FREQUENCY OF BETA THALASSEMIA TRAIT IN PREGNANT ANEMIC PATIENTS ATTENDING KHYBER TEACHING HOSPITAL, PESHAWAR-PAKISTAN

Maimoona Qadir[1✉], Sohail Amir[2]

1✉ Registrar, Department of Gynecology and Obstetrics Unit B, Khyber Teaching Hospital Peshawar, Pakistan

Email: dr.maimoona1983@gmail.com

Contact #: +92-3469196731

2 Assistant Professor Neurosurgery, Naseer Teaching Hospital, Peshawar, Pakistan

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ABSTRACT

OBJECTIVE: To determine the frequency of beta thalassemia trait in pregnant anemic patients attending Khyber Teaching Hospital, Peshawar, Pakistan.

METHODS: This descriptive cross-sectional study was conducted in Gynecology and Obstetrics Department of Khyber Teaching Hospital, Peshawar from 3rd November 2015 to 3rd May 2016. All pregnant women of any parity with hemoglobin value of <10.5g/dl presenting in first trimester and in age group of 15-45 years were included while pregnant anemic women who were already diagnosed cases of haemoglobinopathies were excluded.

RESULTS: Our study of 194 pregnant anemic patients showed that mean age was 27.74±5.16 years. The age distribution was 125 (64.43%) patients in 15-30 years age group and 69 (35.56%) patients in 31-45years age group. Mean hemoglobin level was recorded as 9.43±0.40 g/dl and mean HbA_2 was 4.26±0.52. Mean value for mean corpuscular volume was 60.23±1.57fl and for mean corpuscular hemoglobin was 21±0.42 g/dl. The results of our study for beta thalassemia trait in pregnant anemic patients were recorded as 110 (56.7%) were positive whereas 84(43.29%) had no beta thalassemia traits. Among 125 patients in 15-30 years' age range, 65 (52%) were positive for beta thalassemia trait while out of the 69 pregnant anemic patients in age range of 31-45 years, 45 (65.2%) had beta thalassemia trait (p-value=0.113).

CONCLUSION: Beta thalassemia trait is very common and is found in more than half of pregnant anemic patients in our region.

KEY WORDS: Anemia (MeSH); Beta-Thalassemia (MeSH); Beta-Thalassemia Trait (Non-MeSH); Hemoglobins (MeSH); Antenatal Care (MeSH); Penatal Care (MeSH); Mortality (MeSH); Morbidity (MeSH).

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INTRODUCTION

Thalassemia is the most common inherited monogenic disorder which causes a major genetic health problem worldwide.[1,2] Beta thalassemia represents a heterogeneous group of hemoglobin disorders and is caused by the reduced or absent beta globin gene expression. This disease has high frequency in the Mediterranean regions, Africa, Southeast Asia and Indian subcontinent.[3,4] It is estimated that there are 270 million carriers of thalassemia globally and out of which 80 million are beta thalassemia traits.[5] It is significant health problem in Pakistan and 5-7% of our population (approx 9-13 million) are thalassemia minors,[6] who present with symptoms of anemia upon becoming pregnant and these female subjects were our study population. Due to high carrier state in our population, more than 6,000-7,000 thalassemia major children are born each year in Pakistan.[7,8]

There is a high rate of consanguineous marriages in our society due to which harmful genes are accumulated within a family. In a developing country like Pakistan, the treatment of beta thalassemia major patients which require regular blood transfusions with effective iron chelation therapy is not effective for everyone. Thus the disease ends up with significant morbidity and mortality. An alternative long term approach to this problem would be to reduce the number of these individuals through genetic counseling and prenatal diagnosis of affected fetus.[9,10]

Thalassemia has a high prevalence in Khyber Pakhtunkhwa and screening is an important way to prevent its inheritance in successive generations. The hospitals in our province are using automated haematology analyzers for its diagnosis.[11] A huge number of infants are born thalassemic each year who does not survive beyond puberty unless have good frequency of blood transfusion and chelation. Keeping in view the high prevalence of beta thalassemia, its possible effects on pregnancy and limited studies available, we carried out this study to determine the frequency of beta thalassemia trait among pregnant women presenting with anemia. Our results would enable the clinicians to get alert and provide extra care to pregnant women with beta thalassemia trait who present with anemia.

METHODS

This descriptive cross-sectional study was conducted at Department of Gynecology and Obstetrics, Khyber Teaching Hospital, Peshawar, Pakistan from 3rd November 2015 to 3rd May 2016. Sampling technique was consecutive (non-probability). Sample size was 194 keeping 55.9% proportion of beta thalassemia trait among pregnant women with anemia, 95% confidence interval and 7% margin of error using WHO sample size calculator. Inclusion criteria was all pregnant women of any parity with hemoglobin value of less than 10.5g/dl presenting in first trimester and in age

group of 15-45 years. Exclusion criteria was already diagnosed cases of haemoglobinopathies like thalassemia major, sickle cell anemia on medical grounds.

The study was conducted after approval from hospital ethical and research committee. All pregnant women meeting the inclusion criteria were invited to participate in the study through out-patient department. The purpose and benefits of the study was explained to all women and written informed consent obtained. All women were subjected to detailed history and clinical examination. Complete blood count, red cell indices and hemoglobin (Hb) electrophoresis was performed on 10cc of venous blood in EDTA (anticoagulant) which was obtained from all women and was sent to hospital laboratory in sealed, leak proof containers. Increased level of HbA_2 (>3.5%) on Hb electrophoresis was diagnostic of beta thalassemia trait. Cellulose acetate paper was taken for Hb electrophoresis percentage. Data was recorded on a predesigned proforma. All the laboratory investigations were conducted under supervision of an expert hematologist having minimum of seven years of experience.

The collected data was organized and analyzed in SPSS version 20. Mean and standard deviation was calculated for numerical variables. Frequencies and percentages were calculated for categorical variables. Beta thalassemia trait was stratified among age of mother. Post stratification was done using Chi square test and p-value of =0.05 was considered statisticallysignificant.

RESULTS

In this study a total of 194 pregnant anemic patients were screened for beta thalassemia trait and patients were in age range of 31-45 years. Two age groups were created and it was observed that 125 (64.43%) patients fell into age group of 15-30 years and 69 (35.57%) patients were in age range of 31-45years. Mean age of the study participants was 27.74±5.16 years.

The results of our study showed that among 194 pregnant anemic patients, 110 (56.7%) were positive for beta thalassemia trait whereas 84 (43.29%) had no beta thalassemia trait.

Mean hemoglobin level was recorded as 9.43±0.40 g/dl and mean HbA_2 was 4.26±0.52. Mean value for mean corpuscular volume (MCV) was 60.23±1.57fl and for mean corpuscular hemoglobin (MCH) was 21±0.42 g/dl.

Stratification of beta thalassemia trait in pregnant anemic patients with age of mother (Table I) showed that out of 125 patients in 15-30 years' age range, 65 (52%) were positive for beta thalassemia trait while out of the 69 pregnant anemic patients in age range of 31-45years, 45 (65.2%) had beta thalassemia trait (p-value=0.113).

DISCUSSION

In this study, thalassemia trait was diagnosed in about 56.7% pregnant anemic patients. It was almost equally frequent in patients of 15-30 years' age range (52%) and 31-45 years (65.2%). Mean age was 27.74±5.16 years. Mean hemoglobin level was recorded as 9.43±0.40 g/dl.

Anemia among pregnant women is so common that healthcare providers may consider it a normal phenomenon. Pregnant women with even mild anemia have increased perinatal and early neonatal mortality largely associated with preterm birth and growth restriction. Thalassemia trait in pregnancy is associated with mild hypochromic microcytic anemia.[12] In our study, thalassemia trait was diagnosed in more than half of the pregnant anemic patients. This finding is in agreement with results of other national and regional studies. Hafeez M et al. in their study at Lahore observed that 53.1% of the pregnant ladies presented with the diagnosis of beta thalassemia trait.[13]

Sinha M et al conducted a study in India in 2006, where 120 pregnant anemic women were taken into consideration and it was found that 50% had positive beta thalassemia trait.[14] Another study conducted at India by Mohanty D et all concluded that 55.9% of the pregnant anemic women had positive beta thalassemia trait.[15] The results of the second study were very close to our study's results where 56.7% of pregnant anemic women were beta thalassemia trait positive.

In a similar study done in Jatinagor, Indonesia in 2016, the mean haemoglobin level was 9.5 g/dl, whereas in our study this level was 9.43±0.40 g/dl.[16]

In a study done by Susanti AI et al in 2016, the mean age was found to be 29 years [16] which is quite close to our study where this mean age was 27.74±5.16 years. According to a study which was done in Bangalore, India by Sarda H et al, 209 pregnant anemic women were studied, beta thalassemia trait had a preponderance of 108 (51.6%) in anemic women of age group 21-30 years.[17] This is in accordance with our study where we have observed that this haemoglobinopathy is more prevalent in 15-30 years age group, where out of 125 women, 65 (52%) were positive for beta thalassemia trait.

Autosomal recessive inheritance is seen in most of the haemoglobinopathies therefore screening, counselling and prenatal diagnosis are main pillars of antenatal care in these patients. Although the pregnancy outcome in women with beta thalassemia minor is not significantly different from normal women, the incidence of fetal growth restriction and preterm births is quite high.[16]

STUDY LIMITATIONS

There were several limitations in our study. First, the conventional screening technique of haemoglobin electrophoresis was used. Although newer and more accurate techniques have evolved now but those are expensive and not widely available. Secondly, this was a hospital-based study and Khyber Teaching Hospital was the only centre selected for the study. A population-based study or inclusion of the other local hospitals could have given better idea about the prevalence of this disorder in a locality.

CONCLUSION

Our study concluded that beta thalassemia trait is very common and is

TABLE I: STRATIFICATION OF BETA THALASSEMIA TRAIT WITH AGE (n=194)

Age	Beta thalassemia trait	Frequency	Percentage	p-value
15-30 years (n=125)	Yes	65	52	0.113
	No	60	48	
31-45 years (n=69)	Yes	45	65.2	
	No	24	34.8	

found in more than half of pregnant anemic patients in our region.

RECOMMENDATIONS:

As beta thalassemia trait is a very commonly reported disorder in Khyber Teaching Hospital and even a mild form of anemia in early pregnancy can progress to severe forms resulting in more severe consequences. A large population-based study is needed for the assessment of anemia status in beta thalassemia trait patients. All pregnant women with anemia should be screened for beta thalassemia trait to prevent thalassemia major in successive generations.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

MQ: Concept & study design, acquisition, analysis & interpretation of data, drafting the manuscript, final approval of the version to be published

SA: Drafting the manuscript, critical review, final approval of the version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declared no conflict of interest

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