JMSCR Vol||12||Issue||04||Page 01-04||April 2024

http://jmscr.igmpublication.org/home/
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v12i04.01

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Plasmodium Ovale Malaria-A Case Report from Tertiary Care Centre Central Kerala

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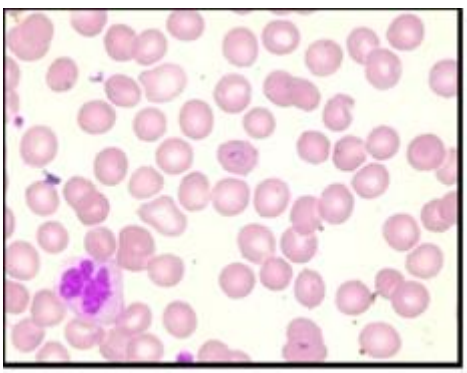
Abstract
Background: *According to World Malaria Report 2019, 3% of the global malaria cases are reported from India. Most cases of malaria in India are due to infestation by Plasmodium falciparum (65%) and Plasmodium vivax (35%). Only a few thousand cases of Plasmodium malariae has been reported from foothill areas in Orissa. Malaria due to Plasmodium ovale is not very common in India and till date only 9 cases have been reported. We are reporting a case of P. ovale malaria which was diagnosed and treated at Government Medical College, Thrissur, Kerala, in a patient who had returned from Uganda. Diagnosis was made with the specific morphological features of these parasites like oval shape of parasitised RBCs, fimbriation of RBCs and very prominent shuffners dots.*
Interpretation & Conclusion: *This is the first case of Pl. ovale reported from central Kerala. This case of plasmodium ovale malaria could be an isolated imported case and there are no reported cases of local transmission so far following detection of this case.*
Keywords: *Malaria, Plasmodium ovale, fimbriation.*

Introduction

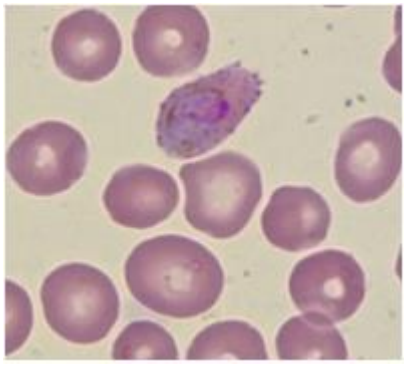
32yr old software engineer working at Bengaluru came to our Outpatient department at Government Medical college Thrissur with history of fever, myalgia, headache and abdominal pain for 5days.Fever was intermittent high grade with chills and rigor. Patient gave a history of recent visit to Uganda. On examination temperature was 104^0F. There was no jaundice, lymphadenopathy, cyanosis or pallor. Examination of abdomen showed hepatosplenomegaly. Routine blood investigations showed thrombocytopenia of 68000/cumm and normal Hb, TC, LFT, RFT, electrolytes, PT, APTT and INR. Urine examination were within normal limits. Serological tests for Dengue (NS1, IgM antibodies) and IgM antibody for Chikungunya were negative. With the history of intermittent high-grade fever with chills and rigor and history of travel outside Kerala and outside India there

was a strong suspicion of Malaria. A peripheral smear examination was done to rule out/diagnose Malaria and also for other causes of thrombocytopenia and fever. Automated haematology Analyzer showed scattergram abnormalities including merging and greying of neutrophils, eosinophil clusters, prominent blue coloured events below neutrophils due to RBC ghosts.[1]

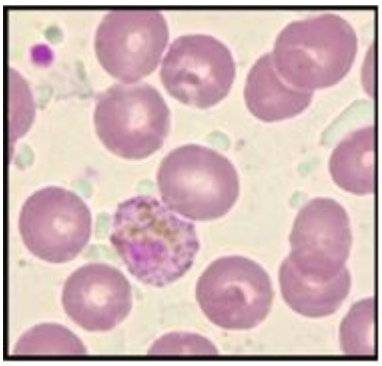
Thin smears, thick smears and buffy coat smears were prepared and stained with Leishman stain. Thick smears showed malarial parasites morphology of which was similar to P. vivax. Thin smears showed normocytic normochromic blood picture with neutrophil predominance, few reactive lymphocytes and thrombocytopenia. Malarial parasites were seen in different stages of maturation including early trophozoites, late trophozoites, schizonts and gametocytes. Examination of thin smears revealed the morphology of these parasites as that of P. ovale on the basis of peculiar morphology and changes in parasitized RBCs[2]. Infected RBCs were enlarged, oval in shape many of them showed surface fimbriations and prominent Schuffners stippling. Schizonts were seen in thick smears and buffy coat smears which were oval in shape with multiple nuclei and thick clumps of malarial pigment. Gametocytes were round to oval in shape almost filling the RBC with fimbriation. Pigment was brown and more coarse than seen in vivax. Malaria Pf/Pv bivalent Antibody Rapid Test was negative.



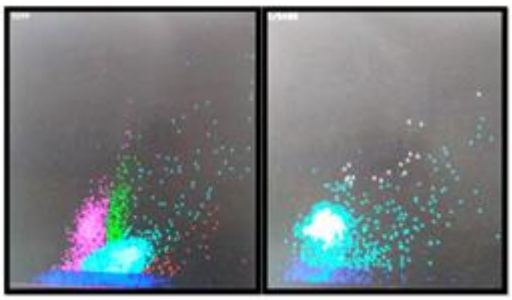
A Early trophozoite of P. ovale



B Late trophozoite with surface fimbriation of RBC and prominent Schuffners dots



C Gametocytes of P. ovale



D Scattergram showing RBC ghosts below neutrophils

Discussion

According to the latest World Malaria report there were 241 million cases of malaria globally in 2021 compared to 227 million cases in 2019.In India there were over a million reported cases of malaria in 2015.In 2019 the number reduced to around 338.5 thousand cases. As of June 2020, the numbers have been significantly low with approximately only 62 thousand cases[3].Most common species of malaria in India are P. falciparum and P. vivax. P. ovale is endemic to tropical Western Africa, it has also been detected in Philippines, Indonesia and Papua New Guinea.

Plasmodium ovale is very rare in India and till date only 9 case reports are available in the literature.[4] Rini Chaturvedi, Nimita Deora etal collated 9 reports for Plasmodium ovale infections from 1930 to 2020.[4] First case of Plasmodium ovale mono infection was reported from Delhi in 1977.[4] Three mixed infections due to Plasmodium ovale and Plasmodium falciparum were reported in 1988 from Koraput district, Odisha. Between 2000 and 2009 monoinfections were also reported from Assam and Gujarat.Mixed infection due to Plasmodium ovale and Plasmodium falciparum has been also reported from Jharkhand, Madhya Pradesh and Odisha between 2010and 2015[4]. Case reported from Johart district Assam in 2002 was in a 28 yr old male who visited Naga hills in Myanmar bordering Nagaland state, Myanmar being an endemic area for ovale malaria[5]. Recent molecular studies indicate that plasmodium ovale malaria is caused by two closely related species Plasmodium ovale curtisi and Plasmodium wallikeri. Plasmodium ovale sympatric infection have been reported from Bastar (Chhattisgarh) in a case of cerebral malaria due to mixed infection with Pf, Pv and Po[6].

This is the first case of plasmodium ovale reported from Kerala. Diagnosis was made with the morphological features of the parasites seen in thin smears. In thick smears morphology was similar to that of Plasmodium vivax. In view of patient's recent visit to East African country, Uganda we searched for P ovale malaria which is endemic in Africa. The bivalent rapid antigen kit available in our laboratory specific for Pf and Pv was negative. Even though this rapid test is 100% sensitive to Pf and Pv a negative test does not rule out the possibility of infection with P. oval and P. malariae. Automated haematology analyser showed few abnormalities in WBC-DIFF scattergram like prominent blue-colored events below neutrophil clusters due to RBC ghosts. These abnormalities which helped in the presumptive diagnosis were confirmed by peripheral smear examination[1]which is the gold standard for malaria diagnosis. Plasmodium ovale species generally produce low parasitaemia and are known to cause relapses and sometimes causes renal complications.[7] Plasmodium ovale and vivax shares similar tertian periodicity and both can cause relapse in patients without radical treatment. Treatment plan recommended by Govt of India for P. ovale is same as for Plasmodium vivax as both species tend to have hypnozoites in liver. Patient was treated with chloroquine 500mg for 3 days, primaquine15mg for 15 days and injection Artesunate 120mg. Follow-up smears showed decreased parasite load and patient became symptomatically better and was discharged. None of the family members and contact persons developed fever. This case of plasmodium ovale malaria could be an isolated imported case and there are no reported cases of local transmission so far following detection of this case.

Conclusion

Malaria Microscopists and Epidemiologist should be alert to the possibility of finding P. ovale in the routine peripheral smear examination in patients coming from endemic areas. Scattergram changes and negative rapid detection cards tests should alert the pathologists to search for the unusual forms of malaria and for mixed infections in non-endemic areas also. Species specific diagnosis is mandatory for appropriate treatment, better control of Malaria and to prevent multiple relapses and drug resistance. Ascertaining the nature of transmission whether it is local or imported is also important in malaria elimination programmes .Increased international travel increases the risk of parasite transmission between endemic and non-endemic countries and can introduce rare species of malaria to non-endemic areas. It is very important to investigate thoroughly all cases of imported malaria including conducting molecular studies in each case and to take necessary measures to prevent introduction of new species of malaria which are non-endemic to our country.

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