Study of Malaria in Pregnancy

Smitha B. Rao[1], Sadiqunissa[2], Vishranka Aithal[3]

[1]Assistant professor, [2]Associate professor, [3]Undergraduate Student

Department of Obstetrics and Gynaecology, Yenepoya Medical College, Mangalore 575018 Karnataka, India.

Abstract

Background : Malaria in pregnancy may be associated with significant maternal and fetal morbidity and mortality. Pregnant women are highly susceptible to malaria due to the lowered immunity in pregnancy.

Aim : To assess the effects of malaria in pregnancy on maternal and fetal health and the outcome of such pregnancy.

Material and Methods : 13 pregnant women with malaria and a comparable control group of 40 pregnant women were recruited for the study. Malaria was confirmed by peripheral blood smear and fluorescent technique and timely treatment started in the cases. The antepartum, intrapartum, and postpartum events were noted in all the patients. Percentages and fishers exact test were used for analysis.

Results : Of the 13 pregnant women who were malaria positive three women were excluded from the study. 80% patients tested positive for Plasmodium vivax and 20% had mixed infestation (P. vivax and P. falciparum). Complications observed in malaria cases were (i) anaemia - 60% (ii) icterus - 20% (iii) pancytopenia - 20% (these complications were statistically significant, $p<0.05$) (iv) intrauterine growth restriction (IUGR) – 20%, (v) oligohydramnios – 20% (vi) maternal death - 10%. Intrapartum complications observed were (i) meconium stained liquor - 20% (ii) birth asphyxia - 10%, 30% babies had meconium aspiration syndrome and neonatal death - 10%.

Conclusion : Results of the study indicate that it is essential to screen all pregnant women with fever for malaria. Early diagnosis and prompt therapy reduces maternal and fetal morbidity and mortality.

Key words : fever, pregnancy, malaria, screening, early treatment.

Introduction

Malaria remains the most important parasitic disease. It kills about 2.5 million people every year [1]. Malaria in pregnancy is associated with significant morbidity and mortality in both mother and the fetus. Because of the lowered immunity during pregnancy, pregnant women are highly susceptible to malaria [2]. The impact of malaria in pregnancy includes abortions, anemia, pancytopenia, intrauterine growth restriction (IUGR), preterm labour intrauterine fetal death, meconium stained liquor, meconium aspiration syndrome. Occasionally cerebral malaria and maternal death may also be seen. Severe anemia as a result of malaria in endemic areas can pose a major obstetric problem. Pregnant women with malaria must be treated promptly because the disease is more severe if associated with high parasitemia [3]. In parts of the world where malaria is endemic, it may directly contribute to almost 25% of all maternal deaths. Pregnant women are three times more likely to suffer from severe disease as a result of malarial infection compared with their non-pregnant counterparts [2,4]. Previous studies have reported abortion rates and fetal loss significantly higher among pregnant women afflicted with malaria.

Materials and Methods

This is a case control study carried out in the department of obstetrics and gynaecology, Yenepoya Medical College, Mangalore over a period of 18 months. 13 pregnant women with fever diagnosed with malaria by peripheral smear and fluorescent technique were included in the study group, hereby referred to as cases. A control group of 40 pregnant women who were

Address for correspondence

Dr. Smitha B. Rao, Anugraha, 3-17-1464/5, Kadri Kaibattal, Mangalore - 575002, Karnataka, India.

E-mail: smitharao_007@yahoo.co.in

comparable with the study group in all parameters were recruited for the study.

Inclusion criteria for cases :

- All pregnant women with fever who had confirmed diagnosis of malaria.

Exclusion criteria for cases :

- Pregnant women who developed medical complications like gestational hypertension, diabetes etc.
- Pregnant women with bad obstetric history, previous caesarean section.

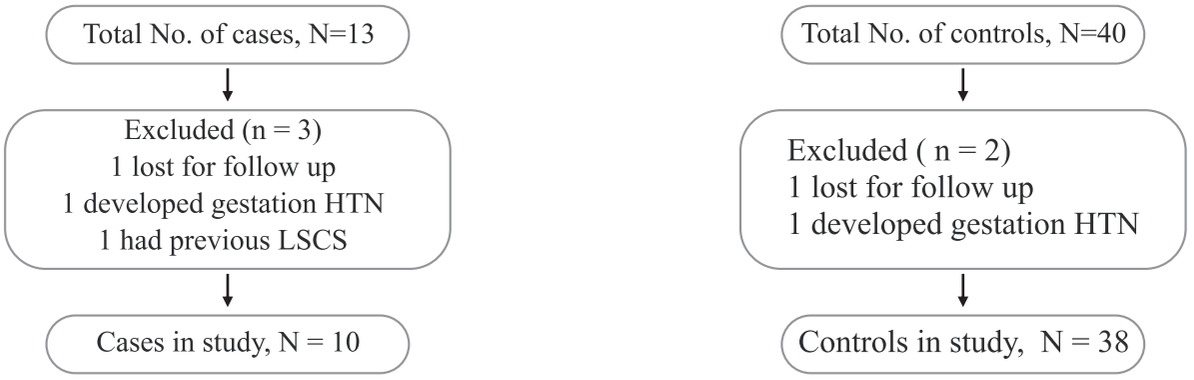
A detailed history and thorough clinical examination was done. Complete blood count, peripheral blood smear, liver function test, screening for HIV and hepatitis B, urine examination was done for all patients.

The patients diagnosed to have malaria were promptly treated with chloroquine or artesunate when required additionally for P. falciparum treatment. After the initial treatment patients were put on weekly chloroquine prophylaxis till delivery. The details of antepartum complications, intrapartum events, postpartum events, fetal outcome were recorded in all patients.

Statistical analysis : Data was analyzed using percentages and fishers exact test. $P<0.05$ was considered to be significant.

Results

This study included the local population of Mangalore. Of the 13 pregnant women with malaria infection, three patients were excluded. Therefore outcome in only 10 cases could be followed up. 38 patients were followed in the control group (Figure 1).



LSCS – Lower segment caesarean section

HTN -Hypertension

Figure 1. Recruitment of case and control groups

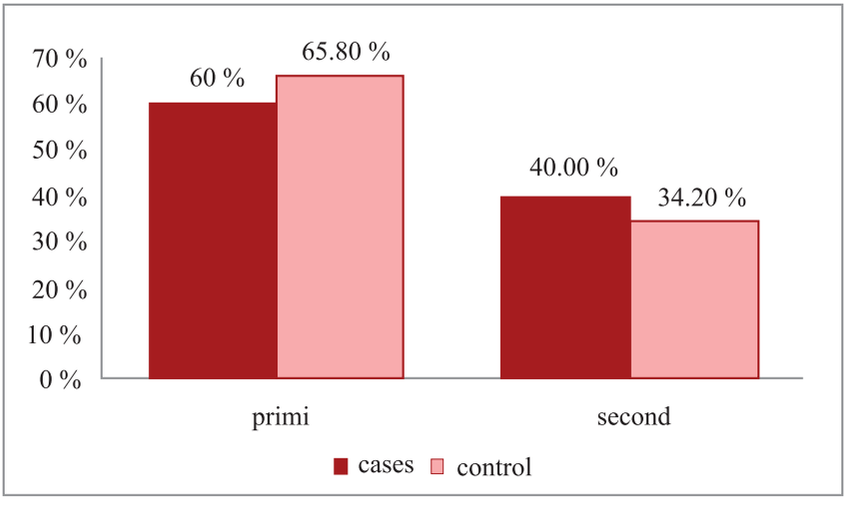


Figure 2. Gravidity of the patients in the study

Six (60%) of pregnant women with malaria (cases) were primigravida whereas remaining 4 (40%) were second gravida. 25 (65.8%) of the control group were primigravida and 13 (34.2%) were second gravida (Figure 2). Malaria affected all the trimesters of pregnancy with predominance in second trimester in 6 (60%), while 3 (30%) and 1 (10%) were affected in first and third trimester respectively (Figure 3). Plasmodium vivax was seen in 8 (80%) whereas mixed infection (P. flaciparum and P. vivax) in 2 (20%) (Figure 4).

Eight patients responded to chloroquine while two patients required treatment with i.v artesunate. The patients treated in first and second trimester were put on weekly chemoprophylaxis with chloroquine. Anemia was seen in 6 (60%) of the patients of whom 2 (20%) had pancytopenia and icterus. Patients were treated with whole blood and blood products as per individual requirement. No cases of pancytopenia or icterus in control group. Complications like anemia, icterus and pancytopenia in the cases were statistically significant ($p<0.05$). 2 (20%) patients with malaria developed intrauterine growth restriction (IUGR) whereas only 2 (5.3%) of control group had IUGR. There was one maternal death at 32 weeks. She was referred with fever for the past two weeks but was not diagnosed to have malaria. When further investigated her serum bilirubin level was >8g/dl and platelet count <20,000 cells/c.mm. Inspite of starting treatment patient died 12 hours after admission probably due to intracerebral bleeding (Table 1). Two (20%) patients in the malaria group underwent lower segment caesarean section (LSCS) the indication mainly was thick meconium staining of liquor (Table 2). Six (15.8%) patients in the control group had LSCS for indications like non-reassuring fetal heart pattern, oligohydramnios, meconium staining of liquor and cephalopelvic disproportion. Meconium aspiration in the malaria group was 30%, whereas 5.3% in the control group. Birth asphyxia was seen in 1(10%) of the malaria group, the baby died contributing to 1(10%) neonatal death (Table 3). There were no such complications in the control group. There was no statistically significant difference in the perinatal outcome among the cases and the control groups ($p=0.108, 0.187, 0.208, 0.208$).

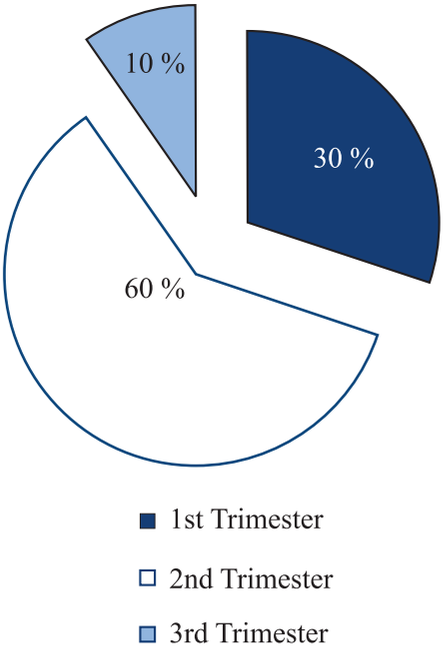


Figure 3. Time of presentation of malaria

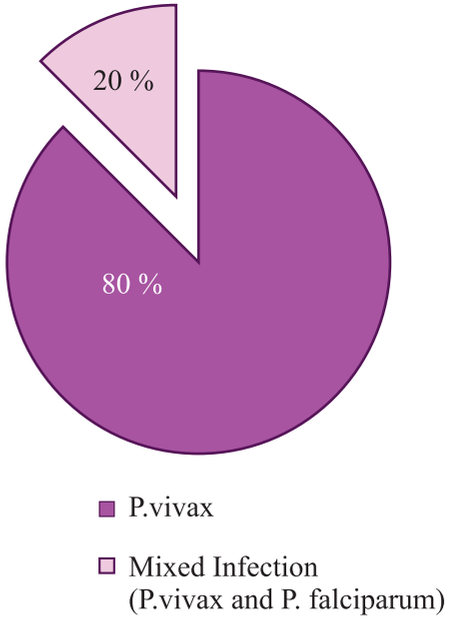


Figure 4. Type of malaria the patient suffered

Table1. Antenatal complications in malaria patients (cases) and non-malaria group (controls).

Antenatal complications : Present/ Absent		Cases n =10	%	Controls n =38	%	p
Abortion	-	Nil	-	1	2.6%	1
Anemia (Hb <8g/dl)	-	6	60%	4	10.5%	0.005
Icterus	-	2	20%	Nil	-	0.039
Pancytopenia	-	2	20%	Nil	-	0.039
Pre term	-	1	10%	3	7.9%	-
IUGR (Intrauterine growth restriction)	-	2	20%	2	5.3%	0.374
Oligo hydramnios		2	20%	2	5.3%	0.374
Maternal death	-	2	10%	Nil	-	0.208

Table 2. Mode of delivery in malaria patients (cases) and non-malaria group (controls)

Mode of delivery	Cases n =10	%	Control n =38	%	p
Vaginal delivery	7	70%	32	84.2	0.638
LSCS	2	20%	6	15.8	0.639

Table 3. Fetal outcome in malaria patients (cases) and non-malaria group (controls)

Fetal outcome	Cases n =10	%	Control n =38	%	p
MAS (Meconium aspiration syndrome)	3	30%	2	5.3%	0.108
IUGR	2	20%	2	2.6%	0.187
Birth asphyxia	1	10%	Nil	-	0.208
Neonatal death	1	10%	Nil	-	0.208

Discussion

Malaria is a parasitic infection caused by four species of Plasmodium that infect humans: vivax, ovale, malaria and falciparum. Of these Plasmodium falciparum is the most deadly. Pregnant women are highly susceptible to malaria because of decreased immunity in pregnancy. Malarial parasite lodges itself in the placenta and causes syncitial necrosis. It then causes thrombosis of placental vessels leading to infarction. When the fever spikes it leads to release of prostaglandins, which leads to abortions and preterm labour. The placental infarction leads to fetal growth restriction and sometimes fetal demise[5,6]. Hemolysis leads to anemia and sometimes pancytopenia. Infection caused by P. falciparum is characterized by cerebral malaria, severe anemia, pulmonary edema, acute respiratory distress syndrome, thrombocytopenia, renal failure and cardiovascular collapse [7,8]. Women with severe anemia are at high risk of morbidity and mortality. It is also noticed that greatest degree of placental infestation is seen in women who have the highest level of immunity leading to milder symptoms and disproportionate increase in fetal complications. The complications of malaria are usually more common and severe during the first pregnancy. In the subsequent pregnancies the antibodies formed prevent cytoadhesion of the plasmodium infected RBC's to the placenta [5].

In 2006, the WHO recommended a combination of quinine and clindamycin for treatment of uncomplicated malaria in pregnancy; however, there is a risk of hypoglycemia with quinine use, as well as

increasingly drug-resistant P. falciparum. More data currently support the use of artemisin -based combination therapy, which appears safe and effective in pregnancy. For severe malaria in pregnancy, the WHO currently recommends treatment with either intravenous (IV) quinine or artesunate, or IV artesunate in the second and third trimesters [9].

In a Cochrane Review comparing malarial chemoprophylaxis with no prophylaxis during pregnancy, Garner and Gulmezoglu found a significant reduction in maternal anemia, parasitemia, and perinatal complications in the groups given chemoprophylaxis [10].

Maitra et al [11], in their study found plasmodium falciparum affecting 97.2% of cases and 71% women were primigravida. The abortion rate was 100% in the first trimester and 75% in the second trimester. The overall fetal loss was 31%. The incidence of maternal death was 8.4%. Chawla et al. [12] in their study reported abortions 7.4% and 3.7% in first and second trimesters respectively. Meconium stained amniotic fluid was seen in 25.9% of cases. The overall fetal loss was 18.5%. Our study revealed that malaria affects second trimester more commonly in 60%. Anemia was seen in 60% of our patients whereas icterus in 20%, pancytopenia in 20%, thrombocytopenia in 20%, oligo hydramnios in 20%, pre-term labour in 10% and maternal death in 10%. Meconium aspiration in 30%, IUGR in 20%, birth asphyxia in 10% and neonatal death in 10%.Probably in our study a bigger number of cases were required to see if all the complications were statistically significant.

Conclusion

Malaria has serious implications on the pregnancy by affecting both the mother and fetus. Anemia and pancytopenia together contribute to a large proportion of maternal mortality in developing and under developed countries. An early diagnosis and prompt therapy will help in reducing maternal and fetal morbidity and mortality. The study also impresses upon the significance of vigorous screening in all pregnant women with fever, especially in endemic areas.

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