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IMPORTED MALARIA PATIENT COMPLICATED WITH SPLENIC RUPTURE AND BLEEDY NECESSITIES SPLENECTOMY

By
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Abstract

Generally speaking, Malaria is a serious parasitic infection that affects both residents and travelers in tropical climates. Almost all severe forms of malaria are caused by *P. falciparum*, but serious complications such as severe anemia, respiratory distress, splenic complications, shock, and multiple organ dysfunctions. This paper documented a case of UN Peace keeping Forces back to Egypt with malaria complicated with splenic infarction.

Key words: Egypt, Imported malaria, Treatment, Splenectomy.

Introduction

Generally speaking, in sub-Saharan Africa, most of mosquito-transmitted diseases, such as malaria or dengue, occur within or around houses (WHO, 2017). There were still 213 million cases of malaria and 380.000 malaria-associated deaths in sub-Saharan Africa, and it is becoming clear that our current arsenal of weapons that include insecticide-treated bed-nets (ITNs), indoor residual spraying and prompt and effective treatment with anti-malarial are insufficient to achieve malaria elimination from the region. However, malaria continued to be a major drain on the health and economy of Africans, as 93% of the global malaria burden occurred in the sub-Saharan Africa (WHO, 2019).

In Egypt, Zaher *et al*. (2007) reported 16 malaria cases in a Military Fever Hospital, they were nine *P. falciparum* imported pilgrims and seven *P. vivax* locally acquired patients. El-Bahasawy *et al.* (2010) reported 20 malignant malaria cases among Peace Keeping Mission Forces back from the Sudan.

Mikhail *et al.* (2009) in Egypt reported the abundance of *Anopheles sergentii, A. pharoensis*, *A. multicolor*, *A. detali*, *A. algeriensis, A. tenebrousus*, *A. superpictus*, *A. tarkhadi*, *A. hispaniola*, *A. rhodesiensis*, *A. stephensi, A. coustani* and *A. gambiae* (formerly). Wassim (2014) reported by the secondary structure and sequence of ITS2-rDNA *Anopheles pharoensis* proved to be the important vector all over Egypt, *An. sergenti* the primary vector in the Western Desert Oases and the Red Sea Coast, *An. multicolor* in Fayoum Governorate, and *An. superpictus* in Sinai Peninsula. Dahesh and Mostafa (2015) in Fayoum re-evaluated malaria and reported that out of 2044 examined persons returned from the Sudan, 14 (0.68%) were nine *P. falciparum* and five *P. vivax* passive cases. Saleh *et al.* (2016) stated that the imported malaria is a health problem and needs continuous monitoring as many clinicians are not aware and that the fifth zoonotic *P. knowlesi* in Malaysia extended to Europe and America. Abdel-Motagaly *et al.* (2017) reported that the needle-stick malaria was nosocomial infection. Al-Agroudi *et al.* (2018) reviewed 100 malaria patients among UN Peace Keeping Forces returned back to Egypt were from Central Africa, (41), Darfur, (38), DR Congo, (11), Nigeria, (3) Chad (2) and a case from to each of Rwanda, Djibouti, Yemen, Kenya, &/or Tanzania. The species were *P. falciparum* (83), *P. vivax* (10), *P. ovale* (one) and mixed infections (six).

This study aimed to report a UN Pease Keeping Forces male patient returned with malaria accompanied by splenic complications.

Subject and Methods

A male 35 years old Policeman on UN Peace Keeping Mission Forces returning back from Democratic Republic of the Congo, Kinshasa the Capital, who was in the Police Camp from 13th October, 2021 to 29th October 2022 when he returned back to Egypt

with manifestations suggestive malaria. He didn't receive any chemoprophylaxis during his stay, and without any history of medical importance. Patient was presented to the ER with fever, malaise and headache for three days after confirmation.

Vital signs on admission (7/11/2022): 1- Blood pressure 110/70, 2- Heart rate 70bpm, SO_2 96% on room air.

Laboratory examinations on admission: TLC (5.8), HB (10), PLT (12), CR (2), Urea (75), T. bilirubin (7), D. bilirubin (4.6), ALT (82), AST (98), CRP (+ve), and D. dimer (8.2).

Malaria rapid test was positive on admission and blood film showed 7% parasitemia. After malaria rapid test was positive with blood film showed 7% parasitemia hemoglobin 10.9platelet 25, the patient treated as imported malaria case. On the next day blood film showed 7% parasitemia. On 10/11/2022 his ultrasound and tapping showed bloody collection with normal chemistry and cytology, and so, general surgery consultation was requested, who recommended triphasic CT.

On 11/11/2022 triphisic CT then surgery consultation done and recommended abdominal exploration and splenectomy which was done on the same day .the patient received 4 FFPs 4 packed RBCs 30 Units PLTs during admission in Kobry El-Koba Medical Campus (11,12,13/11). This study was conducted in a Military Fever Hospital and a Surgical Department of the Kobry-El-Kobba Military Campus patient who underwent abdominal exploration due to malaria rupture spleen and bleeding between 10 to 20 patients.

A single surgical team performed all the operation, informed consent was given from the patient. All patients underwent a careful history and clinical examination, the pre-operative investigation include – CBC showing Hb% ranged from 5-6g/ml and platelet count 50.000 ml.

Liver function, renal ECG and chest x-ray, HIV, and malaria blood film test were done.

Abdominal U/S indicated splenomegaly, pre-splenetic, splenic infarction, an irregular suture of spleen-pre-splenic pre-hepatic and pelvic free fluid.

Physical examination: The patient looked ill, pallor, fever, tachycardia (p.110/min) and chest and heart examination done.

Abdominal examination: Abdominal rigidity, tender, and rebound tender; there was increase size of spleen by persecution.

Details were given in tables (1 & 2) and figures (1, 2, 3, 4, 5, 6 & 7).

Table 1: Investigations:

Date	7/11	8/11	10/11	11/11	14/11	16/11
HGB	10.6	10	8.6	8	11.1	10.9
PLT	23	12	50	52	239	321
TLC	5	5.8	8.4	7.6	19.6	7.4
parasitemia	7	7	5	5	0	0

Table 2: Imaging on 8/11/2022 showed

CT brain	Normal CT of the brain
CT chest	Bilateral basal consolidation and atalctatic band, GGO suggesting (CORAD-5), Right sided pleural thickening
US	Hepatomegaly 17cm, splenomegaly 13.5cm, pelvic fluid= 580ml ascetic tapping showed bloody collection with normal chemistry and cytology. 11/11/2022 Liver 17.5cm, spleen 14.2cm with 2 ill-defined areas of hypo-echoic lesions at posterior aspect of 6.2 x 5.2cm involved capsule. Moderate ascetics with turbidity at pelvis about 700ml, per hepatic, hepatorenal, linorenal, per splenic area (mild amount). 15/11/2022: Minimal free fluid seen as pelvis, mild per hepatic free fluid noted, & bilateral grade I nephropathy
CT with contrast	Grade II splenic tears, hepatomegaly indicating infection, and moderate turbid ascites. Bilateral pleural elusion with consolidation collapse on left side.

Diagnosis: Patient was diagnosed as malaria complicated with splenic rupture was diagnosed clinically, parasitologically and serologically.

Treatment received was 1- Artesunate 2.5 mg/kg twice for 1 day (7/11) then once for 3 days (8/11, 9/11 & 10/11). 2- Doxycycline 100mg oral twice daily (7/11 & 8/11). 3- Perfelgan vial three times daily. 4- Conterloc 40mg twice daily. 5- Dexamethasone 8mg

once daily. 6- Meronam 1gm IV three times daily started (8/11). 7- Clindamycin 6000mg IV three times daily started (9/11 to 12/11). 8- Doxycycline restarted (13/11). 9- 12units platelets once 8/11. 10- Human albumin 3 times for 2 days (6 doses on days10 &11/11). 11- Quinine Hcl 650mg over 4hr three times daily started (11/11/2022). 12- Solumedrol 1gm vial 11& 12/11/2022. 13-1 unit packed RBCs 11/11/2022

Ethical consideration: The Ethical Committee Rules of Kobry El Kobba Military Medical Campus which agreed with the Ethical Guidelines Declaration of Helsinki (6^{th} Revision, 2008) were adopted before starting the operation. Besides, a written consent was obtained from the patient after explaining all technical facts. General anesthesia was done by the anesthetist. Patient was put in spine position, the abdomen and upper thigh was prepared and draped in the customary fashion. Skin was prepared by antiseptic solution and draped midline "supra umbilical and infer umbilical to right side of umbilicus" abdominal incision was done, lina ulba incision opened (Fig. 1). After opening lineal Alba, peritoneum showed severe bleeding from peritoneal cavity i.e. diagnosed before by US free peritoneal fluid (Fig. 2). Backing was done in four quadrant of abdominal cavity upper right, upper left, lower righted lower left to control bleeding, after controling bleeding intraoperative resuscitation was done by blood transfusion inform of 2 backs of blood (500 ml in each one), 12 units of platelet and 4 unit of plasma (Fig. 3). After controlling bleeding and resuscitation of patients, back was removed one by one until source of bleeding found (Fig. 4).

Spleen was the source of bleeding and splenectomy was done and examination of spleen showed splenomegaly, rupture splenic capsule at lower border, perisplenitis and multiple areas of splenic infarction (Fig. 5). After splenectomy incision abdominal exploration was done, aspiration of free blood in peritoneal cavity and measuring it, it's about 1600 mL of blood free in peritoneal cavity, and washed peritoneal cavity by sterile warm normal saline (Fig.6).

The operation was ended by exploration of abdominal cavity again-insertion of 3 drains; one drain in splenic bed, second one in the pelvic and third one in hepatorenal pouch. The wound was closed in customary fashion, the drain was removed when output about 30 mL serous fluid usually take about 4-5 days postoperative.

Post-operative: The patients was nursed in ICU postoperative and the following was done CBC every days platelet count urine output and output of drain.

Analgesia, antibiotic, blood transfusion 500 mL/day, plasma one unit/day's fluid and anti-malaria drug and patient discharged from surgical hospital at 4 post-operative days to fever hospital for completion anti malaria drugs and follow up.

Drain was removed 3-4 days and the suture 10 to 15days' postoperative urinary catheter and Ryle tube 3 postoperative days.

The patient was routinely followed by physical examination and serological investigated on in out-patient clinic after week up to 6 weeks and will be followed-up every month up to one year after operation.

On 14/11/2022, patient returned back for vital stable and admitted in ICU and received antibiotic and antimalarial drugs serial ultrasound done and serial blood film done.

On 16/11/2022 the two drains are removed by the surgeon, cultures of blood, sputum, and urine was negative.

Discussion

In the present study, the patient acquired malaria infection abroad. The incubation period in most cases varied from 7 to 30 days (CDC, 2022). But, malaria incubation period of *P. vivax, P. ovale* & *P. malariae* can be months, or even years (Ashley *et al,* 2018). Clinically, malaria symptoms are nonspecific and may manifest as a flulike illness with fever, headache, malaise, fatigue, and muscle aches. Some patients with malaria present with diarrhea and other gastrointestinal (GI) symptoms. Immune individuals may be

completely asymptomatic or may present with mild anemia (CDC, 2022). Kotepui *et al.* (2020) reported that although mixed infection was recognized, the prevalence of triple mixed infection was high in Oceania and Europe. This may cause misdiagnosis besides Malaria shares similar symptoms with other febrile diseases such as dengue fever, typhoid fever, common cold, respiratory tract infection, dyspepsia, and pneumonia (Saleh et al, 2019).

Splenic infarction etiology is multifactorial including myelofibrosis, haematologic malignant neoplasms, thromboembolic disease due to atrial fibrillation, rheumatologic disorders, *falciparum* malaria, adult respiratory distress syndrome, rupture of splenic artery aneurysm, septic emboli in infective endocarditis, sickle cell disease and Wegener granulomatosis (Guth and Pachter, 2002). Kumar *et al.* (2010) reported that splenic infarction occurred if a splenic artery or any of its branches that became occluded due to embolus, or thrombosis.

Coche *et al.* (1990) in France stated that splenic infarct during *P. falciparum* malaria was rare but well known. By ultrasonography and computed tomography, they suspected a case that showed splenic parenchyma a peripheral hypoechoic lesion and a low attenuation lesion. Diagnostic was confirmed by spontaneous regression during following days. Bonnard *et al.* (2005) in France reported a Caucasian female patient, which splenic infarction occurred during effective antimalarial treatment for initially uncomplicated acute malaria. They added as well seven younger patients with splenic infarction occurred despite appropriate antimalarial prophylaxis and treatment.

Imbert *et al.* (2010) suggested that acute splenic enlargement, which was likely to be more important in *P. vivax* than in other zoonotic species might be a mechanical risk factor for both splenic infarction and rupture. The relatively higher proportion of *P. vivax* mono-specific or mixed infections in patients with either splenic infarction or splenic rupture supported this hypothesis. Gupta *et al.* (2010) in India reported four acute malaria patients with splenic infarction, two with *P. vivax* infection, one with *P. falciparum* and one with a mixed with both species. They concluded that the left upper quadrant abdominal pain, pleuritic left lower chest pain and/or enlarging tender splenomegaly during treatment, splenic infarct should be managed accordingly to avoid further life-threatening complications. Norman *et al.* (2014) in Spain reported that majority of splenic infarction cases were associated with the autochthonous *P. vivax* infections, whereas cases reported in travellers were mostly due to *P. falciparum* acquired in Africa. Hwang and Lee (2014) in Korea reported two cases of splenic infarction after *Plasmodium vivax* infection. By reviewing PubMed and KoreaMed for reports of malaria-associated splenic infarction from 1960 to 2012, they found 40 cases *Plasmodium* species with splenic infarction. These were 23 involved *P. vivax*, 11 *P. falciparum*, one *P. ovale*, and five a mixed infection of *P. vivax* and *P. falciparum*. Of the 40 cases, 2 involved splenectomy and 5 were accompanied by splenic rupture. Turan *et al.* (2015) in Turkey reported that a Turkish male patient acquired *P. falciparum* malaria when travelled to Angola and successfully treated with quinine, doxycycline, and clindamycin. But, without any complaints, splenomegaly and the splenic infarction were found.

Tripathi *et al.* (2019) in India reported a 13-year-old male child of splenic infarction with acute kidney injury by *P. vivax* malaria, which was managed with intravenous artesunate and oral primaquine. They concluded that pain in left hypochondrium in children with *P. vivax* malaria due to splenic infarction needs to be evaluated for any surgical emergency like rupture or abscess.

Lu *et al.* (2022) in China reported a *P. falciparum* patient who developed abdominal pain, reappearance of fever, elevated D-dimer during treatment, and abdominal CT confirmed splenic infarction. Abdominal pain

was relieved and the fever subsided by analgesic and anticoagulant therapy. Six months later, abdominal CT showed splenic recovery. They concluded that splenic infarction must be considered when a malaria patient suffered from abdominal pain, re-appearance of fever and elevated blood D-dimer during treatment.

Conclusion

Malaria remains one of the major vector-borne life-threatening diseases worldwide, particularly in tropical countries. The imported and sporadic local human cases of malaria with the presence of *Anopleles* vector(s) pave to the risk of sudden epidemics.

Recommendations

Clinicians must be aware that left hypochondrial pain occurring while treating acute malaria may be due to splenic infarction.

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Explanation of figures

Fig. 1: Skin "subcutaneous and lineal alba" incision
Fig. 2: Massive volume of blood coming from peritoneal cavity.
Fig. 3: Backing of 4 quadrant of abdominal cavity.
Fig. 4: Removal of back.
Fig. 5: Spleen showing "multiple infarct area, capsular tear, splenomegaly, perisplenitis.
Fig. 6: Volume of blood aspirated from peritoneal cavity.
Fig. 7: Patient after wound closure