

A RARE CASE OF PLASMODIUM FALCIPARUM MALARIA PRESENTING AS SENSORINEURAL HEARING LOSS AND PERSISTENCE OF TROPHOZOITES IN MARROW

Priyadarshini Peram, Vijay Kumar A, Kiranmayi Munagala P, Jyothirmayi and Purushotham B

Department of Medicine, Andhra Medical College, Visakhapatnam 530002

ARTICLE INFO

Article History:

Received 6th July, 2019

Received in revised form 15th

August, 2019

Accepted 12th September, 2019

Published online 28th October, 2019

Key words:

Sensorineural hearing loss, bone marrow, Pyrexia of Unknown Origin, Pancytopenia

ABSTRACT

Malaria is a protozoan disease caused by any of the six species of genus Plasmodium. Sensorineural-hearing loss (SNHL) caused by a variety of anti-malarial has been well-publicized; however, the effect of the malarial parasite itself on hearing is poorly documented, and most evidence is anecdotal. Because of the high prevalence of malaria in tropical countries, even a small number of cases causing SNHL, if goes unnoticed, may show a significant effect on children's education. Persistence of malarial trophozoites in bone marrow can be a cause of Continued fever despite antimalarial therapy and may need prolonged course of treatment.

Copyright©2019 Priyadarshini Peram et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

A 24-year-old male patient with chief complaints of fever with chills and rigors for seven days, associated with vomiting, diarrhea, and abdominal pain, was referred to KGH because of fever with thrombocytopenia after eight units of platelet transfusion. On 2nd day of his hospital stay, we noticed new-onset hearing loss, and he was referred to government ENT hospital and was found to have SNHL. Later he came to be Plasmodium falciparum positive and a course of artesunate given for five days. The patient still had persisted fever, and a bone marrow examination planned because of pancytopenia, which showed persistent trophozoites(Fig. 1&2) in marrow.

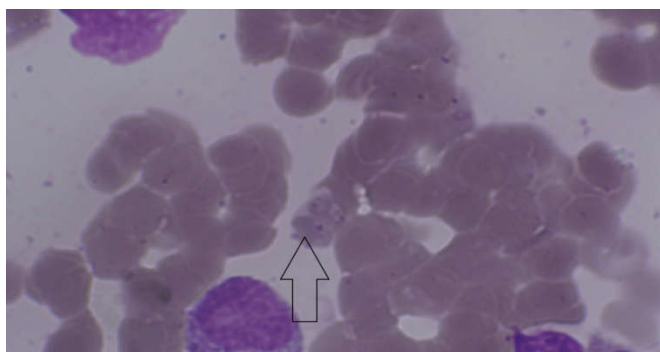


Fig 1

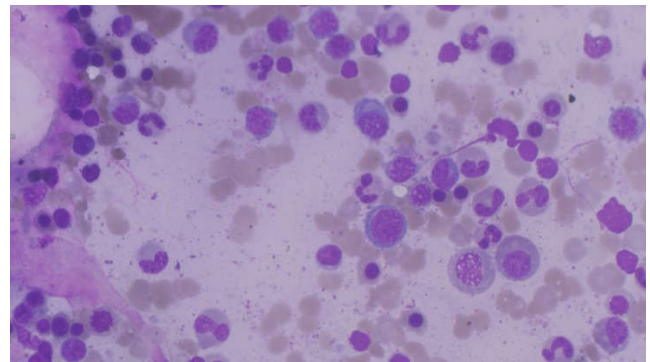


Fig 2

Due to ototoxicity of other antimalarials, Artesunate administered for another five-days. Improvement of hearing loss and fever control achieved.

MATERIALS AND METHODS

A case reported at King George Hospital Visakhapatnam

RESULT

After investigating routine causes for fever and SNHL which were negative bone marrow aspiration was done and detected malaria parasite, another course of antimalarials given, and patients recovered from fever and Hearing loss reversed.

DISCUSSION

Malaria is a most important parasitic disease caused by Plasmodium transmitted by Anopheles mosquito over 106 countries containing 3 billion population causing approximately 2000 deaths each day. And high mortality and

*Corresponding author: **Priyadarshini Peram**
Department of Medicine, Andhra Medical College,
Visakhapatnam 530002

morbidity in children. (1) It is a widespread cause of fever in tropical countries but the initial symptoms may be nonspecific, lack of sense of well being, fatigue, abdominal discomfort. Myalgia, arthralgia, nausea vomiting, orthostatic hypotension, severe headache but without neck stiffness and photophobia classic malarial paroxysms, in which fever spikes, chills, and rigors occur at regular intervals, are relatively unusual and suggest infection with *P. Vivax* or *P. Ovale*.

Symptoms and signs may vary depending upon the involvement of organs. Anemia, leucopenia, thrombocytopenia, hemoglobinuria, jaundice, acidosis, hypoglycemia, hypotension, shock, acute renal failure, acute tubular necrosis, Adult Respiratory Distress Syndrome, convulsions and coma. Hypercoagulable state, coagulation failure, Disseminated intravascular coagulation also observed.(2) Visual defects due to retinopathy, severe neurocognitive impairment other neurological manifestations observed during follow up visits of complicated cases,(3) especially in children recovered from cerebral malaria.(4) Minor bleeds with central vascular necrotic foci in brain parenchyma observed.(5)

Cases of Sensorineural Hearing loss found either unilateral or bilateral in cerebral malaria cases, cause uncertain(6) recovered with prednisolone(7) but mostly associated with cerebral malaria in children.(8) Persistent Cochlear malfunctions observed even after 4 years in severe malaria hospitalized pediatric cases.(9)

Antimalarial drugs can cause hearing loss. Quinine causes high tone auditory defects (10) mostly associated with tinnitus and reversible after completion of course.(11)(12) High-frequency hearing loss and tinnitus observed with Mefloquine. (13)17. In vitro, animal, and human clinical studies supported neurotoxicity of artemisinins, but In vitro data suggests it may require 14 days of exposure.(14) Hearing defects not noticed with artemether-lumefantrine.(15) Hearing loss found with otoacoustic emissions combined with automatic auditory brainstem response in newborns born to mother with *Vivax* infections and who used Chloroquine in the first quarter of gestation.(16) recommend the importance of hearing evaluation in malaria cases.(17) It is very rare to manifest hearing deficit with malaria infection without cerebral malaria or convulsions or headache.(18)

Bone marrow examination is an essential diagnostic tool for PUO.(19) Bone marrow is the preferential site for the localization and maturation of gametocytes stages of *Plasmodium falciparum*(20) and for erythrocytic stages of *vivax* causing relapses and difficulty in eradication in human. (21)Frequent relapse may be due to parasites in splenic dendritic cells, other cells in the spleen (in addition to infected erythrocytes there), bone marrow (importantly), and the skin.(22) In some cases direct destruction of RBC by parasite and hypersplenism causes anemia in which there is compensatory bone marrow hyperplasia. Some cases may show pancytopenia with marrow hypoplasia due to parasite infestation leading to a new aspect of pathogenesis.(23) Few cases reported with microbiologically demonstrated parasites in bone marrow.(24)

CONCLUSION

Though Fever is the most common presentation Malaria has many Different presentations causing significant mortality, morbidity & delay in diagnosis. Sensorineural Hearing Loss is the rare presentation mostly associated with encephalopathy and fever and sometimes as an initial presentation. This case shows that SNHL may follow fever even without encephalopathy. And in a few cases, malaria parasite may be detected in bone marrow, even the peripheral smear is normal. Hence in endemic areas in suspected malaria cases with diagnosis uncertainty, bone marrow aspiration may be needed to demonstrate of parasite. And SNHL may occur before or during the fever, which is reversible with treatment, and some cases may need a prolonged course of treatment.

References

1. Nicholas J.White, Elizabeth A.Ashley.Harrisons Principles of Internal Medicine.20th edn.India.Mc Graw Hill Publication.2018.p1578-1581.
2. Ghosh K, Shetty S. Blood coagulation in falciparum malaria--a review. Parasitol Res. 2008 Mar;102(4):571-6. Epub 2007 Dec 8.
3. Inkaya C.KayaF,Yildiz I *et al*. Plasmodium falciparum malaria: evaluation of three imported cases. Article in Turkish. Mikrobiyol Bul.2016Apr;50(2);328-32
4. Idro R, Kakooza-Mwesige A, Balyejjussa S *et al* Severe neurological sequelae and behaviour problems after cerebral malaria in Ugandan children. BMC Res Notes. 2010 Apr 16;3:104. doi: 10.1186/1756-0500-3-104.
5. Yağmur G¹, Gürler AS, Karayel F *et al*. An Autopsy Case of Sudden Death Caused by Cerebral Malaria Infection. Article in Turkish. Turkiye Parazitoloj Derg. 2015 Sep;39(3):234-7. doi: 10.5152/tpd.2015.3700.
6. Chukuezi A. Hearing loss: a possible consequence of malaria. Afr Health. 1995 Sep;17(6):18-9.
7. Tada T, Hitani A, Honda NH *et al*. A case of falciparum malaria: Acute hearing loss as the initial symptom. J Infect Chemother. 2017 Jan;23(1):56-58. doi: 10.1016/j.jiac.2016.07.016. Epub 2016 Aug 28
8. Zhao SZ¹, Mackenzie IJ. Deafness: malaria as a forgotten cause. 7 Ann Trop Paediatr. 2011;31(1):1-10. doi: 10.1179/146532811X12925735813724.
9. Reiterer E, Reider S, Lackner P *et al* A long-term follow-up study on otoacoustic emissions testing in paediatric patients with severe malaria in Gabon. Malar J. 2019 Jun 24;18(1):212. doi: 10.1186/s12936-019-2840-9.
10. Roche RJ, Silamut K, Pukrittayakamee S. Quinine induces reversible high-tone hearing loss. Br J Clin Pharmacol. 1990 Jun;29(6):780-2.
11. Nielsen-Abbring FW¹, Perenboom RM, van der Hulst RJ. Quinine-induced hearing loss. ORL J Otorhinolaryngol Relat Spec. 1990;52(1):65-8.
12. Claessen FA, van Boxtel CJ, Perenboom RM *et al*. Quinine pharmacokinetics: ototoxic and cardiotoxic effects in healthy Caucasian subjects and in patients with falciparum malaria. Trop Med Int Health. 1998 Jun;3(6):482-9.

13. Fusetti M, Eibenstein A, Corridore V. *et al.* Mefloquine and ototoxicity: a report of 3 cases. Article in Italian. Clin Ter. 1999 Sep-Oct;150(5):379-82.
14. Toovey S. Are currently deployed artemisinins neurotoxic?. Toxicol Lett. 2006 Oct 10; 166(2):95-104. Epub 2006 Jun 7
15. Toovey S. Comment on: no hearing loss associated with the use of artemether-lumefantrine to treat experimental human malaria.. Trans R Soc Trop Med Hyg. 2007 Mar;101(3):314-5; author reply 315-6. Epub 2006 Oct 24.
16. Roche RJ, Silamut K, Pukrittayakamee S. Quinine induces reversible high-tone hearing loss. Br J Clin Pharmacol. 1990 Jun;29(6):780-2.
17. Fusetti M, Eibenstein A, Corridore V. *et al.* Mefloquine and ototoxicity: a report of 3 cases. Article in Italian. Clin Ter. 1999 Sep-Oct;150(5):379-82.
18. Zhao SZ¹, Mackenzie IJ. Deafness: malaria as a forgotten cause. 7 Ann Trop Paediatr. 2011;31(1):1-10. doi: 10.1179/146532811X12925735813724.
19. Kumar V, Bhatia A, Madaan GB *et al.* Role of Bone Marrow Examination in the Evaluation of Infections: Clinico-Hematological Analysis in a Tertiary Care Centre. Turk Patoloji Derg. 2019 Jul 31. doi: 10.5146/tjpath.2019.01466.
20. Alano P. The emerging role of the human bone marrow as a privileged developmental niche for the transmission stages of the malaria parasite Plasmodium falciparum. Commentary. Ann Ist Super Sanita. 2017 Apr-Jun;53(2):96-99. doi: 10.4415/ANN_17_02_03
21. Markus MB. Malaria Eradication and the Hidden Parasite Reservoir. Trends Parasitol. 2017 Jul;33(7):492-495. doi: 10.1016/j.pt.2017.03.002. Epub 2017 Mar 30.
22. Markus MB. Biological concepts in recurrent Plasmodium vivax malaria. Parasitology. 2018 Nov; 145(13):1765-1771. doi: 10.1017/S003118201800032X. Epub 2018 Mar 22.
23. Yamakawa H, Kiyotaki M, Hattori Y. A case of Plasmodium vivax malaria complicated with pancytopenia due to hypoplasia of the bone marrow. Kansenshogaku Zasshi. 1989 Sep;63(9):1043-6
24. Farfour E, Charlotte F, Settegrana C *et al.* The extravascular compartment of the bone marrow: a niche for Plasmodium falciparum gametocyte maturation?. Malar J. 2012 Aug 20; 11:285. doi: 10.1186/1475-2875-11-285

How to cite this article:

Priyadarshini Peram *et al* (2019) 'A Rare Case of Plasmodium Falciparum Malaria Presenting As Sensorineural Hearing Loss And Persistence of Trophozoites in Marrow', *International Journal of Current Advanced Research*, 08(10), pp. 20310-20312. DOI: <http://dx.doi.org/10.24327/ijcar.2019.20312.3964>
