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OBSERVATIONS ON PRESENCE OF MALARIA PARASITE IN PATIENTS SUFFERING FROM HAEMOGLOBINOPATHIES (THALASSEMIA AND SICKLE CELL ANEMIA) IN TERTIARY CARE HOSPITAL, RIMS RANCHI

Paediatrics

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ABSTRACT

Introduction: Sickle cell disease and thalassemia are common haemoglobinopathies in many states of India including Jharkhand. Although epidemiological observations suggest that patients with sickle cell trait and thalassemia are relatively immune to anemia. But contrary to classical teaching severe complications and heavy malarial parasitemia has been observed in patients of sickle cell anemia. This is against the current belief that sickle cell gene protects against heavy parasitemia.

Aims and objective: To study the presence and incidence of malaria in sickle cell anemia and thalassemia patients.

Material and methods: This was a retrospective observational study in a tertiary care hospital in RIMS Ranchi over one year period from April 2016 to March 2017. 104 patients of thalassemia and sickle cell disease, presented with fever over the period from April 2016 to March 2017 were included in this study. Relevant clinical examination and blood investigation including peripheral blood examination for malarial parasite (thick and thin smear) was done.

Conclusion: There is presence of malaria in thalassemia and sickle anemia patients (Incidence-18% in SCA and 14% in Thalassemia) which is in contrast to classical teaching.

KEYWORDS

Malaria, Sickle cell disease, Thalassemia.

I. INTRODUCTION

Malaria is a major public health problem in several parts of India including Jharkhand. It is a serious health problem which causes morbidity and mortality. About 95% of population in the country resides in malaria endemic areas.80% of the malaria reported in the country is confined to areas consisting 20% of population (residing in tribal ,hilly, difficult and inaccessible areas). The National Vector-Borne Disease Control Program reported around 0.8 million cases of malaria in India in 2014 with some 300 deaths; 60% of the cases is due to P.falciparum. Annual Parasite Incidence (API) rate has consistently come down from 2.12 per thousand in 2001 to 0.89 per thousand in 2014 but confirmed deaths due to malaria have been fluctuating during this period between 1707 and 561.Slide Positivity Rate(SPR) and Slide Falciparum Rate(SFR) have reduced over the years 2001-2014.The country SPR has declined from 2.31 to 0.89 and SFR has declined from 1.11 in 2001 to0.58 in 2014.This indicates endemicity of malaria in the country and partial success of National Antimalarial Program.[1]

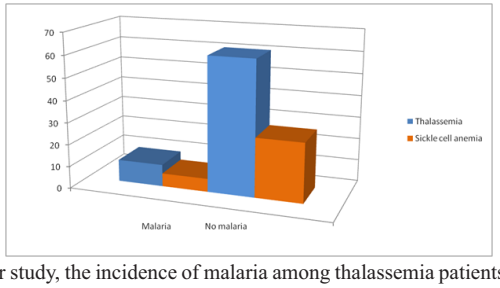
Thalassemia is a heterogenous group of inherited disorders of haemoglobin(Hb) and commonest single gene disorder in the world first noted in the Mediterranean population and causing a significant morbidity and mortality in India and abroad.[2,3] It has been estimated that in India 0.37 per 1000 fetuses have Hb disorder.[4] Thalassemia and hemoglobinopathy are the major health concern in the Indian subcontinent as the prevalence rate of beta thalassemia mutations is as high as 17% in some populations.[5] Other hemoglobinopathies prevalent in India are Hb E- beta thalassemia, sickle cell anemia ,HbE and HbD.6-8 Current observation show that severe complications and heavy malarial parasitemia is found in patients of sickle cell anemia.The finding creates interest about relationship between haemoglobinopathies and malarial parasite.

II. MATERIAL AND METHODS

This was a retrospective observational study in a tertiary care hospital in Rajendra Institute Of Medical Sciences Ranchi over one year period from April 2016 to March 2017. 104 patients of thalassemia and sickle cell disease presented with fever over the period from April 2016 to March 2017 were included in this study. Clinical examination and blood investigation such as Complete blood count (CBC),Peripheral blood smear examination, Random blood glucose ,Serum electrolytes, Blood urea and serum creatinine, Serum transaminases, Serum bilirubin and PT & APTT were done. Urine analysis was also done. Data analysis was done with Statistical Packages for Social Sciences (SPSS IBM) version 21.0. Ethical permission was obtained from Ethics Committee of RIMS Ranchi.

III. RESULTS

Incidence of malaria in Haemoglobinopathies.(N= 104)



In our study, the incidence of malaria among thalassemia patients was 14% and the incidence of malaria in sickle cell disease was 18%.

Table 1: Association between malarial incidence and baseline characteristics. (N=104)

S.No	Study participant's profile	Malarial infection		P value
		Present N(%)	Absent N(%)	
01	**Gender**			
	Male	16(20.8)	61(79.2)	**0.039**
	Female	1(3.7)	26(96.3)	
02	**Family history of hemoglobinopathy**			
	Yes	10(16.4)	36(83.6)	0.988
	No	7(16.3)	51(83.7)	

Chi square test applied, p value ‹ 0.05 is significant

Table 2 : Association between malarial incidence and types of hemoglobinopathy. (N=104)

S.No	Types	Malarial infection		P value
		Present No.(%)	Absent No.(%)	
01	**Types of thalassemia (n=71)**			
	Thalassemia major	8(11.2)	50(70.4)	0.77
	Thalassemia trait	2(2.8)	11(15.5)	

02	**Types of sickle cell anemia (n=33)**			
	Sickle cell disease	16(64)	9(36)	0.640
	Sickle cell trait	1(12.5)	7(87.5)	

Chi square test applied, p value ‹ 0.05 is significant

IV. DISCUSSION

In this study 104 participants were included out of which 74% were males and 27% were females. Among the total 104 participants, 71 were thalassemia patients and 33 had sickle cell anemia. Prevalence of malarial infection was found to be higher in males compared to females and this was found statistically significant. (p value=0.039)
It has been observed that only 14% of the thalassemia patients included in the study acquired malarial infection. The incidence of malaria in sickle cell disease was 18%.

V. CONCLUSION

This study is an effort to look for presence or absence of malaria in patients of hemoglobinopathies such as thalassemia and sickle cell anemia. We observed presence and gradual increase in incidence of malaria in thalassemia and sickle cell anemia patients (18% in SCA & 14% in Thalassemia) which in contrast to conventional theory. other studies have also found out this association but no such reports exist from eastern part of India viz Jharkhand, Chhatishgarh, Orissa, West Bengal.

This possibly may be either due to change in genotype of malaria parasite leading to entry of parasite into red blood cells of haemoglobinopathies patients or it may be due to changes in structure of red blood cells of the patients leading to breach in immunity.

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