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HYPOTHYROIDISM INCIDENCE IN PATIENTS OF B THALASSEMIA MAJOR

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Abstract:

Objective: *This research's primary objective was to classify the occurrence of hypothyroidism in patients with major β-thalassemia.*

Place and duration of study: *This research was performed from July 2019 to February 2020 in the Pediatrics Department of Shaikh Zayed Hospital Lahore for eight months.*

Study Design: *It is a type of cross-sectional research.*

Sampling Technique: *Consecutive sampling method with non-probability*

Material and Methods: *A total of 75 patients with major β-thalassemia were chosen for this study. The maximum age was 5-15 years. The selection of patients was random from either sex. A sample of 3 ml of blood was delivered to a reputable laboratory to determine the TSH and T4 level. The ELISA package, to test the level of TSH and T4 level, was used. This data was analyzed to determine the incidence and percentage of hypothyroidism using SPSS version 20. Informed consent and ethical approval were obtained from patient families and hospital committees, respectively.*

Inclusion criteria: *Cases of confirmed beta-Thalassemia major Between 5 and 15 years of age groups for either sex.*

Exclusion criteria: *Acute Illness Patients, Patients with minor and intermediate thalassemia.*

Results: *Hypothyroidism was observed in the children having an average age of 10.48±2.6 years. A total of 22 patients were suffering from hypothyroidism (29.3 percent). Of these, eight patients (30.8%) were female, and 14 (28.6%) were male.*

Conclusion: *Children with β thalassemia major can also suffer from hypothyroidism, even in the absence of signs and symptoms. It is also essential to routinely screen children with beta-thalassemia for hypothyroidism to allow an early diagnosis and provide immediate care.*

Keywords: *Hypothyroidism, β thalassemia major, TSH, T4.*

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INTRODUCTION:

β-thalassemia is an autosomal recessive condition in which hemoglobin β-chain production is irregular. There are three severe, intermediate, and minor forms of beta-thalassemia. There is extreme anemia during the second half of the first year of life in patients who suffer from a major type and become symptomatic, and large blood transfusions are needed. It is the most common monogenic condition in the world. Every year in Pakistan, about 9,000 kids suffer from β thalassemia major. 5-7 percent is the approximated carrier average. Stem cell transplantation and daily transfusion of blood are two treatment modalities. Multiple risks are associated with frequent unnecessary transfusions of blood. Excessive iron deposition in various body organs, leading to early death, is typical. With the use of iron chelators, the survival rate has been enhanced, but at the expense of raising endocrine complications in long-term survivors, including hypogonadism, cardiomyopathy, diabetes mellitus, hypothyroidism, and hypoparathyroidism. In patients suffering from β thalassemia severe, subclinical, primary and core form of hypothyroidism has been observed and subclinical type is among those most frequently seen.

Signs and symptoms:

Cold intolerance, constipation, low school results, weight gain, and lethargy are signs and hypothyroidism symptoms.

Incidence of hypothyroidism in patients with β thalassemia major ranges from 7-78 percent. The research was carried out in the Lahore Children's Hospital, Department of Hematology, which included 70 beta-thalassemia patients, in which 25.7 percent of the patients had hypothyroidism. Our research aimed to determine the prevalence of hypothyroidism in patients with major types of beta-thalassemia, as previous studies' findings differ significantly. It may concentrate on early diagnosis and timely treatment of endocrine system-related complications and decrease mortality.

Sampling technique:

non-probability of sequential sampling technique

MATERIALS AND METHODS:

For this study, a total of 75 cases of patients with β-thalassemia major were chosen. The age limit was 5-15 years. Patients were chosen randomly from both genders. A sample of 3 ml of blood was taken and sent to a reputable laboratory to determine T4 and TSH levels. The ELISA package was used to test T4 and TSH levels. This data was analyzed to determine the percentage and incidence of hypothyroidism using SPSS version 20. Informed consent was obtained from patients' families, and ethical approval was obtained from the hospital's committee.

Criteria for inclusion:

reported cases of β Thalassemia major. Between 5 and 15 years of age, of either sex.

Exclusion criteria:

patients with acute disease Patients with mild and intermediate thalassemia

RESULTS:

Hypothyroidism was observed in children aged 10,48 ± 2,6 years on average. A total of 22 patients were suffering from hypothyroidism (29.3 percent). Of these, eight patients (30.8%) were female, and 14 patients (28.6%) were male.

Table 1: Gender distribution (n=75)

Gender	Frequency	Percent
Male	49	65.5
Female	26	34.7
Total	75	100.0

Table 2: Age distribution (n=75)

Age Distribution	Frequency	Percent
5-10 years	35	46.7
11-15 years	40	53.3
Total	75	100.0

Table 3: Mean TSH and T4 levels (n=75)

TSH/T4	Mean	Std. Deviation
TSH	4.4400	1.7339
T4	9.2267	1.4665

Table 4: Frequency of hypothyroidism frequency:

Hypothyroidism	Frequency	Percent
Yes	22	29.3
No	53	70.7
Total	75	100.0

DISCUSSION:

Frequent blood transfusions have improved life expectancy in patients with major beta-thalassemia for many decades. The use of iron chelators has reduced complications. Still, this treatment is costly, not readily accessible, and challenging to perform, and inadequate compliance is seen to lead to excessive iron in the body. As it can decrease mortality, early detection, and treatment of endocrine disorders associated with excessive frequent blood transfusions is significant. Hypothyroidism is the most significant endocrine abnormality because it can lead to growth defects that are very common in patients with major beta-thalassemia. According to our report, all patients had normal T4 levels, except for one, while 22 patients had elevated TSH levels and 53 patients had normal levels. Of the 75 total patients tested, 22 had hypothyroidism. Our research findings are consistent with the Malik et al. study, in which the incidence of hypothyroidism was 25.7 percent in patients with major beta-thalassemia. The disparity in treatment protocols can explain our study's minor variance. Dysfunction in the thyroid gland may be caused by excessive iron accumulation in the thyroid gland.

Iron overload and a vital control factor are some of the critical concerns in major patients with beta-thalassemia. Iron overload signs and symptoms typically occur in the 2nd decade of life. Still, numerous liver biopsies performed at an early stage of life show that iron deposition's toxic effects begin early. It is not yet fully known how tissue damage occurs due to iron overload. Still, it has been attributed to lipid peroxidation and free radical formation that damages lysosomal, mitochondrial, and sarcolemmal membranes. Hypothyroidism results from tissue damage that occurs in the thyroid gland. In patients with beta-thalassemia major, thyroid dysfunction was most frequently seen in older children, suggesting a link between hypothyroidism and old age. In our research, 10.48 was the mean age of the patients. It has also been shown that there is a correlation between age and increased levels of ferritin. It is because the older kids have been transfused with more blood, contributing to iron overload. Subclinical hypothyroidism was seen in 22 patients over 11 years of age in our sample who were not undergoing daily chelation therapy. No clear link between gender and

hypothyroidism has been seen. Further studies are required to find a link between thyroid dysfunction and iron overload in patients with beta-thalassemia. A weak indicator is a risk of underestimating the role of iron in thyroid dysfunction in overly overloaded patients with serum ferritin levels.

CONCLUSION:

Children with β thalassemia major may also suffer from hypothyroidism even in the absence of signs and symptoms. Therefore it is imperative to routinely screen children with beta-thalassemia for hypothyroidism to make an early diagnosis and provide immediate care.

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