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A Study of blood group protection to severe malarial complication in children

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Abstract

Several studies undertaken have been unable to link ABO blood groups to the incidence of malaria and related clinical outcome. There is a paucity of hospital based, comparative studies to investigate the relationship between blood groups types and severity of malarial infections. Several studies undertaken have been unable to link ABO blood groups to the incidence of malaria and related clinical outcome. There is a paucity of hospital based, comparative studies to investigate the relationship between blood groups types and severity of malarial infections.

Keywords: Blood group, Protection, Malaria

Introduction

Several studies undertaken have been unable to link ABO blood groups to the incidence of malaria and related clinical outcome [2-3]. There is a paucity of hospital based, comparative studies to investigate the relationship between blood groups types and severity of malarial infections.

The resurgence of malaria is a serious public health problem in many parts of the world. It is therefore, important to identify the factors which contribute to susceptibility of hosts. Blood group 'A' patient was found to be more common in malaria cases than in individuals with group 'O' [1]. Plasmodium falciparum rosetting, a parasite virulence phenotype associated with severe malaria, is reduced in blood group O erythrocyte compared with groups A, B and AB [4]. Both P. falciparum and P. Vivax [15] infections provides supporting evidence in favor of an effect of ABO group on disease severity as O group provides advantage over non O groups [5]. Individuals of blood group A and B are more susceptible to severe malaria infection as compared with individuals of blood group O; however the severity of infection differs due to differential host susceptibility [6]. In view of the above we conducted a study to determine if any particular blood group confers some degree of protection against severe malarial complication.

Aim

- To find if any particular blood group confers some degree of protection to severe malarial complication.

Materials and Methods

The study was a prospective study conducted on 100 consenting patients presenting with smear positive malaria admitted in the Department of Pediatrics at Kanachur Institute of Medical Sciences, Mangalore from Feb 2018 to July 2020.

- Diagnosis was based on peripheral smear
- Blood group was determined by forward and reverse method

Inclusion Criteria

Smear positive malaria cases in pediatric cases.

Exclusion Criteria

>18 years

The clinical course between the different groups were compared using the following parameters for severe infection [WHO criteria for severe malaria] [8].

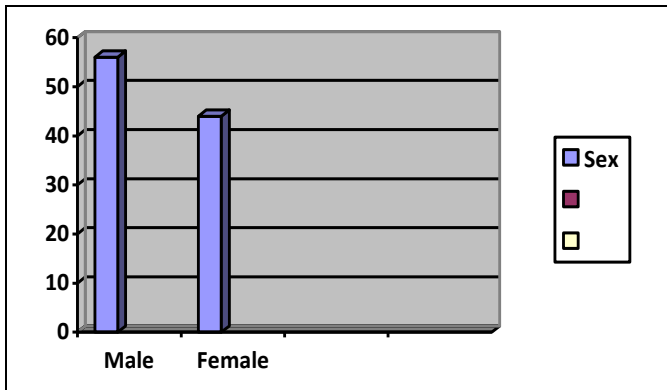


Fig 1: Sex distribution

Table 2: Blood groups association and malaria

	Malaria Parasite		
	Falciparum	Mixed	Vivax
A+ve	26	57.1	56.8
AB+ve	11	0.0	5.3
AB-ve	1	0.0	0.0
A-ve	0.0	0.0	1
B+ve	19	15.7	15.4
B-ve	1.1	0.0	0.0
O+ve	36.8	27.2	19.2
O-ve	5.1	0.0	2.4
Total	100	100	100

Table 2: Blood groups association and malarial complication

	Malaria Parasite	
	Complicated	Uncomplicated
A+ve	34.0	50.0
AB+ve	0.0	8
AB-ve	0.0	0.7
A-ve	0.0	0.8
B+ve	28.5	13.6
B-ve	0.0	0.8
O+ve	34.0	23
O-ve	1.5	3
Total	100	100

Discussion

It is a well known fact that blood groups are an expression of genetic constitution; in view of this statement we conducted a study to find the influence of blood groups on susceptibility to malaria [7-8]. Malaria has been emerging as a major national health problem with considerable morbidity and mortality and has long been eluding our efforts for an effective control [13-15].

Aditya K Panda *et al.* [9], Zerihun, Tewodro *et al.* [10] in different studies showed that a higher percentage of males than females were affected by malaria which is comparable with the results of our study

Tauseef Ahmad *et al.* [11] in their study has a higher percentage of males 58.7% than females 41.3% which is comparable with the results of our study.

Jimmy Antony *et al.* [12] studied 139, out of which 121 cases were males (87.05%) and 18 cases (12.95%) were females, which is comparable with the results of our study.

These results are different as compared to the study by Tyagi S.P [16] who found blood group B to be the predominant blood group (37.21%) in his study of the distribution of blood groups in Uttar Pradesh.

In a study involving 170 children, Tejinder Singh [17] found

a preponderance of *P. Falciparum* [4] infection. Incidence of malaria was found to be maximum in those with blood group A, A/O ratio being 1.93.

Singh, Shukla *et al* [18] in their study involving ABO groups among malaria cases from district Mandla, Madhya Pradesh found that blood groups A, B & O were equally susceptible to malaria infection but AB group had less number of persons with malarial parasites. A lower frequency of *P. falciparum* was observed among individuals with blood groups A and O.

Fischer PR. and Boone P. [19] studied 489 patients in Zimbabwe in an effort to see if clinically severe malaria was associated with blood group. They found that patients with malaria and blood group A had lower haemoglobin levels and more risk of coma than did infected patients with other blood groups, similar findings were noted in our study

Aditya K Panda *et al.* [9] showed in their study that the blood group 'B' was significantly higher in patients with severe malaria, whereas in our study it was group 'A' was more common.

Higher prevalence of blood group 'O' was observed in uncomplicated cases in various studies by Rowe *et al.* [20], Lell *et al.* [21] and Zerihun *et al.* [7], similar findings were noted in our study.

Conclusion

The severity and complications are more in patients with blood group O.

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