Prevalence and Proportion of Anemia in Pregnant Women Suffering from Malaria

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ABSTRACT

Objective: To find out the prevalence and proportion of anemia in pregnant women suffering from malaria. The aims & objectives of our study were to evaluate prevalence & proportion of anemia in pregnant women with malaria among the patients visiting the tertiary hospital PUMHS Hospital, Nawabshah, Shaheed Benazirabad so as to give awareness of these complications to doctors to ensure early diagnosis, prevention & prompt treatment of such cases.

Study Design: Descriptive observational study.

Place and Duration of Study: This study was conducted at Outpatient Department of MMCH Hospital & Department of Pathology from April 2012 to February 2013.

Materials and Methods: Study includes total 120 cases of malaria, diagnosed on the basis of clinical & laboratory findings. The hematological complications like anemia, leukocytosis & thrombocytopenia were studied in these patients.

Results: Out of 120, 64 patients were anemic. We divided pregnant women into 5 groups, 40 patients were in 16 – 20 years age group and amongst them 55% patients were anemic, 34 patients were in 21 – 25 years age group and amongst them 50% were suffering from anemia, 22 patients were in age group 26-30 & amongst them 22 % anemic, 15 cases were in age group 31 – 35 & out of them 46% were anemic and in age group 36 – 40 years 46 percent were anemic. Overall there were 53% anemic patients in total of 120. According to the occupation status majority were daily wages laborers and farmers and other were housewives. Out of 120 patients most of them were Multigravida. Most of the patients were suffering from anemia, 76% patients had Leucocytosis with Neutrophillia, 74 percent patients had complication of Lymphocytosis, 80 percent of patients had decreased level of monocytes and 60 percent had decreased level of platelets. All the patients were suffering from fever and associated symptoms of chills, sweating, feeling of hotness and coldness, 63 percent had back pain, 45 percent had headache and 23 percent had complication of Spleenomegaly. The diagnosis of malaria was made on clinical grounds & confirmed by laboratory findings. The problems of hematological complications as anemia, leukocytosis & thrombocytopenia were detected among the patient of malaria by determining hemoglobin concentration, complete blood picture & urine examination report.

Conclusions: P.vivax malaria is most prevalent variety. Anemia, leukocytosis & thrombocytopenia are the most common hematological complications in these patients. It is suggested to ensure

i. Effective malaria control program in country, specially interior Sindh.
ii. Effective measures for prevention, diagnosis & treatment of patients.
iii. Effective health education through electronic & print media.

Key Words: Anemia, Pregnant Women, Malaria

INTRODUCTION

Malaria remains a global health problem with an estimate of 3 billion people at risk of infection in 109 malaria endemic countries. Approximately 250 million cases occur annually leading to approximately one million deaths. 1.2 billion people live in areas with a high risk of malaria (more than 1 reported case per 1000 population per year). There were an estimated 247 million malaria cases among 3.3 billion people at risk in 2006, causing nearly a million deaths, mostly of children under 5 years[1]. In human the sprozoites are transmitted into body by mosquito bite & they first infect the liver cells, then red blood cells & releasing merozoites that mature in male & female gametocyte in human body. When a healthy female mosquito bites a malaria infected human these gametocytes reach in mosquito's stomach unite together to form zygotes that develop into Oocysts which grow & rupture to release sporozytes & cycle starts again[5].

According to world malaria report 2011, there were 225 million cases of malaria worldwide & malarial mortality rate reduced by 5% with overall 20-23% throughout world, as an estimated 655000 deaths in 2011 & 781000 deaths in 2010[2]. Although infection due to Plasmodium falciparum is responsible for the greatest overall morbidity and mortality, P.vivax contributes seventy to eighty million new cases to the annual worldwide burden of disease, especially in

temperate regions[3]. Over 40% of world population lives in malaria endemic area including South Asia, India, Pakistan, Bangladesh, Africa, areas of Middle East, Central and South America[4].

As for hematological complications of malaria are concerned, the anemia, leucocytosis, leucopenia & thrombocytopenia are well recognized complications. The pathogenic mechanisms that cause these complications include haemolysis of parasitized & non-parasitized red blood cells, depression of erythropoiesis, megakaryopoiesis & bone marrow depression, so also immune mediate destruction of thrombocytes caused by releasing of inflammatory cytokines such as tumor necrosis factor & interleukine 1,6 & 10 from the activated macrophages in malaria[6].

The factors contributing to the severity of hematological complication are malaria immunity, endemicity, hyperparacytemia, hemoglobenopathies, G6PD deficiency nutritional status & co-morbidity of HIV & dengue fever[7].

The clinical presentation of malaria caused by all species of malaria parasite resembles & includes fever, headache, body ache, joint pain, chills, sweating & vomiting. These symptoms appear within 1 – 2 weeks after bite of infective mosquito[8].

Pl. falciparum originally was discovered in gorillas caused sever malaria especially among the children producing anemia, respiratory distress, hepato-splenomagaly & finally renal failure or black water fever & cerebral malaria with retinal changes (whitening) which may be a useful clinical sign that distinguish malaria from other causes of fever[9,10].

Although blood is most frequently used to make a diagnosis of malaria by microscopic examination of Giemsa stained blood films but saliva & urine have been investigated as an alternative non invasive techniques[11]. The rapid malaria diagnosis test & polymerase chain reaction have been discovered recently to be used for diagnosis of malaria. These tests are not implemented in poor country like Mozambique due to their high cost. Often the history of fever is taken as the indication to treat malaria in these countries[13,14,15].

MATERIALS AND METHODS

This Observational descriptive study was conducted at outpatient department of MMCH Hospital & Department of Pathology from Apr 2012 to Feb 2013. Total 120 pregnant patients visiting OPD were included in the study and patient having any morbidity were excluded from the study. The prevalence of malaria with reference to age, sex, area of residence & clinical findings were recorded. For the laboratory diagnosis of malaria blood samples in test tube containing EDTA were sent to pathology department. Thick & thin blood smears were made on the clean glass slides from the EDTA mixed blood, &

examined under microscope for detection of various developmental stages of malaria parasites after staining with Giemsa stains. The Hb concentration, CBC including RBC, TLC, DLC & platelet counts were determined by a hematological analyzer (Sysmac). The ESR & ICT were also done from the same blood sample.

RESULTS

Out of 120 pregnant patients, 40 were from urban and 80 pregnant women were from rural life. Out of 40, 19 patients were anemic and 21 were non-anemic while out of 80 rural patients 50% were anemic (Table No. 1). We divided pregnant women into 5 groups, 40 patients were from 16-20 year (anaemic patient were 22), 34 patients were from 21-25 year (50 percent women were suffering from anemia), 20 patients were in age group 26-30 years (11 patients were anaemic), 15 patients were between 31-35 (7 patients were anaemic) and 11 were in 36-40 years group (7 were anaemic). Overall 64 patients were anemic in total 120 cases (Table No.2). Regarding occupational status, majority were daily-wages laborers and farmers and rest were housewives (Table No.3). Out of 120 patients majority were multigravida (Table No.4). All patients were suffering from anemia but 76% had Leucocytosis with Neutrophilia, 74 percent patient had complication of Lymphocytosis, 80 percent of patient had decreased level of monocytes and 60 percent had decreased level of platelet (Table No. 5). All the patients were suffering from fever and associated symptoms of chills, sweating, feeling of hotness and coldness, 63 percent had body pain, 45 percent had headache and 23 percent had complication of Spleenomegaly (Table No. 6).

Table No. 1: Distribution of case with reference to residence

Place of residence	Anemic	Non – Anemic
Urban 40	19 (47.5%)	21 (52.5%)
Rural 80	45 (56.25%)	35 (43.75%)
Total 120	64(53.33)	56(46.67)

Table No. 2: Distribution of case with reference to age

Age related group	Total case	Anemic	Non – Anemic
16-20 yrs	40	22 (55%)	18 (45%)
21-25 yrs	34	17 (50%)	17 (50%)
26-30 yrs	20	11 (55%)	9 (45%)
31-35 yrs	15	7 (46.66%)	8 (53.33%)
36-40 yrs	11	7 (46.66%)	4 (36.66%)
Total	120	64(53.33)	56(46.67)

Table No. 3: Distribution of case with reference to occupation

Sr. No.	Occupation group	Total case	Anemic	Non – Anemic
1	Housewife	15	10 (66.66%)	5 (33.33%)
2	Farmer	30	17 (56.66%)	13 (43.3%)
3	Daily-wages worker	75	60 (80%)	15 (20%)

Table No. 4: Distribution of case with reference to parity

S. No.	Parity	Total case	Anemic	Non – Anemic
1	Primigravida	35	18 (51.42%)	17 (48.57%)
2	Multigravida	58	40 (68.96%)	18 (31.04%)
3	Third trimester	27	18 (66.66%)	9 (33.33%)

Table No. 5: Distribution of case with reference to haematological complications

Sr. No.	Haematological Complications	No. of patients	Percentage
1	Anemia	120	100.00
2	Leucocytosis with Neutrophilia	92	76.60
3	Lymphocytosis	89	74.16
4	Decrese in Monocytes	95	80.00
5	Thrombocytopenia	72	60.00

Table No. 6: Distribution of case with reference to clinical findings

Sr. No	Clinical Findings	No. of Patient	Percentage
1	Fever	120	100%
2	Associated Symptoms like Chills, Sweating, feeling of Coldness and hotness.	120	100%
3	Bodyache	76	63.33%
4	Headache	55	45.83%
5	Pallor	80	66.66%
6	Spleenomegaly	28	23.33%

Table No.7: Distribution of cases with reference to haematological parameters(Hb & ESR)

Sr. No.	Haematological parameters	No. of Patient	Percentage
1	HB 5.5 – 11.5 g/dl 8.5 $\pm$ 3	88	73.30
2	ESR 40 – 110mm 37.5 – 72.5	120	100.00

Table No. 8: Distribution of cases with reference to hematological parameters determined by haematological analyser (Sysmac)

Sr. No.	Haematological parameters	No. of patients	Percentage
1	TLC: 6500-25000/cumm Mean=8750 $\pm$ 1625	90	75%
2	RBCs: 2.4-4.5m Mean=3.5$\pm$1.0	67	55.8%
3	DLC: Eutrophils 67-85% Mean=80.5 $\pm$ 5.5	92	76.6%
4	Lymphocytes 10-14% Mean=11$\pm$3	87	72.5%
5	Monocytes: 10-18% Mean=14$\pm$4	96	80.0%
6	Eosinophils: 2-4% Mean=3$\pm$1	120	100%

DISCUSSION

The malaria mortality rate in 2010 was 50, 56 & 86 persons per 100,000 populations in 3 Africans countries as reported by Guardian news London[16]. On the celebration of malaria day on 25 April 2011, the map of Plasmodium falciparum malaria & endemicity in 2010 & several other maps related to malaria were published in Asia, Africa & America as noted by Gething et al[17].

Malaria was endemic in broadband around the equator, in areas of America, many part of Asia and much of Africa, & 85 – 90% of malaria mortality due to the P. falciparum occurred among the children & pregnant women in Sub-Saharan Africa[18].

Malaria was prevalent throughout the human history & one in every two people had been died due to malaria & its complications. Atlas projects founded by Wellcome UK Trust to rectify malaria mapping providing more contemporary & robust means by which the current & future malaria disease burden was assessed as reported by Hay et al[19].

The malaria superimposed with HIV infection is increasing a person's susceptibility to malaria infection as stated by Abu Redid et al[20].

The female anopheles mosquitoes such as A.culicifacies & A.sephenisi were common in Pakistan that transmitted malaria as recorded by national Malaria control program 2006[21]. While prevalent rate of P. Vivax malaria was two times higher than P. falciparum in interior Sindh as well as in Baluchistan Pakistan, Mehmood et al[22], Nizamani et al[23] & Yasin Zai et al[24].

The hematological complications in malaria such as anemia, Leucocytosis with Neutrophilia & thrombocytopenia were stated by Khalid et al[25] & age as a risk factor for thrombocytopenia & anemia in children treated for acute uncomplicated falciparum malaria was found by Adedapo et al[26]. The high

concentration of interleukin-10 associated with thrombocytopenia in falciparum malaria was demonstrated by Casal-Pascual et al[27]. The hemozoin containing leukocytes (HCL) such as monocytes & neutophils seen in blood films on patients with malaria were negatively correlated with severity of malaria in Ugandan children as stated by Mujuzi et al in his study[28].

In contrast to this study, Hunched et al studies stated that presence of HCL in blood films of patients with malaria were used as reliable diagnostic but less prognostic tools[29]. Both studies stated that hemozoin is brownish black malaria pigment that digests product of hemoglobin produced by phagocytosis of parasitized & none parasitized RBCs by monocytes & neutophils. Casal – Pascual el al demonstrated that suppression of erythropoises produced severe malarial anemia that is associated with hemozoin containing leukocytes in peripheral blood[30].

The hematological complications of malaria evaluated by hematological parameters to differentiate malaria from other acute febrile illness were studied by Danish et al[31]. They stated that severe anemia & thrombocytopenia determined by hemoglobin & platelets counts less than 5g/dl & 5000/cumm respectively in these patients had more specific, sensitive & predictive values to diagnose malaria.

CONCLUSION

P.vivax malaria is most prevalent variety. Anemia, leukocytosis & thrombocytopenia are the most common hematological complications in these patients. It is suggested to ensure

i.   Effective malaria control program in country, specially interior Sindh.
ii.   Effective measures for prevention, diagnosis & treatment of patients.
iii.   Effective health education through electronic & print media.

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