Plasmodium falciparum Malaria Retinitis; A Case Study at the Armed Forces Hospital, Jazan

Mohammed Al Jurebi[1], Ahmed Behiry[2,3], Osama Attia[4,5],Salah Alharbi[6]
[1]*Brigadier General, Consultant Ophthalmologist; Armed Forces Hospital, Jazan,KSA.*
[2]*Consultant Medicine and Infectious diseases; Armed Forces Hospital, Jazan,KSA.*
[3]*Assistant professor; Tropical medicine, Zagazig Faculty of Medicine –Egypt.*
[4]*Consultant Internal Medicine; Armed Forces Hospital, Jazan,KSA.*
[5]*Lecturer; Internal Medicine, Zagazig Faculty of Medicine-Egypt.*
[6]*Laboratory Specialist; Armed Forces Hospital, Jazan,KSA.*

Corresponding Author
Ahmed Behiry
Mobile:+966543139847

E mail:ahmedbihery@hotmail.com

Key words: Plasmodium falciparum ;Malaria; retinitis

Receive date:20/10/2023

Revise date:20/10/2023

Accept day:5/11/2023

Publish date:7/11/2023

Malaria, is one of the most common life threatening infectious diseases, it is still a major public health problem worldwide, especially in the tropical and subtropical areas. According to the World Health Organization) about 229 million new malaria cases were documented in 2019 and over 3.4 billion people are at risk of infection. About 94% of the malaria cases were reported in the WHO African Region (AFR), while 3.0 and 2.2% of the cases were recorded in the Southeast Asia Region and Eastern Mediterranean Region, respectively **[1]**.

In Kingdom of Saudi Arabia, the national malaria control program, which was started in 1948, has achieved a great reduction in the number of malaria cases, and malaria is now restricted to the south-western areas, which includes the Aseer and Jazan regions. Malaria cases increased again after 2014, with 5,382 malaria cases reported in 2016 most of the cases are *Plasmodium falciparum* **[2,3]**.

A cross sectional study was carried out from April 2018 to January 2019 and another retrospective study during the period of 2010–2017 the association of climatic changes especially in the rainy times with the monthly reported malaria cases was retrospectively analysed in Jazan , showed that the results of Frequency and distribution of malaria cases at Jazan area (A total of 1124 febrile subjects were found to be positive for malaria: 1060 (94.3%) were infected with *P. falciparum* and 5.7% (64/1124) had *P. vivax*) **[4]**.

Cerebral malaria is a neurological complication of Malaria, caused by plasmodium falciparum. Ophthalmological lesions have been described in this condition and some retinal lesions are specific to it. They gave rise to the malarial retinopathy, which was mainly described in paediatrics, with severe out-come **[5]**. The reported cases in adults are very little, so it may need a more focus on it.

The evidence for including the assessment for malaria retinopathy in the diagnosis of cerebral malaria is strong. Including the signs of malaria retinopathy as retinal angiography and histopathological data in the definition of cerebral malaria in African children strongly benefits other patients; also it will lead to useful information and clinical case definition for malaria retinopathy associated with the P. falciparum **[6]**.

Case study:

A previously healthy 27-year-old male military soldier presented at The Emergency Room of The Armed Forces Hospital in Jazan with a 3-day – history of cyclic fever associated with chills, rigors, headache and blurred vision. One week earlier, before the onset of his symptoms , he mentioned that he was working in a near-by area in Jazan ,which is known to be endemic in malaria, and The

patient had been in his usual state of health until 3 days before this admission, when fever and rigors were noticed .Also, he noticed darkening of the urine colour. On further discussion, he reported being bitten by a lot of mosquitos. He did not report dyspnoea, chest pain, or cough. He had no GIT symptoms, he had no motor or sensory deficits, and denied any fits or loss of consciousness. The patient denied any bleeding orifices or skin rash. The patient did not smoke tobacco, use illicit drugs, or drink alcohol.

The patient was admitted to The Internal Medicine Department. On examination, He was fully conscious and oriented to time, place and persons. His vitals showed that the temperature 39.1 °C, the blood pressure 115/ 68 mm Hg, the pulse 112 beats per minute, the respiratory rate 22 breaths per minute, and the oxygen saturation 98 % in the room air. He started to develop blurred vision and feeling difficulty with colours, his CNS examination was unremarkable with normal cranial nerves examination , normal gait with no sensory or motor deficits in all limbs , pupils were equal, round, and reactive to light, and the neck was supple. His chest examination showed no crackles or wheezes. The heart sounds were regular, with no murmur. Abdominal examination was soft and lax on palpation with no organomegaly and no oedema in the lower limbs. There was no cervical, axillary, inguinal lymphadenopathy or skin rash.

A full laboratory work-up was requested and the results showed that the haemoglobin level was 10.5 g per decilitre, the mean corpuscular volume 94 fl, and the platelet count 62,000 per cubic millimetre. The WBC was 3.2 per cubic millimetre, with normal differential. The creatinine level 74 µmol per litre, the albumin level 3.8 g per decilitre, the total protein level 7.5 g per decilitre. Liver profile showed mild elevate aminotransferases with ALT 88 and AST 70. The prothrombin time of 18.6 , INR 1.5, partial thromboplastin time 43, and The LDH was 287 U per litre (normal value, 120 to 242), and the haptoglobin level was less than 10 mg per decilitre (normal value, 30 to 200). The reticulocyte production index was 1.3, and the direct Coombs test was negative. The peripheral blood smear revealed a *Plasmodium falciparum* microgametocyte using Giemsa stain with parasitemia level of 6 %.

Patient was started on Artesunate intravenous injections at a dose of 2.4 mg/kg given at 0, 12, and 24 hours and then once daily for a total of 7 days. Also he was given 3 tablets of Fansidar (sulfadoxine 500 mg –pyrimethamine 25 mg) as stat dose on the first day of admission as per The Saudi Ministry of Health guidelines.

The ophthalmology team was consulted: And on examination there was a decrease in acuity of vision of both eyes (right eye (6/60) and left eye (6/12), with marked impairment in his Colour vision of the red-green deficiency of 3/21 with Ishihara score for colour vision [7]. Fundus examination showed pigmented para-venous chorioretinitis, macular whitening and black pigmentation on the retinal vessels mainly at the periphery.

His ophthalmological examination records 1 year earlier during his annual check-up was normal with acuity of the right eye (6 / 6) and the left eye (6 / 6), with intact colour vision and normal fundus examination .

Based on that, the patient was diagnosed as severe *Falciparum malaria* with malaria retinitis, which is considered type of cerebral malaria.

During patient's hospital stay, the patient reported improvement of his symptoms with resolution of fever and rigors. However, he still complained of blurred vision. Laboratory follow-up was done daily and showed improvement and laboratory results. On the day 7 his laboratory results showed that blood film for malaria was negative and his routine laboratory results showed that the haemoglobin level was 11.7 g per decilitre, , and the platelet count 220 ,000 per cubic millimetre. The WBC was 7.2 per cubic millimetre, with normal differential. The creatinine level 68 µmol per litre. Liver profile showed normal aminotransferases with ALT 32 and AST 20. The prothrombin time of 11.6, and INR 1.1. So, the patient was discharged from the hospital and was scheduled for a follow-up with the ID OPD as well as the ophthalmology OPD after 2 weeks.

Fundus fluorescein angiography during admission showed that there was Central retinal whitening with no cotton wool spots .there was no Obstruction of microcirculatory blood flow with normal perfusion of retinal blood flow, as shown in (figures 1 and 2) for the right eye and (figures 3 and 4) for the left eye.

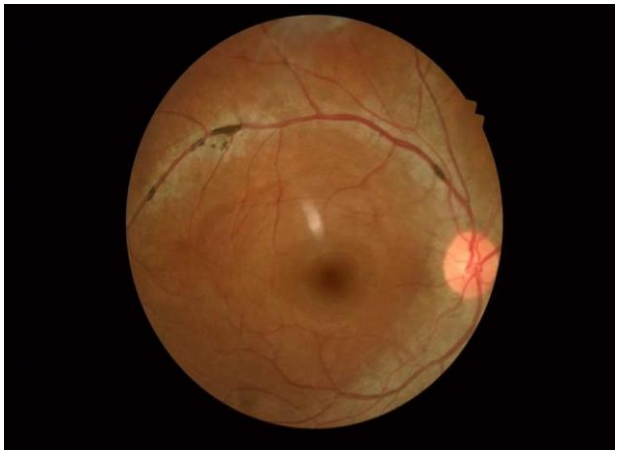


Figure 1: Right eye showed multiple small zones of vessel discoloration of pigmented Para-venous retino-choroiditis more at the periphery than central, but no hemorrhages nor papilledema.

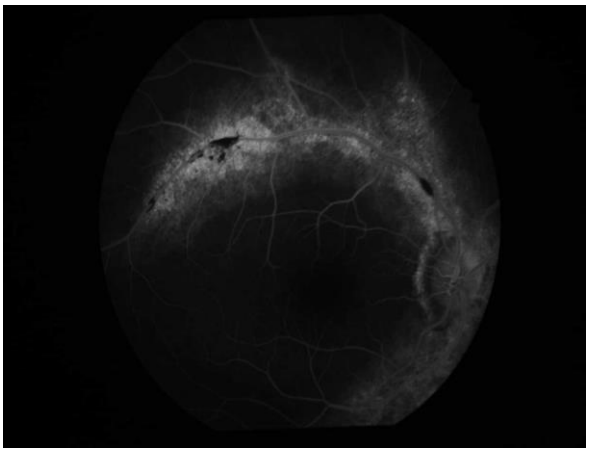


Figure 2: Right eye showed that there was leakage along upper and lower retinal blood venous

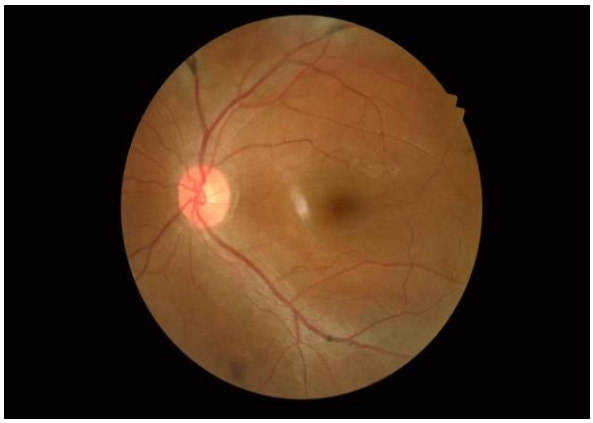


Figure 3: Left eye showed multiple small zones of vessel discoloration of pigmented Para-venous retino-choroiditis more at the periphery than central, but no hemorrhages nor papilledema.

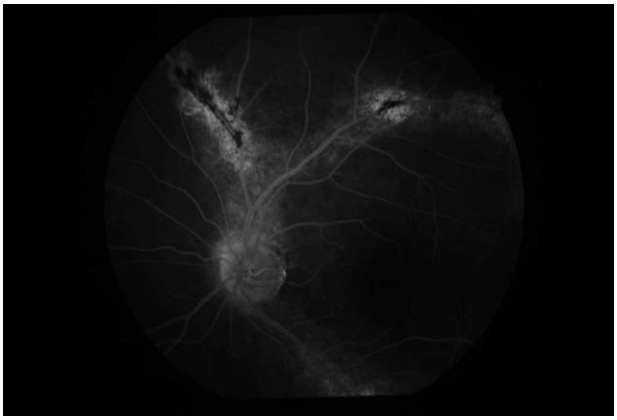
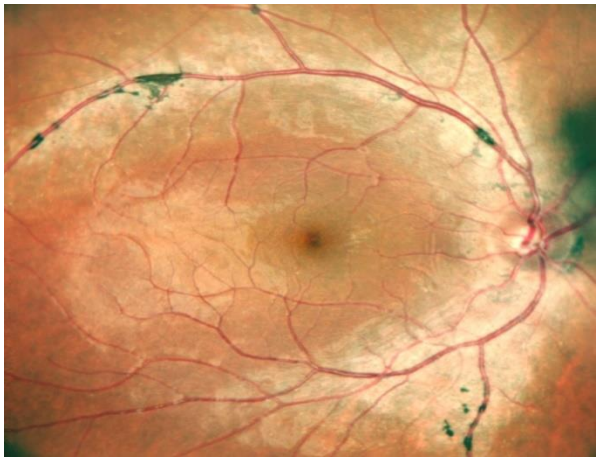
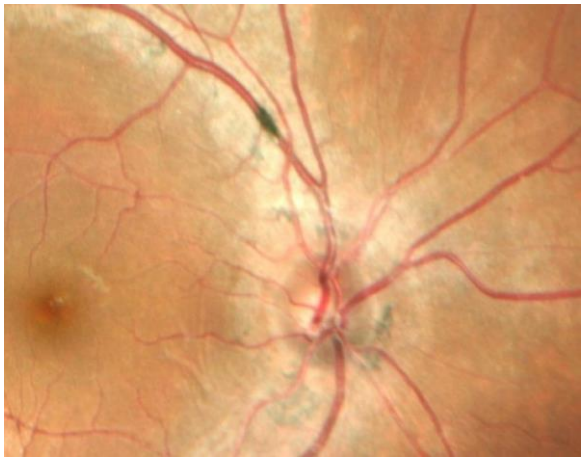


Figure 4: Showed left eye with fluorescein leakage from the upper temporal and nasal retinal veins.

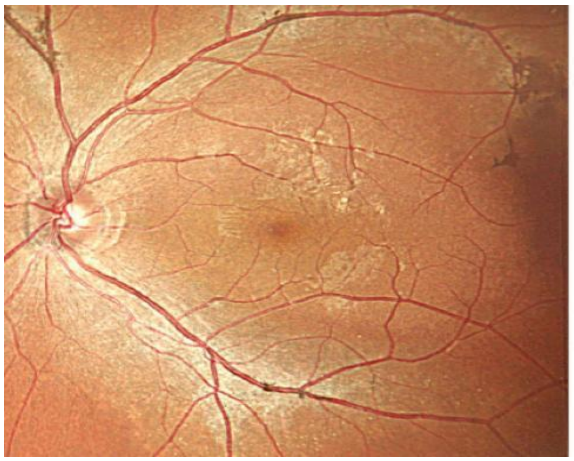
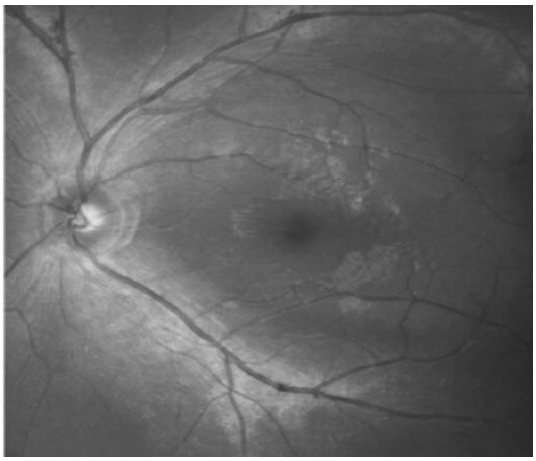
Two weeks later, patient came to the Infectious disease clinic follow-up, and showed that he was clinically stable, his laboratory work-up showed negative blood film for malaria and his other routine laboratory investigations were within normal. The patient was also on a regular follow-up at the ophthalmology clinic and he was improving.

At 12 months, The patient full ophthalmology examination showed improvement of his vision of 6/6 in the right eye and 6/6 in the left eye, and his colour vision also showed marked improvement of red-green to 18/21 with Ishihara score for colour testing **[7]**.

Fundus fluorescein angiography was done at 12 months, and showed the same malaria pigments along the blood vessels, but there was improvement of macular whitening with complete resolution. The patient retina photos at that visit at 12months are shown in figures 5, 6, 7 and 8) respectively.

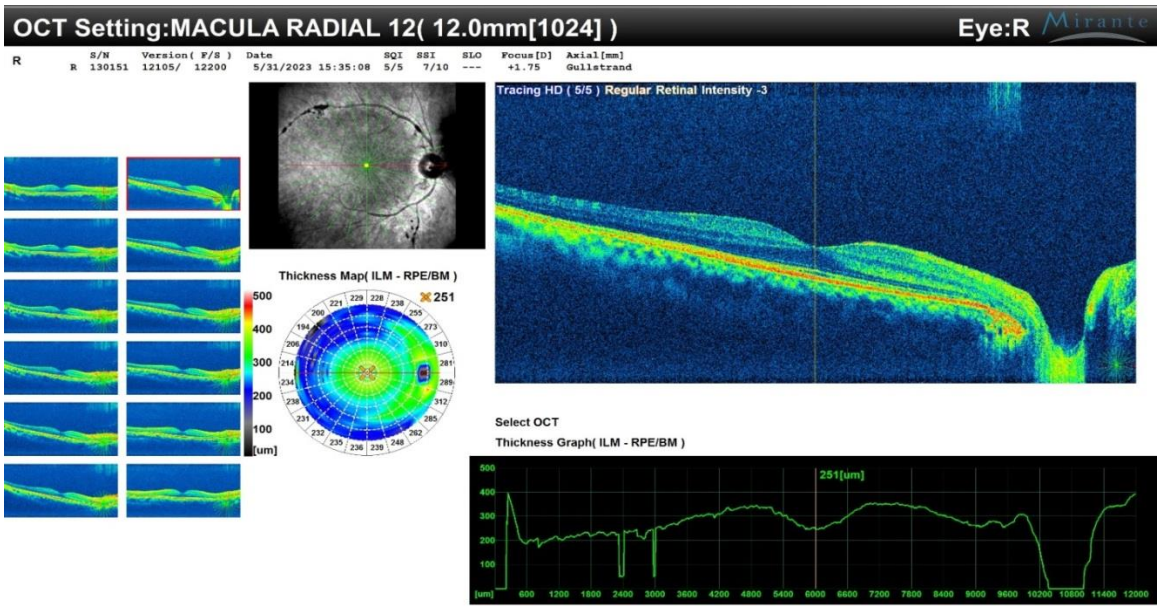



Figures 5 and 6 for the right eye after 12 months showed: Multiple small zones of vessel pigmented discoloration of Para-venous vessels more peripheral than center, also no leakage along retinal blood vessels.

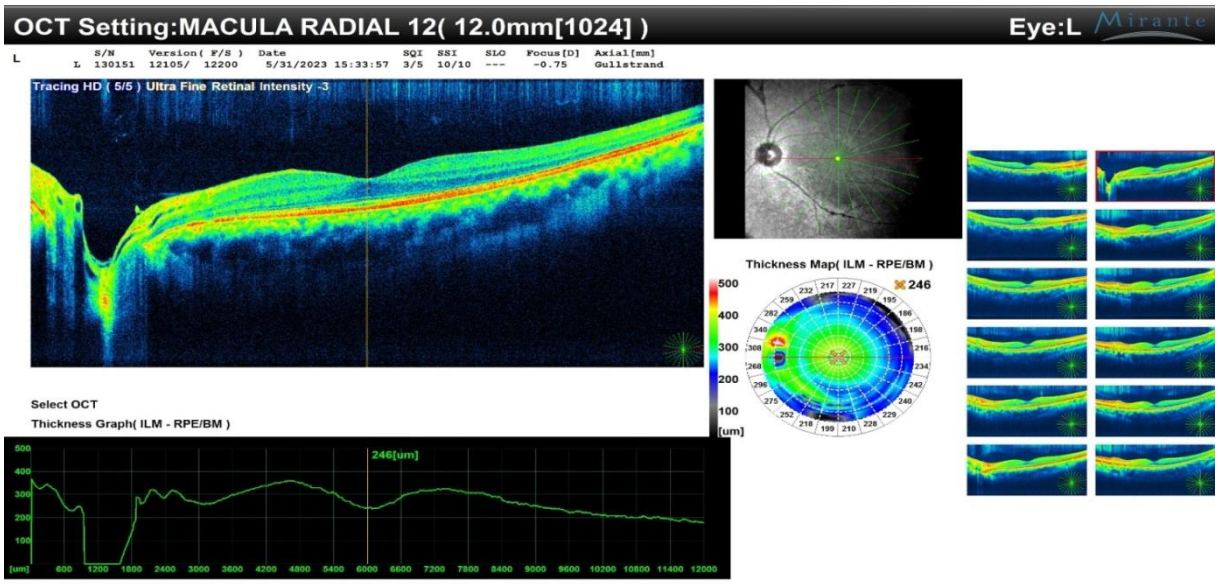



Figures 7 and 8 for the left eye after 12 months showed: Multiple small zones of vessel pigmented discoloration of Para-venous vessels in peripheral, with no leakage.

After 12 months, OCT MACULA was done and was normal as shown in figures 9 and 10 below in figures 9 and 10:



Figures 9: Right eye OCT (optic coherence tomography) for macula was normal.



Figures 10: Left eye OCT (optic coherence tomography) for macula was normal.

Conclusion

Prober and on time management of *Falciparum Malaria* can save eyes and lead to complete resolution of visual acuity and colour vision.

Ethical consideration: All the information gathered from the patients was handled confidentially, and it was used only for research purpose.

REFERENCES

1- WHO. World malaria report 2020. Geneva: World Health Organization; 2020. https://www.who.int/publications/i/item/9789240015791. Accessed 15 Dec 2020.

2- Silliman RH, Garcia-Aranda P, Elzagawy SM, Hussein BE, Mayah WW, Martin Ramirez A, et al. Imported and autochthonous malaria in West Saudi Arabia: results from a reference hospital. *Malar J*. 2018; 17:286.

3- Ministry of Health. National Malaria Drug Policy. Riyadh: Ministry of Health, 2018. https://www.moh.gov.sa/Ministry/About/Health%20Policies/029.pdf. Accessed 10 Nov 2020.

4- Hesham M. Al-Mekhlafi, Aymen M. Madkhali, Khalid Y. Ghailan, Ahmed A. Abdulhaq .Residual malaria in Jazan region, southwestern Saudi Arabia: the situation, challenges and climatic drivers of autochthonous malaria**.** *Malaria Journal***;** 20: 315 (2021).

5- Chiabi A, Bolaji Obadeyi, Nguefack S, Zafack J, et al. Seizures in severe malaria: is there direct brain involvement? *Open Area Studies J.*

6- Beare NA, Lewallen S, Taylor TE, Molyneux ME. Redefining cerebral malaria by including malaria retinopathy. *Future Microbiol*. 2011 Mar;6(3):349-55.

7- Ishihara S, Ishihara's test for colour - Blindness Kanehara and Co., LTD, 1982.