertiary hospital in Klang Valley, Malaysia from January 2016 until December 2017.

CASE SERIES

Case 1

A 31-year-old Nigerian man presented with 8 days history of intermittent fever that was associated with headache, chills and rigours. On day 6 of fever, he started to have diarrhoea and frequent vomiting as well as feeling lethargy. He had been working in Malaysia for the past few years. He just came back from his hometown in Nigeria, 2 weeks before hospital admission. Clinically he had fever but was alert and conscious and his vital signs were normal. Examination of systems were all normal. Blood count revealed thrombocytopaenia with normal haemoglobin and white cell levels. He was admitted with a working diagnosis of dengue fever with warning signs. Further investigations showed negative dengue serology and normal kidney function. However, blood film for malaria parasites (BFMP) was positive for *Plasmodium falciparum*. He was treated with Riamet® given at 0, 8, 24, 48 and 60 hours. He responded well, proven by the complete disappearance of malarial parasites on BFMP by day 4 of admission. He recovered and was discharged.

Case 2

A 24-year-old student from Nigeria presented with 4 days history of fever with arthralgia and myalgia. He also complained of 2 days history of diarrhoea and vomiting. One week prior to admission, he noticed a swelling in his right axilla, which he had sought treatment and was given antibiotic. Clinically, he was alert and conscious and his vital signs were stable. There was a 1x1 cm pustular lesion over his right axillary region. Systemic examination was unremarkable. Blood count revealed thrombocytopaenia with normal levels of haemoglobin and white cells. Dengue

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TABLE 1: Case 1 patient's serial blood film for malaria parasites results

No		Blood film for malaria parasites
1	Day 1	Plasmodium Falciparum 68200/μL
2	Day 2	Plasmodium Falciparum 4010/μL
3	Day 3	Plasmodium Falciparum 2080/μL
4	Day 4	No malarial parasite seen
5	Day 5	No malarial parasite seen
6	Day 6	No malarial parasite seen

serology was negative. The working diagnosis was right axillary abscess with viral fever, to rule out dengue fever. BFMP was positive for *Plasmodium falciparum*. Thus, he was admitted for further management. He was started on oral antibiotic for the abscess and given 6 doses of Riamet®. He requested to be discharged on day 5 of admission due to financial constrain. Table 2 shows patient's serial BFMP results.

Case 3

A 40-year-old Filipino lady was brought semi-conscious to the casualty. According to her friend she had been unwell for about ten days, right after returning from Cameroon. She complained of abdominal pain, poor appetite, and vomiting. The friend only noticed that she was very ill when she had an episode of urinary incontinence at home. Clinically, she was disorientated, febrile and appeared dehydrated and jaundiced. Blood pressure was low (90/60 mm/Hg) and pulse rate was 112 bpm. Abdominal examination revealed hepatosplenomegaly. Other systems were normal. Full blood count revealed anaemia and thrombocytopaenia. However, the white cell count was normal. Rapid dengue serology test was negative. She was treated as having severe sepsis due to meningitis, to rule out cerebral malaria. Urgent BFMP was positive for *Plasmodium falciparum*. Table 3 showed serial BFMP results. Further blood investigations showed hypoglycaemia, metabolic acidosis, hyperkalaemia, renal impairment and haemoglobinuria. There was no bacterial growth

TABLE 2: Case 2 patient's serial blood film for malaria parasites results

No		Blood film for malaria parasites
1	Day 1	Plasmodium Falciparum 20280/μl
2	Day 2	Plasmodium Falciparum 2240/μl
3	Day 3	Plasmodium Falciparum 960/μl
4	Day 4	No malarial parasite seen

TABLE 3: Case 3 patient's serial blood film for malaria parasites results

No		Blood film for malaria parasites (asexual/sexual)
1	Day 1	Plasmodium Falciparum 117/53 /μl
2	Day 3	Plasmodium Falciparum 173/58 /μl
3	Day 4	Plasmodium Falciparum 16/247 /μl
4	Day 5	Plasmodium Falciparum 640/0 /μl
5	Day 6	Plasmodium Falciparum 0/40 /μl
6	Day 8	Plasmodium Falciparum 40/0 /μl
7	Day 10	No malarial parasite seen
8	Day 11	No malarial parasite seen
9	Day 12	No malarial parasite seen

on blood culture. CT scan of the brain was also normal.

She regained consciousness after two days of intravenous artesunate and was transferred out from the high dependency unit. She was then given Riamet® for 4 days, and one dose of primaquine due to persistence of malarial parasites even after completion of Riamet. She was discharged well.

DISCUSSION

For the period of 2 years in an urban district hospital near Kuala Lumpur, we only found three malaria cases, of which all were imported. All three patients were non-citizens and had a recent travel history to African countries prior to illness. This is not unexpected because in 2017, the World Health Organization (WHO) reported only 85 indigenous human malaria cases in Malaysia, whereas cases of imported human malaria cases were almost five times higher (423 cases). The number of indigenous and imported malaria cases in 2017 decreased substantially from 6141 cases in 2016.[2]

Plasmodium knowlesi which is a zoonotic infection is the most common cause of malaria infection in Malaysia, followed by *Plasmodium vivax, Plasmodium falciparum, Plasmodium ovale* and *Plasmodium malariae*.[3] In this case series, all patients were infected by P. falciparum, a common cause of malaria in African countries. Retrospective studies from Italy and China amongst imported malaria cases are consistent with our findings with most cases caused by *Plasmodium falciparum* and most patients having recent travel history to African countries.[4]

Cases 1 and 2 presented with almost similar symptoms on admission, both came with fever, diarrhoea and vomiting whilst case 3 presented with altered level of consciousness. Malaria infection results in a wide variety of symptoms, ranging from absent or very mild symptoms to severe disease and even death. Severe disease is manifested by anaemia, respiratory distress, acute kidney injury and coma which occurs in infections caused by *P. knowlesi, P. falciparum* and *P. vivax*.[4]

Initial blood investigations for cases 1 and 2 showed normal haemoglobin and white cell count but low platelet (97 to 105 x 10^9/L). Case 3 presented with anaemia and thrombocytopaenia (platelet of 103 x 10^9/L). Malaysia being endemic for dengue fever, dengue virus infection was considered as the provisional diagnosis in all 3 cases. Nonetheless, due to patients' background and travel history, blood film for malarial parasites (BFMP) were also investigated. A study by Hanson *et al*. (2015) among patients with severe falciparum malaria infection showed that the admission platelet count was inversely related to parasite biomass, the degree of microvascular sequestration and disease severity.[5] This is in line with a study by Das *et al*. (2017) who found that patients with complicated or severe malaria had significantly low platelet count compared to uncomplicated malaria.[6] The platelet count for all patients above was almost similar, however case 3 presented with severe malaria whereas case 1 and 2 just came in with mild symptoms. Interestingly, the patient with severe malaria had very low parasitemia level as compared to the others. Bruneel *et al*. (2016) found that the most useful biomarkers associated with severity were plasma albumin, sTREM-1 and $pfHRP_2$ (parasite-related marker).[7] Therefore platelet and parasitic counts should not be used as a marker to predict disease severity.

The World Health Organization (WHO) recommends artemisinin-based combination therapies (ACT) as the first-line treatment for uncomplicated falciparum malaria and intravenous artesunate followed by ACT for complicated cases. Unfortunately, artemisinin-resistant *P. falciparum* phenomenon has been found in Indochinese nations of Myanmar, Cambodia, Thailand and Vietnam.[8] Resistant strains are manifested by slow parasite clearance. All three cases were given anti-malaria drug accordingly and complete clearance of parasites was seen right after completion of therapy. Prevalence of ACT resistance in the African region is very rare,[9] thus complete clearance of the African strain in the above cases were as anticipated.

CONCLUSION

Towards achieving zero malaria status, imported malaria infections should be addressed seriously. The actual threat now is the possibility of reintroduction of malaria into areas, which have eliminated the disease. Current medical check-up program for foreigners that includes BFMP test is only done upon arrival and for visa approval purposes only. As depicted by the case series, malaria infections occurred upon re-entering the country post-visit abroad. Thus, measures to tackle this issue are highly warranted.

This report also highlights the importance

of travel history in the management of febrile illness. Even though the incidence of local malaria cases is on the decline, malaria should remain included in the working investigations for febrile illness patients with recent travel history to high-burden countries. A prompt malarial investigation will expedite the diagnosis of malaria and avoid unnecessary investigations and clinical complications.

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