Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2015; 3(2D):783-788 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublisher.com

Research Article

Study of Malaria Complicating Pregnancy: Our Experience

K. S. Raja Kumari[1], Nandini[2*], Jambanna Gowda[3]

[1]Associate Professor, OBG Department, Raichur Institute of Medical sciences, Raichur, Karnataka, RGUHS, Bangalore, India

[2]Assistant Professor, OBG department, RaichurIinstitute of Medical sciences, Raichur, Karnataka, RGUHS, Bangalore, India

[3]Junior Resident, OBG department, Raichur Institute of Medical sciences, Raichur, Karnataka, RGUHS, Bangalore, India

***Corresponding author**
Nandini
Email: selmanandini@gmail.com

Abstract: Malaria in pregnancy entails a grave risk to the mother and fetus. Currently 25 million pregnant women are at risk for malaria. According to the report of World Health Organization (WHO), malaria accounts for over 10,000 maternal and 200,000 neonatal deaths per year. The aim of study was to know the incidence and type of malaria complicating pregnancy in our locality, i.e. in and around Raichur, with the aim to know the complications, outcome and response to treatment. Results show incidence of *Plasmodium vivax* 58%, *Plasmodium falciparum* (17%), mixed 25% of all malaria positive cases in pregnancy in and around this city. Chief obstetric complications were severe anemia, preterm labor, low birth weight babies (42%), oligoamnios (20%), and PPH requiring blood transfusion in one case, renal failure requiring dialysis in one case, one neonatal death, mild jaundice in two cases and no maternal deaths or IUD in the present series. Limitations of study: Only twelve cases were recruited, and ten cases could be studied. This study shows that all pregnant women with fever should be screened for malaria, and presumptive treatment with chloroquine should be started. All malarial positive cases should be treated with therapeutic doses of chloroqrine, and if not responding, preferred drug is artisunate injection followed by artisunate tablets.
Keywords: Malaria in pregnancy, Presumptive treatment, Preterm labor, Anemia in pregnancy, Chemoprophylaxis

INTRODUCTION

Malaria is one of the major public health problems [1]. Malaria is a major vector-borne disease caused by *Plasmodium* parasites that are spread to people through the bites of infected Anopheles mosquitoes, called as "malaria vectors. According to WHO there were about 198 million cases of malaria in 2013 (with an uncertainty range of 124-283 million) and an estimated 584 000 deaths (with an uncertainty range of 367 000-755 000) [2].

National Vector Borne Disease Control Programme (NVBDCP) reported around 1.5 million confirmed cases annually of which 40–50% are due to Plasmodium falciparum [1]. South East Asia is the second most affected region in the world and maximum numbers of cases were reported in India with an estimated 24 million cases per year [3, 4]. India alone contributes 80% of malaria burden of Southeast Asia [5].

Pregnant women are more susceptible to malaria than the general population [6] resulting in miscarriage and low birth weight, especially during first and second pregnancies [2]. According to the World Health Organization (WHO), malaria accounts for over 10,000 maternal and 200,000 neonatal deaths per year [7-9].

The aim of study was to know the incidence and type of malaria complicating pregnancy in our locality, i.e. in and around Raichur, with the aim to know the complications, outcome and response to treatment

METHODOLOGY

This study was carried out in OBG department of RIMS hospital, Raichur, Karnataka, from Jan2012 to December 2014 i.e. over a period of three years on inpatients admitted in maternity ward with fever. All the patients who developed fever (>100^0 F) in the antenatal and post partum period were given a presumptive treatment of malaria with tab chloroquine after sending a peripheral smear for malaria parasite examination. (Dose – Tab chloroquine – 600mg on D1, 600 mg on D2 , and 300 mgs on D3).

MP positive cases were carefully monitored in the antenatal period for maternal and fetal condition with particular attention to anemia, preterm labor,

IUGR, And IUFD. After delivery the baby was examined clinically and histopathologically.

Fever, if not responding well to chloroquine and in falciparum cases, either quinine or artisunate was given.

Chemoprophylaxis was given either with tab chloroquine weekly basis, or by single course of Sulphadoxine 1600 mgs) with pyremethamine (75 mgs) combination, once a month after discharging from hospital.

Primaquine was not given to antenatal cases but given in selective postnatal cases.

Patients with severe falciparum malaria like cerebral malaria or renal failure were treated with IV quinine and supportive treatment as soon as diagnosis was made. Dose – initially a loading dose of quinine 20mgs/ kg/ in 10% dextrose over 4 four hours , followed by 10mg/kg in 10% Dextrose over two hours infusion—8th hourly till consciousness became clear , then oral quinine was given for 7 days. Quinine injection and tablets were used only in two cases in consultation with physician. Two cases were treated with only chloroquine and primaquine was added in postpartum period. Rest of the cases was treated with chloroquine and artisunate injections. Artesunate 2.4 mg/kg body weight IV or IM given on admission, then at 12 h and 24 h, then 4mg/kg/ wt/ once a day tab for 7 days. Lab investigations included peripheral blood smear for MP, CBC with ESR, Blood glucose, RFT, serum bilirubin, serum electrolytes. For rapid diagnosis of P. falciparum infection - Parasight F kit test was done in a few cases.

Table 1 and 2: shows that out of 74 cases of fever in pregnancy, admitted into maternity ward, malaria parasite was detected in 12 cases i.e. in 16% of cases. Out of these, *Plasmodium vivax* was found in 7cases i.e. 58% of cases, and *Plasmodium falciparum* in 2 cases i.e 17 % of cases, and in mixed in 3 cases, i.e. 25%.

Table 3 depicts that the incidence of malaria is high from July to December. The vector, female anopheles mosquito breeds in pools of water in rainy season. The hot climate and humidity also favors mosque survival.

Two cases were case was removed from study, because one lady was detected with heart disease at 24 weeks of pregnancy. One patient lost follow up.

Maximum numbers of patients were in 2nd trimester. In areas of unstable malaria like India, women of all parities are at risk of infection but women at greatest risk are primigravida in 2nd or 3rd trimester.

Table 1: Incidence of malarial patients in maternity ward

Year	Total no of pregnancy with fever admitted	MP positive cases	Percentage
2012	22	5	23%
2013	23	3	13%
2104	29	4	14%
Total	74	12	16%

Table 2: Types of malaria

Total MP + ve cases	*Plasmodium vivax*	Percentage	*Plasmodium falciparum*	Percentage	Mixed	Percentage
12	7	58%	2	17%	3	25%

Table 3: Distribution of cases throughout the year

Year	Total MP + ve cases	January to June	Percentage	July to December	Percentage
2012	5	2	40%	3	60%
2013	3	1	33%	2	67%
2104	4	1	25%	3	75%
Total	12	4	33%	8	67%

Table 4: Distribution of cases according to gravidity/ parity

Year	Total MP + ve cases
1st pregnancy	6
2nd pregnancy	5
3rd or more	1
	12

Table 5: Fetal outcome in 10 cases studied

Normal birth weight	3	30%
Low birth weight	7	70%
Birth asphyxia	2	20%
Moderate to severe oligoamnios	2	20%
Preterm labor/ PROM	2	20%
Congenital malaria	0	0
Placental parasitemia	0	0
Still birth	1	10%

Table 7: Incidence of low birth weight

Cases	low birth weight		
	<2 kg	2-2.5kgs	>2.5 kg
P.V	--	3	3
P.F	1	1	
Mixed	1	1.	

Incidence of low birth weight was in six babies, i.e 70%, but all nine were thriving well at the age of three months. In one case patient developed PIH in second trimester and suffered from severe oligoamnios delivered at 34-36 weeks a still born child of 1. 2kg. Placental biopsy was done in two cases. One case showed marked hypertrophy and thickening of blood vessels, and baby weight was 1.7 Kg, treated in NICU, and doing well at the age of 3 months.

Table 8: Maternal complications due to malaria non complicated and complicated

Moderate to severe anemia	8	80%
Parenteral iron therapy in ante natal and post natal period	5	50%
Cerebral malaria	1	10%
Renal failure requiring dialysis	1	10%
Severe oligoamnios	2	20%
PPH requiring blood transfusion	1	10%
Jaundice	2	20%
Hypoglycemia	4	40%
Early neonatal death	1	10%
Blood transfusion during Antenatal period.	3	30%
Maternal mortality	nil	0

One patient delivered a preterm baby outside, referred as postpartum convulsions with pyrexia, suffered from renal failure, referred to higher center for dialysis.

Four patients developed giddiness after delivery, without significant PPH, suffered hypoglycemia, responded to IV glucose. In this study, of 10 cases there was no maternal mortality.

Table 9: Malarial prophylaxis treatment

Only chloroquine tablets	Chloroquine with sulphadoxine and pyremethamine tablets
5	5

Table 10: Malarial treatment in pregnancy

Only chloroquine tablets, and primaquine in post partum period	Chloroquine with artisunate injection followed by artisunate tablets.	Quinine injection , followed by tab
2	6	2

All twelve recruited patients received presumptive treatment with Chloroquine, and when report came as malaria positive stared with repeat course of chloroquine therapeutic dose in 2 cases. For complicated malaria, and if not responding to chloroquine, inj. artisunate was given in 6 cases and i.v. quinine in 2cases. Chemoprophylaxis continued with suphadoxine and pyremethamine or chloroquine till delivery. Postpartum patient was treated with Chloroquine with primaquine tablets.

Chloroquine is a very effective and rapidly acting schizonticidal drug with least toxicity. It is the first line antimalarial during pregnancy. Artisunate or quinine is 2nd line of treatment in case of chloroquine resistance or in faciparum malaria. But *P. vivax* is less sensitive to sulphonamides, and rapidly develops resistance to pyremethamine.

DISCUSSION

Pregnant women are more susceptible, more likely to become infected, suffer a recurrence, develop severe complications and to die from malaria [6]. It is estimated that at least 25% of pregnant women are infected with malaria, in malaria endemic areas. Higher risk for infection and morbidity has been observed in primigravidas, adolescents, and women co infected with HIV [10].

Majority of complications due to malaria in pregnancy results from two main factors: The immunocompromized state of pregnancy and Placental sequestration of infected erythrocytes [8].

In general, in malaria endemic areas adults develop immunity to malaria infection due to immunoglobulin production during prior infections in childhood. But in pregnancy, especially in primigravidas it declines [11].

Parasites have affinity for decidual vessels and may involve placenta extensively without affecting the fetus. In non immune women, congenital malaria may develop in up to 7% of neonates [12].

Thorough assessment of severity of infection should precede, but not delay treatment in pregnant women.

Fetal complications

Presence of plasmodial parasites in a pregnant woman's body results in a negative impact on her own health as well as on the fetus [6]**.**

Fetal complications occur as a result of placental inflammation, maternal anemia and manifest as stillbirth, intrauterine growth restriction, and low-birth-weight neonates. In endemic areas, congenital malaria is a rare complication; however newborn parasitemia may present after 2 to 3weeks, i.e. when maternal antibodies wear off [8].

Diagnosis of malaria

Early diagnosis and treatment reduces disease and prevents deaths, also contributes to reducing malaria transmission [2].

Historically, diagnosis of malaria has relied on clinical history or microscopic identification of the asexual stages of the parasite on a blood smear fixed with Giemsa stain [8]. For the confirmation of diagnosis, microscopy of stained thick and thin blood smears has high sensitivity, possible to detect malarial parasites at low densities, helps to quantify the parasite load, possible to distinguish the various species of malaria parasite and their different stages [1].

Recent advances in diagnosis of malaria include rapid diagnostic tests (RDTs), immunochromatographic dipstick assays [13]. Several types of RDTs are available [1]. RDTs report sensitivitivty is above 90% for detection of malaria, and sensitivity increases as the level of parasitemia increases. Malarial antigen detection byRDTs may be a better diagnostic tool for use in pregnant women, as much of *P falciparum* sequesters in the placenta and may not be visible on a standard smear that produces false-negative results if diagnosis is based on microscopy and clinical symptoms alone [8, 13].

Prevention and Treatment

Prevention of malarial disease in pregnancy has 2 main strategies: Providing pregnant women with insecticide-treated bed nets (ITN) and intermittent presumptive treatment (IPT) with antimalarial medications [8].

Treatment of uncomplicated malaria in pregnancy relies on the balance between potential fetal adverse effects from drug toxicity, and improved clinical status with clearance of the parasite [8].

Iintermittent presumptive treatment (IPT) refers to the administration of 2 or more doses of chemoprophylaxis after 20 weeks of gestation [8].

In low Risk areas, presumptive treatment comprises of a single dose of chloroquine phosphate 10 mg/kg body weight to all fever / suspected malaria cases.

Treatment in MP positive cases

Chloroquine Base	Day 1	10 mg/kg (600 mg adult)
Chloroquine base	Day 2	10 mg/ kg (600 mg adult)
Chloroquine base	Day 3	5 mg/kg (300 mg adult)

Primaquine is avoided during pregnancy as there is a theoretical risk of hemolytic anemia in a G6PD-deficient fetus [14].

Study has reported significant reductions in maternal anemia with the use of sulfadoxine-

pyrimethamine as compared with chloroquine, pyrimethamine, or no prophylaxis [15, 16]. Sulfadoxine-pyrimethamine has been reported to be

safe in pregnancy when used intermittently as part of IPT [17].

For uncomplicated malaria in pregnancy, the WHO has recommended a combination of quinine and clindamycin. Artemisinin-based combination therapy has found to be safe and effective for *P falciparum* malaria in pregnancy.

For severe malaria in pregnancy, the WHO has recommended treatment with either intravenous quinine or artesunate or intravenous artesunate in the second and third trimesters. Intravenous quinine be avoided in the second and third trimesters as it is associated with recurrent hypoglycemia [18].

CONCLUSION

Malaria in pregnancy entails a grave risk to the mother and fetus. This study shows incidence of *Plasmodium vivax* 58%, *Plasmodium falciparum* (17%), and mixed in 25%, of all malaria positive cases in pregnancy in and around this city.,Chief obstetric complications were severe anemia, preterm labor, low birth weight babies (42%), oligoamnios, and PPH requiring blood transfusion in one case, renal failure requiring dialysis in one case. No maternal deaths in the present series. Complications are more frequent with *Plasmodium falciparum* malaria and in mixed cases.

All fever cases should get presumptive treatment in pregnancy in endemic area. Chloroquine is still the first line of drug in pregnancy with malaria for both plasmodium vivax and *Plasmodium falciparum.* Chemoprophylaxis was given either with chloroquine weekly basis, or by single course of Sulphadoxine with pyremethamine combination.

Complicated malaria like cerebral malaria, or no responders to chloquine should be treated with artisunate or quinine without any delay along with supportive management to prevent maternal complications.

ACKNOWLEDGMENT

We acknowledge the support of all faculty members and staff of maternity ward, and staff of MRD section, who helped us.

REFERENCES

1. National Institute of Malaria Research, National Vector Borne Disease Control Programme; Guidelines for Diagnosis and Treatment of Malaria in India 2009 Guidelines for Diagnosis and Treatment of Malaria in India. Government of India, 2009. Available from http://www.mrcindia.org/Guidelines_for_Diagnosis___Treatment.pdf
2. WHO; Malaria. Fact sheet N°94, Reviewed April 2015. Available from http://www.who.int/mediacentre/factsheets/fs094/en/
3. National Institute of Malaria Research; Estimation of true malaria burden in India. Available from http://www.mrcindia.org/MRC_profile/profile2/Estimation%20of%20true%20malaria%20burden%20in%20India.pdf.
4. Kumar V, Mangal A, Panesar S, Yadav G, Talwar R, Raut D *et al*.; Forecasting malaria cases using climatic factors in Delhi, India: A time series analysis. Malaria Research and Treatment, 2014; 2014: Article ID 482851, 6 pages. Available from http://www.hindawi.com/journals/mrt/2014/482851/
5. Kumari M, Ghildiyal R; Clinical profile of *Plasmodium vivax* malaria in children and study of severity parameters in relation to mortality: A tertiary care centre perspective in Mumbai, India. Malaria Research and Treatment, 2014; 2014: Article ID 765657, 6 pages. Available from http://www.hindawi.com/journals/mrt/2014/765657/
6. Malaria in Pregnancy. Available from http://www.patient.co.uk/doctor/malaria-in-pregnancy
7. Konar H, Chaudhuri P; Malaria in pregnanacy. In Mishra MG, Sinha HH; Treatment and Prognosis in Obstetrics & Gynecology. Treatment and Prognosis in Obstetrics & Gynecology, JP Medical Ltd., 2014: 126.
8. Schantz-Dunn J, Nour NM; Malaria and pregnancy: A global health perspective. Rev Obstet Gynecol., 2009; 2(3): 186–192.
9. World Health Organization; Global Malaria Programme: pregnant women and infants. Available from http://apps.who.int/malaria/pregnantwomenandinfants.html.
10. Desai M, ter Kuile FO, Nosten F, McGready R, Asamoa K, Brabin B et al. Epidemiology and burden of malaria in pregnancy. Lancet Infect Dis., 2007; 7(2): 93–104.
11. Ofori M, Ansah E, Agyepong I, Ofori-Adjei D, Hviid L, Akanmori B; Pregnancy-associated malaria in a rural community of Ghana.Ghana Med J., 2009; 43(1): 13–18.
12. Gupta S; Infection during pregnancy. A Comprehensive Textbook of Obstetrics and Gynecology. JP Medical Ltd, 2011: 492.
13. Murray CK, Bennet JW; Rapid diagnosis of malaria. Interdiscip Perspect Infect Dis., 2009; 2009: Article ID 415953, 7 pages. Available from http://www.hindawi.com/journals/ipid/2009/415953/
14. Primaquine pregnancy and breastfeeding warnings. Available from

http://www.drugs.com/pregnancy/primaquine.html

15. Asa OO, Onayade AA, Fatusi AO, Ijadunola KT, Abiona TC; Efficacy of intermittent preventive treatment of malaria with sulphadoxine-pyrimethamine in preventing anaemia in pregnancy among Nigerian women. Matern Child Health J., 2008; 12(6): 692–698.
16. Falade CO, Yusuf BO, Fadero FF, Mokuolu OA, Hamer DH, Salako LA; Intermittent preventive treatment with sulphadoxine-pyrimethamine is effective in preventing maternal and placental malaria in Ibadan, Southwestern Nigeria. Malar J., 2007; 6: 88.
17. Peters PJ, Thigpen MC, Parise ME, Newman RD; Safety and toxicity of sulfadoxine/pyrimethamine: implications for malaria prevention in pregnancy using intermittent preventive treatment. Drug Saf., 2007; 30(6): 481–501.
18. World Health Organization; Guidelines for the Treatment of Malaria. Geneva, 2006.