Research Article

CD19 and CD24 in beta thalassemia major and iron deficiency anemia in children

Hanan M. Kamel, Gehan L. Abdel Hakim, Nagwa I. Okaily Diab and Alaa A. Rashed
Department of Clinical Pathology, El-Minia Faculty of Medicine

Abstracts

Introduction: β-Thalassemia major is a hereditary hemolytic anemia caused by defect in β globin chain synthesis. **Aim of the work: The aims of this study are:** 1- Detection of CD19 and CD24 expression among children with β-thalassemia major and iron deficiency anemia. 2- The relationship of CD19 and CD24 to the clinical course of β-thalassemia major and iron deficiency anemia. 3- Correlation of CD19 and CD24 in β-thalassemia major and iron deficiency anemia. **Subject and Methods:** This prospective cohort study was conducted in the Department of Clinical pathology and Pediatric Hematology Unit at Minia University hospitals during the period from June 2017 to March 2018. This study included 60 patients in addition to 30 healthy controls, their age ranged from 9 months to 12 years. **Results:** Thirty beta thalassemia major children, thirty iron deficiency anemia children and thirty apparently healthy children as control, their age ranged from 9 months to 12 years. They were selected from out-patient clinics and those who were admitted in Pediatric department in Minia University hospital from June 2017 to March 2018. **Discussion:** β-thalassemia syndromes are the most common inherited hemoglobinopathies in the world caused by a genetic deficiency in β-globin chain synthesis. **Summary:** This study aimed to assess CD19 and CD24 expression in beta thalassemia major and iron deficiency anemia, and to evaluate their association with different demographic and laboratory data, as well as their relation to disease out come.

Keywords: BM: Bone marrow, AST: Aspartate transaminase, DB: Direct bilirubin

Introduction

β-Thalassemia major is a hereditary hemolytic anemia caused by defect in β globin chain synthesis. It is considered the most common hemoglobinopathy in Egypt and is one of the major health problems in our locality (Zahran et al., 2016).

Long life blood transfusion is the main supportive treatment of this disorder. The beneficial effect of regular blood transfusion is to maintain growth and development during childhood (Elsayh et al., 2016).

Iron deficiency is the most common cause of anemia worldwide, it is a state of low total body iron content. Iron deficiency anemia develops when body iron stores are depleted, level of circulating iron is reduced and there is insufficient iron available for erythropoiesis (Naqash et al., 2018).

Iron deficiency causes can be broadly classified into four groups: inadequate dietary intake, defective absorption, excessive loss of iron, or increased requirements (Nguyen et al., 2017).

CD19 is a 95-kDa transmembrane receptor present on progenitor B cells, naïve and memory B cells, as well as on plasma blasts, but not on terminally differentiated plasma cells. High-affinity associations of CD19 with CD21, CD81, and CD225 alter B cell responses both quantitatively, acting as an enhancer of activation signals, and qualitatively, promoting survival (Teplyakov et al., 2018).

CD19 is expressed throughout B-cell development and plays a critical role in maintaining the balance between humoral, antigen- induced immune response and tolerance induction (Forsthuber et al., 2018).

Subject and Methods

This prospective cohort study was conducted in the Department of Clinical pathology and Pediatric Hematology Unit at Minia University hospitals during the period from June 2017 to March 2018. This study included 60 patients in

addition to 30 healthy controls, their age ranged from 9 months to 12 years.

Children were classified into the following two groups:

Group I: It included 30 beta thalassemia major children.

This group was divided into two subgroups:

- Group Ia: 15 patients with chelation therapy.
- Group Ib: 15 patients without chelation therapy.
- Group II: It included 30 iron deficiency anemia children.

This group was divided into two subgroups:

- Group II a: 15 patients under treatment.
- Group II b: 15 newly diagnosed patients.
- Group III (Control group): It included 30 healthy controls.

After obtaining written informed consent from their parents, all children were subjected to the following:

1- Careful history taking.
2- Clinical Examination:
- General examination.
- Abdominal examination.
- Radiological examination: abdominal ultrasonography.

Results

Thirty beta thalassemia major children, thirty iron deficiency anemia children and thirty apparently healthy children as control, their age ranged from 9 months to 12 years. They were selected from out-patient clinics and those who were admitted in Pediatric department in Minia University hospital from June 2017 to March 2018 .

They were subdivided into three groups:

Group I (beta thalassemia major children): their age ranged from 1 to 12 years with mean± SD 6.6±3.7.

Group Ia: Included 15 patients with chelation therapy.

Group Ib: Included15 patients without chelation therapy.

Group II (iron deficiency anemia children): their age ranged from 9 months to 12 years with mean ± SD 5.5±2.7.

Group II a: Included 15 patients under treatment.

Group II b: Included 15 newly diagnosed patients

Group III (control group):

Thirty apparently healthy children. All the control participants were matched with patient population in terms of age ranged from 9 months to 12 years with mean ± SD 6.4±3.7.

Table (1): Demographic data of different groups

	Group I (n=30)	Group II (n=30)	Group III (n=30)	P value		
				I vs II	I vs III	II vs III
Age (years)						
Range	(1-12)	(0.8-12)	(0.8-12)	*0.275*	*0.859*	*0.274*
Mean ± SD	6.6±3.7	5.5±2.7	6.4±3.7			
Sex						
Male	14(46.7%)	13(43.3%)	14(46.7%)	0.795	1	0.795
Female	16(53.35%)	17(56.7%)	16(53.3%)			

Chi square test for qualitative data between the three groups

Table (1) showed comparison between group I, II and III as regards age and sex.

There was no statistically significant differences between group I, II and III regarding age and sex.

Discussion

β-thalassemia syndromes are the most common inherited hemoglobinopathies in the world caused by a genetic deficiency in β-globin chain synthesis (He et al., 2017).

Manifestations of beta thalassemia major are those of anemia, failure to thrive and organomegaly. Patients presenting later will have signs of extramedullary hematopoiesis; (frontal bossing of the skull, hepatosplenomegaly, thinning of long bones cortices, widening of medullary and diploic spaces; resulting in bossing of skull, prominence of the upper incisors and wide separation of orbits (Origa et al., 2017).

Summary

This study aimed to assess CD19 and CD24 expression in beta thalassemia major and iron deficiency anemia, and to evaluate their association with different demographic and laboratory data, as well as their relation to disease out come.

Subjects were classified into:

- Group I: It included 30 beta thalassemia major children

This group was divided into two subgroups:

- Group Ia: 15 patients with chelation therapy.
- Group Ib: 15 patients without chelation therapy.
- Group II: It included 30 iron deficiency anemia children.

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