Placental Parasitemia Among Tribal Pregnant Women in an Endemic Zone of Malaria in Bangladesh

Background

- As per world malaria report of 2008, Bangladesh had estimated 2.9 million malaria cases and 15000 deaths in 2006
• Bangladesh ranks 4th among those 10 countries which are responsible for 90% of malaria cases in regions other than Africa *

*WHO. World malaria report 2008.*
• Risk is greatest in the east and north-east of the country in areas bordering India & Myanmar.
• These hilly & forest area is inhabited by tribal population
• P. falciparum accounts for 90% cases*

*ACT Malaria, 2006.
Placental Malaria

- In endemic areas malaria parasite are often absent in peripheral blood of pregnant women as they are sequestrated heavily in placenta.

- This situation is termed placental malaria.
• Affected women are usually asymptomatic & peripheral parasitemia are often submicroscopic, detectable only by ICT or PCR. *

• This placental sequestration is only possible for placenta specific P. falciparum strains

• Placenta specific strains bind to specific receptor present only in placenta

Clinical Features

• Maternal features:
  1. Commonly primi & second gravida are affected.
  2. Commonly second trimester.
  3. In highly endemic area most patient are asymptomatic.
  4. Low peripheral blood parasitemia or submicroscopic parasitemia but heavy placental infection in endemic areas.
• Foetal features:
  1. Low birth weight.
  2. Increased incidence of preterm delivery & abortion.
  3. Congenital malaria.
  4. Increased perinatal & infant mortality rate.
Diagnosis of placental malaria

The existing methods of diagnosis of placental malaria are*

1. Placental biopsy.
2. Detection of parasite in placental blood smear.
   a. Incision method
   b. Scraping method
   c. Tissue washing method
3. Detection of parasite by ICT in placental blood.
4. Detection of parasite genome in placental blood by PCR

Global Situation

Prevalence:

- Africa 27.8%
- India 0.5-14.4%
- Bangladesh ?

Study in Bangladesh

- Study conducted in delivery unit in 2004 found 2 cases (0.53%) of placental parasitemia (n=379).*

This study was done in area with unstable transmission

Objective

• To describe the burden of malaria among tribal women of Rangamati, an endemic zone of malaria in Bangladesh.

• To define the outcome of pregnancy (maternal & child) at delivery among cases with placental parasitaemia.
• STUDY DESIGN: Descriptive cross-sectional study.

• PLACE OF STUDY: Rangamati General Hospital


• SAMPLE SIZE: Total 109 consecutive cases of tribal pregnant women.
INCLUSION CRITERIA:

• All tribal women undergoing child delivery in RGH

EXCLUSION CRITERIA:

• Non-tribal pregnant women
Delivery Outcome

1. Term delivery - delivery between 38-42 weeks of gestation.

2. Pre-term delivery - delivery before 37 completed weeks of gestation.

3. Abortion - termination of pregnancy before 28th week i.e. before foetus is viable.

4. Maternal death
Fetal Outcome

1. Still birth- death of a foetus after 28th weeks of gestation

2. Live birth-
   b. Low birth weight baby- body weight <2500gm irrespective of period of gestation.

I. Preterm baby- born < 37th week but weight is appropriate for gestation.

II. Intrauterine growth retardation- babies whose birth weight is below the tenth percentile of the average for the gestational age or less than 2 standard deviation for their gestational age.
Investigations

1. Hb%, TC and DC of WBC, ESR
2. Peripheral BSE for malaria parasite with count
3. ICT for malaria from peripheral blood of mother
4. Placental blood smear for malaria parasite and count
5. Placental blood for malaria ICT
6. Urine for routine examination
7. Blood sugar
8. Neonatal Haemoglobin level (only in placental parasitemia positive cases)
Procedure and Data collection

• All consenting tribal women were enrolled in study
• Malaria parasite was searched in maternal peripheral blood & in placental blood following birth of child.
Malaria was diagnosed by the detection of parasite in peripheral blood slide examination obtained by finger prick and/or positive ICT for plasmodium falciparum.

(For ICT; Core malaria Pan/Pf Kit of Core Diagnostics, Birmingham, UK was used.)
Placental malaria was diagnosed by examination of thick film of blood samples obtained by placental incision.
• Slide preparation & ICT test is same as for peripheral blood sample.

• Blood collection, smear preparation & ICT examination were carried out within 15 minutes of expulsion of placenta.

• Placenta from caesarian section delivery were also included for study.
Results

• 109 tribal women participated in the study.

• All participants were from five various tribal groups and majority belonged to the Chakma community (86%).
Age Distribution

![Bar graph showing age distribution with categories 11-20 year, 21-30 year, 31-40 year, and 41-50 year. The 21-30 year group has the highest bar.]
Distribution by Gravida

- Primigravida (63)
- Multigravida (46)
Malaria Case Distribution

- Non-malaria (95.43%)
- Malaria (4.57%)
- Placental parasitemia (1.82%)

Number of cases: 104, 5, 2
Delivery Outcome

- Term delivery: 97 cases
- Preterm delivery: 3 cases
- Still birth: 0 cases

Non malaria case:
- Term delivery: 100 cases
- Preterm delivery: 3 cases
- Still birth: 0 cases

Malaria case:
- Term delivery: 3 cases
- Preterm delivery: 2 cases
- Still birth: 0 cases
• Burden of malaria during pregnancy in current series:
  a) Total malaria cases: 4.57% (n=5).
    i) 2 infected at the time of delivery having placental infection.
    ii) 3 infected before delivery (in 1st or 2nd trimesters) & aparasitemic during delivery.
b) Placental parasitemia: 1.82% (n=2).

c) Pregnancies unaffected by malaria: 95.43% (n=104).

d) All malaria infected cases were primi
• Placental malarial infection accounted for
  a) 20% preterm delivery (n=5)
  b) 12.5% of LBW (n=8)

Placental infection resulted in babies
average birth weight being 710 gm lower
than the babies of unaffected mother
LBW Babies

The graphical representation shows the number of low birth weight babies associated with different maternal conditions:

- **Pre term delivery**: 4 cases, 3 non-malaria, 1 malaria.
- **Multigravida**: 1 case, all non-malaria.
- **Eclampsia**: 1 case, all non-malaria.
- **Unknown**: 2 cases, both non-malaria.

This data highlights the impact of preterm delivery and unknown factors on the occurrence of LBW babies, with malaria being a contributing factor in some cases.
Conclusion

• The prevalence of placental malaria (parasitemia) is low in the tribal rural pregnant women participating in current case series compared to the observations in Africa.

• Adverse pregnancy outcomes (Low birth weight baby & preterm delivery) are associated with positive placental parasitemia.
Thank You