

**Usefulness of RET-He in Evaluation of Anemias in Pediatric Age Group in A Tertiary Care Centre, in Telangana, A Cross Sectional Study**Fakeha Firdous<sup>1</sup>, Zu Afshan Sultana<sup>2</sup>, Anjani M<sup>3</sup>, Md. Saad Hussain<sup>4</sup>, G J Vani Padmaja<sup>5</sup><sup>1</sup>Assistant Professor, Pathology, Niloufer Hospital, Hyderabad<sup>2</sup>Assistant Professor, Pathology, Niloufer Hospital, Hyderabad<sup>3</sup>Associate Professor, Pathology, Niloufer Hospital, Hyderabad<sup>4</sup>Medical Intern, Ayan Medical College<sup>5</sup>Professor, Pathology, Niloufer Hospital, Hyderabad

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Conflict of interest: Nil

**Abstract:**

**Introduction:** Anemia in pediatric age group can be due to various etiologies ranging from simple nutritional cause to severe cause like haematological malignancy. Childhood anemias need to be evaluated thoroughly in order to reduce the morbidity of these children. Routine biochemical parameters are helpful in evaluating anemias. RET-He is an important marker for early detection of anemia, thereby reducing the morbidity of the cases.

**Aim:** To study the usefulness of RET-He in anemic children by comparing it with other parameters of hemogram and HPLC.

**Materials and methods:** This cross sectional study was carried out in Pathology department of Tertiary care pediatric hospital in Telangana, India, from May 2022 to May 2023. The RET-He values were compared with various parameters in the hemogram along with HPLC of the patients.

**Results:** A total of 172 cases were evaluated and the levels of RET –He was compared with other hemogram parameters and HPLC.

**Conclusion:** It was concluded that reticulocyte haemoglobin levels provides us useful information for the early diagnosis, treatment and monitoring of anemias in pediatric age group.

**Keywords:** RET-He, Anemia, Pediatric, Iron deficiency, HPLC.

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**Introduction**

Measuring the haemoglobin content of reticulocyte is also known as RET-He or reticulocyte haemoglobin equivalent. It is the fastest way to detect changes in iron status.

By measuring the haemoglobin content of reticulocytes, we can assess the actual amount of iron used for synthesis of haemoglobin. It can also indicate whether there is enough iron available for erythropoiesis or not.

Conventional biochemical markers which are available for assessing iron status like serum iron, transferrin or ferritin are drastically disturbed during inflammation as an acute phase response or in other severe disease conditions; thereby the interpretation of results is impossible or difficult.

RET –He is considered the most sensitive indicator for assessing the current status of available iron for erythropoiesis. It will be very helpful to the

clinicians to draw conclusion on both the quantity and quality of young RBC fraction. It is a fast, practical test, inexpensive and an early marker for disease-even earlier than clinical biochemistry markers. Normal range for RET-He is 28-36pg.

RET –He is very useful in evaluating patients with iron deficiency anemia, anemia of chronic disease and in patients with nephrological disorders. A high/normal ferritin value together with a low RET-He value suggests functional deficiency.

**Materials and Methods**

This cross sectional study was done in department of pathology at Niloufer hospital/OMC, Hyd, from May 2022 to May 2023, the number of cases in our study in the above mentioned study period were 172.

**Inclusion criteria:** All pediatric patients coming to the outpatient department with clinical diagnosis of anemia were included in our study.

**Exclusion criteria:** Patients with a recent history of blood transfusion and cases of haematological malignancies were excluded from our study.

In our study, the diagnostic performance of RET-He which was provided by Sysmex XN 1000 analyser was evaluated and compared with other parameters provided by the same like-HB, RBC, MCV, MCH and HPLC done using D10 Biorad analyser. Fresh blood samples were evaluated, which were collected in EDTA vacutainers, without any delay in processing of samples. Usage of fully automated hematology analyser cans

alleviate the need of manual techniques and invasive procedures.

Results: In our study 172 cases of anemia were evaluated. The mean age group was 6years with age ranging from 0-12 years, youngest patient was 5 days and oldest was 12 years. MCV ranging from 47.7 to 115.3pg, RBC count ranging from 0.85 to 6.56 million/cumm, MCH ranging from 10-39.6, RET-He ranging from 10.3 -40.7. Number of males was 109 and number of females was 63. Low RET-He was observed in 151 cases. Hemoglobinopathies noted in our study 15, which included beta thalassemia 8, sickle cell anemia 4 and hereditary persistence of fetal haemoglobin 3 cases.

#### Tables:

**Tables 1: Age and Sex distribution:**

| Age group | Male | Female | Total |
|-----------|------|--------|-------|
| 0-2       | 70   | 35     | 105   |
| 2-6       | 26   | 15     | 41    |
| 6-12      | 13   | 13     | 26    |
|           |      |        | 172   |

**Tables 2: Mean RET-He:**

|      |       |
|------|-------|
| 0-2  | 18.5  |
| 2-6  | 17.37 |
| 6-12 | 23.28 |

**Tables 3: Mean RET-he in hemoglobinopathies:**

| Age group  | Mean RET-he in hemoglobinopathies |
|------------|-----------------------------------|
| 0-12 years | 19.9                              |

#### Discussion:

Evaluation of RET-He can be carried out as a routine marker of latent anemia to identify at risk patients [1]. It can also be used as a routine screening test to detect iron deficiency [2] RET-He can be used as a single screening parameter without the consideration of other iron parameters [3]. RET-He is a real time indicator of iron supply to developing RBCs and also earliest marker to respond to iron therapy [4]. it is useful for screening of iron deficiency, diagnosis of iron deficiency anemia and diagnosis of functional iron deficiency anemia in acute or chronic diseases and also helps to monitor iron therapy [5]. it may also improve the targeting of iron supplementation programs in resource limited countries[6-9]

The RET –He provides information about the current availability of iron in erythropoiesis.it is independent of acute phase and can be determined in few minutes of blood count [10,3]

The classical haematological parameters can be recognized at a relatively late stage due to the approximate 120days lifetime of erythrocytes. As the haemoglobin content of reticulocytes reflects the actual iron metabolism of erythropoiesis, it

provides an assessment of quality of cells. Therefore any changes in iron status of erythropoiesis can be detected earlier rather than the haemoglobin content of mature erythrocyte [MCHC][1,11].

RET-He exhibits recent changes in synthesis of haemoglobin in reticulocytes. Therefore the RET-He levels in beta thalassemia trait were lower than iron deficiency anemia.

#### Conclusion

Thus by using RET-He to evaluate iron deficient state in patients with anemia improves the diagnosis of iron deficiency anemia and early iron deficiency, especially when they are confounding factors like inflammation combined iron deficiency and hemoglobinopathies.by including the RET-He in routine hemogram, we can identify iron deficiency at an early stage and provide iron deficiency anemia by providing iron therapy, thereby reducing their morbidity. Therefore we conclude that RET-He is a sensitive indicator for iron availability for erythropoiesis .it is an easy, simple, inexpensive investigation which can be carried out in all laboratories as an early marker of the disease.

**Consent:** Informed written consent from parents/guardians.

**Ethical clearance:** Taken from college ethical committee.

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