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"A Clinical Study of Malaria in ABO blood Group"

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Abstract :
Background and Objective*: Malaria has been emerging as a major national health problem with considerable morbidity and mortality. Since blood group are an expression of genetic constitution, it was decided to study their influence on susceptibility to malaria. To establish whether there is a relationship between A, B, O blood groups and malaria, blood group frequencies in malaria patients.*
Study design and method: *A study group consisted of 250 patients. The control series was formed by determining the baseline distribution of ABO blood groups of 250 individuals from the general population, Becton-Dickinson's quantitative buffy coat (QBC) II system was used in detection of malarial parasite (MPFT-Malarial parasite fluorescent technique). Thick and thin smears were prepared stained and examined. ABO blood grouping were done using the slide agglutination method. The correlation between the blood groups and malaria was studied.*
The control series was formed by determining the baseline distribution of ABO blood groups of 250 individuals from the general population,
Result: *Malaria was found to be most common in the 21-30 years of age group (43.6%). the commonest blood group to be found was O+ with a value of 38% . Out of 250 cases, blood group O+ had maximum number of complications (20.3%). Among all age groups, Vivax malaria was the commonest (71.6%). Both Falciparum and mixed infections were commonly seen in the age group of 21-30 years with values of 9.2% and 18.3% respectively.*
Conclusion: *Complications were more in blood group O+. Complications were more common in Males. Most common complication was ARDS. Repeated attacks were seen mainly in blood group O+ and B+. The maximum number of severe cases of malaria was seen in patients with blood group O+.*
Keywords: *Malaria, ABO blood group)*

I. Introduction

The resurgence of malaria is a major national health problem with considerable morbidity and mortality and has long been eluding our efforts for effective control. Knowledge of factors, which affects the susceptibility of the host, will be an added advantage in our efforts to control malaria.

Although erythrocytes have traditionally been considered relative inert containers of haemoglobin, mounting evidence suggest that they in fact bear numerous surface molecules that are active in microbial attachment processes. Various host receptors on the surface of the uninfected RBC have been proposed including ABO blood group antigens[1,2].

Also, the severity of malaria and its association with the ABO blood groups & the protective effects of blood group antibodies have been highlighted in various studies.

The identification of the ABO antigens as receptor or co-receptors responsible for invasion by the malaria parasite brings in the possibility of receptor blockade for anti malaria therapy as a potential therapeutic tool.The genetic makeup of individuals may cause a considerable variation in their reaction to malarial infection and blood groups being an expression of genetic constitution are likely to indicate an individual's susceptibility[3].It was therefore thought worthwhile to conduct a study on the relationship between the ABO blood groups and malarial infection in our set up.

II. Aim And Objective

1. To establish whether there is a relationship between A, B, O blood groups and malaria.
2. To study the blood group frequencies in malaria patients.
3. To determine if any particular blood group confers some degree of protection against malaria or its complications.
4. To look for any sex predilection**.**

III. Materials And Methods

The present study was carried out in YENEPOYA MEDICAL COLLEGE HOSPITAL after obtaining clearance from the Ethical Committee of the Hospital.

- Relevant clinical data (demographic- age, sex, place, occupation) including history were obtained from the patient.
- A detailed clinical examination was performed. Relevant investigations were conducted.
- Patients with or without fever and who are either smear positive for malarial parasite or positive for Becton-Dickinson's quantitative buffy coat(QBC) II system were included.
- A study group consisted of 250 patients. The control series was formed by determining the baseline distribution of ABO blood groups of 250 individuals from the general population,
- Becton-Dickinson's quantitative buffy coat (QBC) II system was used in detection of malarial parasite (MPFT-Malarial parasite fluorescent technique).
- Thick and thin smears were prepared stained and examined.
- ABO blood grouping were done using the slide agglutination method.
- The correlation between the blood groups and malaria was studied.

3.1 Exclusion criteria

1. Individuals who took anti-malarial drugs within two weeks before giving blood sample.
2. Patients with fever other than smear positive malaria.
3. Patients with hematological malignancies.
4. Chronic debilitating illnesses like Diabetes Mellitus, Rheumatoid Arthritis, AIDS, Renal Failure.

3.2 Complicated malaria (WHO criteria)

1. Impaired consciousness (but arousable)
2. Prostration and extreme weakness
3. Jaundice
4. Cerebral malaria (unarousable coma not attributable to any other cause in a patient with Falciparum malaria
5. Generalized convulsions
6. Normocytic Anemia
7. Renal failure
8. Hypoglycemia
9. Fluid, electrolyte, acid base disturbance
10. Pulmonary oedema
11. Circulatory collapse and shock (algid malaria)
12. DIC
13. Hyperpyrexia
14. Hyperparasitemia
15. Malarial haemoglobinuria

3.3 Mild Malaria: Acute febrile illness but no features of severe malaria.

3.5 Moderate Malaria: Did not fulfill the criteria of severe malaria.

3.5 Severe malaria: Those with cerebral malaria (in coma and unable to localize a painful stimulus). Fully conscious but either prostrated (unable to maintain a sitting posture) or in respiratory distress (abnormally deep breathing with intercostals or subcostal recession)

3.6 Repeated attacks: were taken as two or more attacks of malaria

IV. Observations And Results

The study group was comprised of a total of 250 malaria patients. Majority of the cases were found among males (209 patients; 83.6%) than among the females (41 patients; 16.4%).

The study group was divided into groups based on age[table 1]. Malaria was found to be most common in the 21-30 years of age group (43.6%) followed by those between the age group of 20 years and below. Incidence was less at the older age group i.e. between 51-60 and those who were 60 years and above. Chi square test, $\chi 2 = 45.413$, P=<0.001, HS.

Table 1. Age distribution of patients and control.

		Group		
		Malaria	Controls	Total
Age	20 yrs and below	45	16	61
		18.0%	6.4%	12.2%
	21 - 30 yrs	109	76	185
		43.6%	30.4%	37.0%
	31 - 40yrs	43	40	83
		17.2%	16.0%	16.6%
	41 - 50yrs	26	48	74
		10.4%	19.2%	14.8%
	51 - 60yrs	16	40	56
		6.4%	16.0%	11.2%
	Above 60	11	30	41
		4.4%	12.0%	8.2%
Total		250	250	500
		100.0%	100.0%	100.0%

The blood group prevalence in the control group and in patients with malaria. In both these groups, the commonest blood group to be found was O+ with a value of 38% and 27.6% respectively. Chi square test, $\chi^2 = 33$, P=.000<0.001, HS

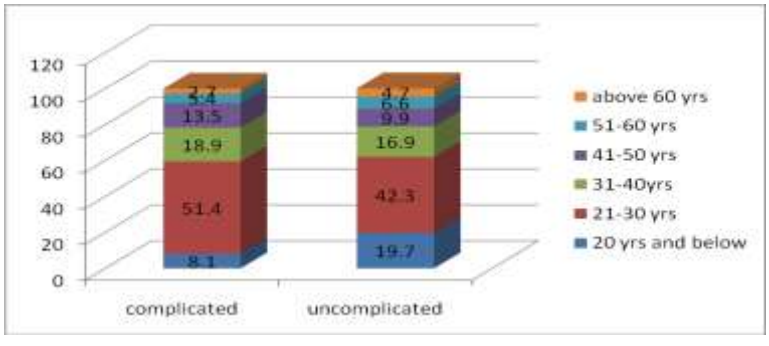
Vivax and Falciparum infected patients as well as those with mixed infection. Among all the blood groups, Vivax malaria was the commonest with a total value of 71.6%. Falciparum cases were more in the blood group O+ (11.6%). Mixed infection was predominantly seen in patients with blood group A- (33.3%) but this was statistically not significant [Table 2].

Table 2: blood group prevalance of malaria

		Parasite type			
		FALCIPARUM	MIXED	VIVAX	Total
Blood Group	A-	0	4	8	12
		.0%	33.3%	66.7%	100.0%
		.0%	7.8%	4.5%	4.8%
	A+	1	10	37	48
		2.1%	20.8%	77.1%	100.0%
		5.0%	19.6%	20.7%	19.2%
	AB-	1	2	7	10
		10.0%	20.0%	70.0%	100.0%
		5.0%	3.9%	3.9%	4.0%
	AB+	2	3	15	20
		10.0%	15.0%	75.0%	100.0%
		10.0%	5.9%	8.4%	8.0%
	B-	2	5	14	21
		9.5%	23.8%	66.7%	100.0%
		10.0%	9.8%	7.8%	8.4%
	B+	4	16	42	62
		6.5%	25.8%	67.7%	100.0%
		20.0%	31.4%	23.5%	24.8%
	O-	2	1	5	8
		25.0%	12.5%	62.5%	100.0%
		10.0%	2.0%	2.8%	3.2%
	O+	8	10	51	69
		11.6%	14.5%	73.9%	100.0%
		40.0%	19.6%	28.5%	27.6%
Total		20	51	179	250
		8.0%	20.4%	71.6%	100.0%
		100.0%	100.0%	100.0%	100.0%

The complicated cases seen in each blood group. Out of 250 cases, blood group O+ had maximum number of complications (20.3%). Maximum complications was seen in the age group of 21-30 years of age group (51.4%) whereas the least was seen in patients who were above 60 years (2.7%) %) but this was statistically not significant [fig 1].

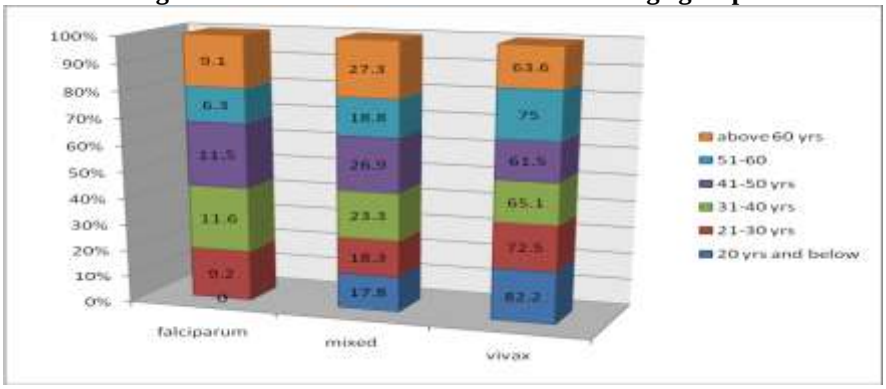
Figure 1; Age distribution of complicated and uncomplicated malaria



Among all age groups, Vivax malaria was the commonest (71.6%). Both Falciparum and mixed infections were commonly seen in the age group of 21-30 years with values of 9.2% and 18.3% respectively. More complications were seen among males (n=36; 97.3%) than among females (n=1; 2.7%).

The sex prevalence in the study group comprising of Vivax, Falciparum and Mixed malarial patients[figure 2]. In both females and males, Vivax malarial cases were more commonly seen (20.1% and 79.9% respectively). No Falciparum cases were reported in females whereas mixed infection was seen more among males (46 patients 90.2%) than among females (5 patients 9.8%) which was highly significant.

Figure 2: Prevalence of malaria in different age group.



The different complications present in Vivax, Falciparum and mixed malarial patients [table 3] . Out of 37 patients, the most common complication seen was ARDS comprising of 29.7%. Falciparum infected patients showed more number of DIC cases (42.9%) whereas mixed malarial patients showed more number of ARF cases (33.3%). Out of 37 patients, the most common complication seen was ARDS comprising of 29.7%. Falciparum infected patients showed more number of DIC cases (42.9%) whereas mixed malarial patients showed more number of ARF cases (33.3%).

Table 3: Complications of malaria

		Complications if any					
		ALGID MALARIA	ARDS	ARF	DIC	JAUNDICE	Total
Parasite type	FALCIPARUM	1	2	1	3	0	7
		14.3%	28.6%	14.3%	42.9%	.0%	100.0%
		33.3%	18.2%	10.0%	37.5%	.0%	18.9%
	MIXED	2	6	7	4	2	21
		9.5%	28.6%	33.3%	19.0%	9.5%	100.0%
		66.7%	54.5%	70.0%	50.0%	40.0%	56.8%
	VIVAX	0	3	2	1	3	9
		.0%	33.3%	22.2%	11.1%	33.3%	100.0%
		.0%	27.3%	20.0%	12.5%	60.0%	24.3%
Total		3	11	10	8	5	37
		8.1%	29.7%	27.0%	21.6%	13.5%	100.0%
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

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V. Discussion

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.Since blood group are an expression of genetic constitution, it was decided to study their influence on susceptibility to malaria.

In the 250 cases studied, more infected cases were found among males (83.6%) It was also found that most of the cases were in the 21-30 age group (43.6%). The baseline distribution of blood groups in the normal population was established by taking samples from 250 individuals. Blood group O+ (38.0%) was the commonest in the population. Tyagi S.P[1] found blood group B to be the predominant blood group (37.21%) in his study of the distribution of blood groups in Uttar Pradesh.[4]

Blood group O+ was commonest in the study group (27.6%) i.e., in the patients with malaria but this was statistically significant P = 0.001.

Vivax malaria was found to be the commonest in all the blood groups(71.6%)[5]

P. Falciparum malaria was seen predominantly in blood group O+ (11.6%). Patients with blood group O+ were found to have more complications in the form of ARDS,DIC and ARF.

Majority of the studies show that blood group A were found to have more complications in contrast to our study which showed blood group O + .This could be due to blood group A being a coreceptor in Plasmodium Falciparum rosetting [6,7] also found rosetting to be more in blood group A subjects.

It has been postulated that plasmodia possess antigens equivalent to the blood group antigens A and B of man and that the anti-A titre of those group O subjects who often had repeated attacks of P. Vivax and P. Falciparum malaria was far greater than in control group O subjects[8].

The anti-B titre was also raised but not to the same extent as for anti-A. Consequently, if malarial infection is to any extent combated by anti-A, it would be more severe in those subjects unable to elaborate this antibody ie. Group A subjects [9].

Repeated attacks were found to be more in blood groups O+ and B+. An interesting finding was the selective feeding of Anopheles Gambiae with a preference for blood group O[10].

In terms of severity of malaria, blood group A was found to have the maximum numbers of cases (44.44%).

Of the children with severe malaria 50% belonged to group O. however, this may not be significant as there was no significant difference in the frequency of ABO groups in children with severe malaria and controls in both the studies.

The trends noted in this study have however, not been found to be statistically significant.

This study could have been more informative if Duffy blood group testing could have been done as well as testing for RBC rosette formation. This was however not possible due to the limitation of the facility & reagents being unavailable.

VI . Conclusion

Malaria is more common in Males. It is predominantly found in the 21 – 30 year of age group. The baseline population showed a predominance of blood group O+. The maximum number of malaria patients was in blood group B. Vivax malaria was the commonest infection in all blood groups. Falciparum cases were predominantly seen in blood group O+

Mixed cases were predominantly seen in A-. Complications were more in blood group O+.

Complications were more common in Males. Most common complication was ARDS. Repeated attacks were seen mainly in blood group O+ and B+.

The maximum number of severe cases of malaria was seen in patients with blood group O+.

References

[1]. Tyagi SP. Distribution of ABO blood groups in Uttar Pradesh. Journal of the Indian Medical Association. 1968; Vol 51, No: 2, 57 – 59.
[2]. Singh T. Malaria and ABO blood groups. Indian Pediatr. 1985. Nov, 22 (11) : 857 – 8.
[3]. Wood CS, Harrison GA, Dorec, Weiner AS. Selective feeding of Anapheles according to ABO blood group status. Nature 1972; 239 – 165.
[4]. Athreya BH, Coriell LL. Relation of blood group to infection. Am J. Epidem 1967; 86 : 292 – 295.
[5]. Vogel F. blood groups and diseases. Am J Hum Genet 1970; 22 : 464 – 470.
[6]. Mourant AE, Kopec AC, Sobezak KD, Blood groups and diseases, NewYork Oxford 1978; p18.
[7]. Gupta and Chowdhuri. Bulletin of the World Health Organization 1980.58(6): 913-915.
[8]. Oliver – Gonzalez JJ Infect Dis 1944; 74 : 173
[9]. Athreya BH, Coriell LL. Relation of blood group to infection. Am J. Epidem 1967; 86 : 292 – 295.
[10]. Wood CS, Harrison GA, Dorec, Weiner AS. Selective feeding of Anapheles according to ABO blood group status. Nature 1972; 239 – 165.