Original Article

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Thrombocytopenia! Is it Related to Microcytic Hypochromic Anaemia?

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Abstract

Background And Objectives: Anaemia in children is one of the major health problems in India as well as in many parts of the world. Iron deficiency is well known to cause thrombocytosis. However, Iron deficiency may also lead to thrombocytopenia. The present study was undertaken with an aim to analyse, the improvement in the platelet counts of children between 1 to 12 years of age suffering from microcytic hypochromic anaemia and thrombocytopenia after receiving appropriate iron therapy. *Methodology:* The study was conducted on 561 anemic children in the age group of 1 to 12 years, out of which only 67 children had microcytic hypochromic anemia with thrombocytopenia. The children with Hb% lesser than the cut-off value for their age were included in the study. Detailed clinical history was elicited and thorough clinical examination was performed. Peripheral smears of these patients were examined. Bone marrow examination was done. The complete haemogram including reticulocyte count was done. *Results:* Childrens with microcytic hypochromic anemia with thrombocytopenia(60 cases) improved with iron therapy whereas in 7 cases causes of thrombocytopenia was different. *Interpretation and Conclusion:* Pediatric anaemias are very common since children are the most vulnerable for occurrence of these anaemias and thrombocytopenia can be encountered in many cases of microcytic hypochromic anaemia. Therefore it is also necessory to rule out this association before considering other causes of thrombocytopenia in cases of microcytic hypochromic anemia.

Keywords: Microcytic Hypochromic Anaemia; Thrombocytopenia; Bone Marrow Study; Iron Deficiency Anaemia; Paediatric Anaemia.

Introduction

Anaemia in children is one of the major social health problems in India, especially in rural India and in many parts of the world. Anaemic children have reduced exercise capacity, slower rate of growth, impaired cognitive development, and delayed wound healing [1]. Anaemic children are also at an increased risk of dying due to complications associated with malnutrition and infection. Prevalence rate of anaemia is an important indicator of the nutritional status within the pediatric population. As many as 20 percent of the children in the United states and 80 percent of the children in the developing countries are anaemic at some point by the age of 18 [2].

Iron deficiency is the most common etiology of anaemia in children worldwide. Although the prevalence of iron deficiency has steadily declined among infants in the United States owing to a successful initiative to improve dietary iron intake [3], in developing countries like India, 39% children below 5 years and 48% children between 5 – 14 years still suffer from anaemia [4].

It is reported that, in Asia, the prevalence of anaemia in children below two years of age will possibly surpass 90% of children [5].

Iron deficiency anaemia is the commonest form of nutritional deficiency in the world responsible for the staggering amount of ill health, cost productivity, increased mortality and morbidity. It remains the most common hematologic disease in infants and children

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[2].Iron deficiency is well known to cause thrombocytosis. However, iron deficiency may also lead to thrombocytopenia. This has been described in both children and adults [7-11]. The present study was undertaken with an aim to analyse, the improvement in the platelet counts of children between 1 to 12 years of age suffering from microcytic hypochromic anaemia and thrombocytopenia after receiving appropriate iron therapy.

Materials and Methods

The present study was conducted on 561 patients in the age group of 1 to 12 years, who were admitted to pediatric ward of S Nijalingappa Medical College, Bagalkot with anaemia and also those who presented with other complaints and were incidentally found to have anaemia.

A detailed history was elicited along with a thorough clinical examination. The required quantity of venous blood was collected in EDTA tubes, which was analyzed using Swelab Alfa cell autoanalyser, having three part differentials.

Peripheral smears were prepared on glass slides and stained with Leishman's stain. The reticulocyte count was done by the supravital staining technique using Brilliant cresyl blue. Bone marrow aspiration was done and slides were stained with Giemsa stain.

Study was conducted after getting Ethical clearance.

Results

Out of 561 anaemic children enrolled in the study over a period of one year,332 children had microcytic hypochromic anaemia (Table 1)and amongst these 67 had thrombocytopenia. The morphological diagnosis of anaemia given on peripheral smear examination was later confirmed by doing bone marrow study in all the cases. In 90% cases, thrombocytopenia improved with iron therapy, where as in 10% cases actual cause of thrombocytopenia was malaria and viral fever (Table 3). The 45 cases of thrombocytopenia that had platelets count below 50,000/cumm had severe anaemia (Table 2). Children with malaria and viral fever had platelet count in between 50000 to 1.5 lakh/cumm.

Table 1: Distribution of various morphological types of anaemia

Etiology	Number	Percentage
Microcytic hypochromic anaemia	332	59
Normocytic hypochromic anaemia	122	22
Dimorphic anaemia	49	09
Normocytic normochromic anaemia	45	08
Macrocytic anaemia	08	01
Hemolytic anaemia	06	01
Total	561	100

Table 2: Gradation of thrombocytopenia

Range (/cumm)	No of cases
<50000	45
>50000to 1 lakh	06
1.0 lakh to 1.50 lakh	15

Table 3: Cause of thrombocytopenia

Diagnosis	Cases
Microcytic hypochromic anaemia	60
Malaria	03
Viral fever	04

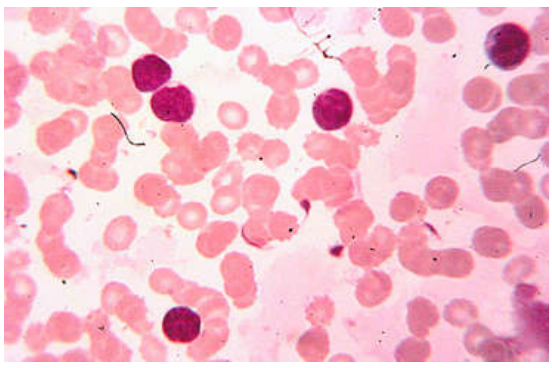

Fig. 1: Peripheral smear showingmicrocytic hypochromic cells, Leishman's stain (X400)

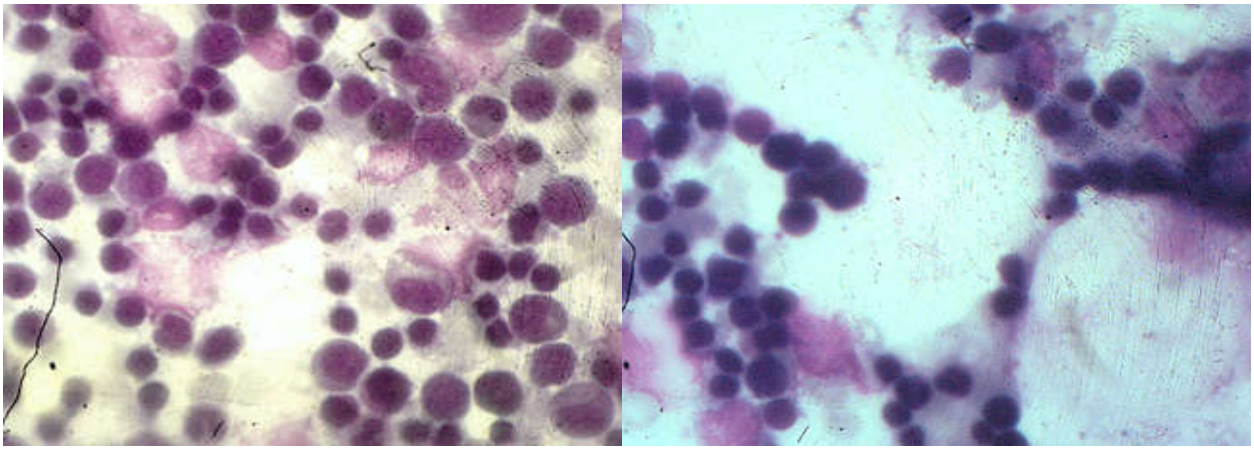

Fig. 2: Bone marrow aspiration smear showing micronormoblasts, Giemsa stain (X400)

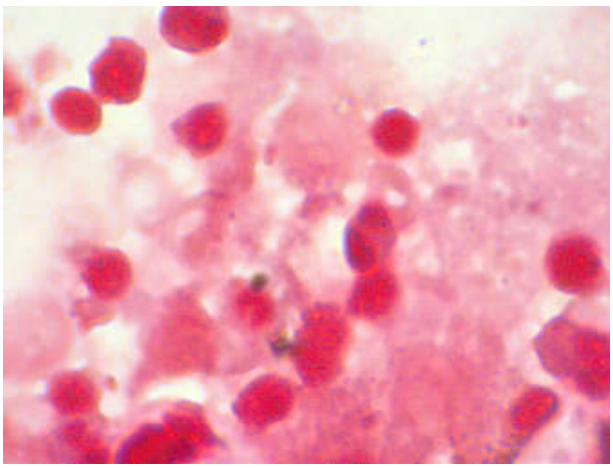

Fig. 3: Bone marrow aspiration smear showing reduced iron store. (Grade-0) Pearl's stain (X1000)

Discussion

Pediatric anaemia is an important universal problem [12]. It is a critical issue which needs to be addressed on a priority basis especially in the developing countries [13]. Nutritional anaemia is a recongnized public health problem worldwide [14].

Iron deficiency anaemia is the commonest form of nutritional deficiency in the world responsible for the staggering amount of ill health, cost productivity, increased mortality and morbidity. Even in the developed countries, iron deficiency with or without anaemia is still prevailing in infants, toddlers, adolescent females and women of the child bearing age. It remains the most common hematologic disease in infants and children [15].

Treatment with oral iron usually increases the haemoglobin concentration by at least 1g/dL within one month of starting iron supplementation [16]. Often, iron deficiency isassociated with normal or elevated platelet counts [17] but in this study it was observed that 67 children out of toatal 561with microcytic hypochromic anaemia presented with varying degrees of thrombocytopenia, which is an unusual finding. However in studies done by Gross and colleagues, Lopas etal [8], Perlman et al [18]and Van K morris et al [19] only few cases of microcytic hypochromic anaemia presented with thrombocytopenia.

This study is one of its own kind,werein large number of cases were included and in which observations were made. In all the cases with microcytic hypochromic anaemia, bone marrow revealed reduced number of megakaryocytes which is in concordance with Lopas et al. All 60 cases of microcytic hypochromic anaemia with varying degrees of thrombocytopenia showed improvement in their platelet counts, on administration of iron therapy. Increased haemoglobin percentage in all these cases was well correlated with increased reticulocyte counts and correction in the platelet counts were assessed on follow-up peripheral smear examinations. In two of these cases, bone marrow study showed increased number of megakaryocytes after iron therapy.

Conclusion

Thrombocytopenia can be encountered in many cases of microcytic hypochromic anaemia. Therefore it is recommended that one should not only rule out other causes of thrombocytopenia like viral infections and conditions related to bone marrow suppression but also consider that, this reduced platelet count can be purely associated with microcytic hypochromic anaemia. However, exact cause of this association is still unclear and further workup is still needed to prove the underlying cause of this association.

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