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Original Research Article

To estimate Serum calcium Changes in thalassemia patients

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Abstract

Background & Methods: The aim of the study is to study estimate Serum calcium Changes in thalassemia patients. Patient should undergo blood investigation for serum calcium, phosphorus and Paratharmone. Four ml venous blood was collected in a plain vial, aseptically. Serum Paratharmone was estimated two sites labelled antibody radio-immunoassay.

Results: Maximum number of patients 46 (46% of cases) had serum calcium level 8.1-9mg/dl. 28 (28 % of cases) had serum calcium 7.1-8mg/dl. 14 (14%of cases) had serum calcium ≤7mg/dl and 12 patients had serum calcium >9mg/dl. The chi-square statistic is 21.4559. The *p*-value is < .00001. The result is significant at $p < .05$.

Conclusion: Frequency of blood transfusions increased with age. Mostly patients belong to 4-10 years of age group received 1 unit of RCC per month (30/35 cases) but cases who belongs to 11-14 years of age group mostly received 2 units of RCC per month (47% of total cases who belong to 11-14 years age group). All (100% of cases) patients diagnosed as thalassemia major. Maximum number of patients 46 (46% of cases) had serum calcium level 8.1-9mg/dl.

Keywords: Serum, calcium, & thalassemia.
Study Design: Observational Study.

1. Introduction

Thalassemia is the genetic disorders in globin chain production. In individual with β-thalassemia, there is either a complete absence of globin gene production or a partial reduction. Although, β-thalassemia has more than 200 mutations, most are rare. Approximately 20 common alleles constitute 80 percent of the known thalassemia worldwide[1]. 03 percent of the world's population carries gene for β-thalassemia (20). It has high incidence in a broad tropical belt extending from Mediterranean region through the Middle East and Far East. The largest concentration of thalassemia patients is seen in South-east Asia, Bangladesh, North-west India, Pakistan, Middle-east countries, North-Africa, Greece and Italy[2]. Frequency of thalassemia gene in Indian population varies between 0-17 percent in different ethnic group with average of over 03 percent [3]. Its prevalence is high among Gujratis, Punjabis, Sindhis, Lohanas etc. Over thirty million people are carriers of

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thalassemia gene in our country. Ten thousands thalassemic children are born every year in India.

The major features contributing to the pathogenesis of sequelae of β-thalassemia are inadequate β globin chain production leading to decreased levels of normal hemoglobin (Hb A) and an imbalanced α and β globin chain production. There is disruption of maturation of red blood cells, resulting in ineffective erythropoiesis[4]. Though the marrow is hyperactive, the patient has relatively few reticulocytes and severe anaemia. Since there is an excess of α chains relative to β and γ chains, α tetramers are formed[5].

2. Material and Methods

This Prospective Cross Sectional Study was conducted in the Department of Paediatrics of Amaltas Institute of Medical sciences, Dewas from Jul 2019 to Jun 2020 on 100 patients. Patient should undergo blood investigation for serum calcium, phosphorus and Paratharmone. Four ml venous blood was collected in a plain vial, aseptically. Serum Paratharmone was estimated two sites labelled antibody radio-immunoassay.

INCLUSION CRITERIA

Thalassemia patients included in the study are:

- Aged from 4-14 years who requiring regular packed red blood cells transfusion.

EXCLUSION CRITERIA

- Having some renal disease
- Malabsorption syndrome
- On long term anticonvulsant therapy
- Taking vitamin D and calcium supplementation

3. Result

TABLE NO. 1: AGE DISTRIBUTION OF CASES

Age	No. of cases	Percentage
04-10	70	70
11-14	30	30

ABLE NO 2: SEX WISE DISTRIBUTION OF CASES

Sex	No. of cases	Percentage
Male	56	56
Female	44	44

Maximum Patients were male children (56%) and Females constituted 44%.

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TABLE NO. 3: TYPE OF THALASSEMIA

Type	No. of cases	Percentage
Thalassemia major	100	100
Thalassemia Intermedia	00	00
Thalassemia Minor	00	00

All (100% of cases) patients diagnosed as thalassemia major.

TABLE NO. 4: SERUM CALCIUM LEVEL IN THALASSEMIA PATIENTS

Serum calcium level	No. of patients	Percentage
≤ 7 mg/dl	14	14
7.1-8 mg/dl	28	28
8.1-9 mg/dl	46	46
>9 mg/dl	12	12

Maximum number of patients 46 (46% of cases) had serum calcium level 8.1-9mg/dl. 28 (28 % of cases) had serum calcium 7.1-8mg/dl. 14 (14%of cases) had serum calcium ≤7mg/dl and 12 patients had serum calcium >9mg/dl. The chi-square statistic is 21.4559. The *p*-value is < .00001. The result is significant at $p < .05$.

4. Discussion

We studied cases with high ferritin levels (>1500 μg/L) leading to the deposition of iron on soft-tissues causing hemosiderosis thus resulting in damage to the parathyroid gland function[6]. As per previous studies, the prevalence varies greatly from low to as high as 22.5%. Hypoparathyroidism is well-known to occur in thalassemia major patients. In our study, mean parathormone level is 29.7±19.59pg/ml. Khalida Parveen Basha in 2009 also showed that significant decrease in PTH (p <0.001) was observed. In our study out of 50 cases 6(12% cases) had low serum parathormone level which suggest hypoparathyroidism[7]. In these 6 cases all had low calcium level and 4 had high phosphorus level. In study done by Cao A, Galanello R, Rosatelli MC, et al in 1996 is shows that adecrease of parathyroid hormone (PTH) levels in the absence of symptoms has been reported in over 12% of the patients examined. Shamshirsaz et al(53) and Carmen Barbu et al in their study also shows that Hypoparathyroidism was found in 7% of patients[8].

In our study all 6 cases who diagnosed as Hypoparathyroidism aged between 11-14 years of age. So it is shows that risk of hypothyroidism increasing with age. A study also reported that untreated transfusional iron overload in thalassemia major is fatal in the second decade of life.

In our study there are 6 cases diagnosed as hypoparathyroidism from them 3 case received ≤120cc/kg/year, one received 121-180cc/kg/year and 2 cases received 181-240cc/kg/year packed red blood cell transfusion. So, in our study it was observed that there is no clear relationship between Hypoparathyroidism and APCRR (Annual Packed Cell Requirement Rate) by using Pearson correlation test. The cause of Hypoparathyroidism in

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thalassemia is assumed to be iron 49 deposition in parathyroid glands, but the reason why some patients develop Hypoparathyroidism and others do not, is not exactly known[9].

5. Conclusion

Frequency of blood transfusions increased with age. Mostly patients belong to 4-10 years of age group received 1 unit of RCC per month (30/35 cases) but cases who belongs to 11-14 years of age group mostly received 2 units of RCC per month (47% of total cases who belong to 11-14 years age group). All (100% of cases) patients diagnosed as thalassemia major. Maximum number of patients 46 (46% of cases) had serum calcium level 8.1-9mg/dl.

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