Anemia In Well-Baby Clinic Of Community Hospital

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Abstract: The objective of this study is to evaluate the prevalence of anemia in apparently- healthy infants in Well-baby clinic of community hospital. There are 182 apparently healthy 9 months old infants enrolled. Boys and girls are 107:75. The prevalence of anemia is 60%, with mean hemoglobin 9.73 g/dL. Sensitivity and specificity of "look pale" are 25.69% and 86.30%, comparing with blue sclera are 62.39% and 46.58%. Positive predictive value and negative predictive value of Look pale and blue sclera are 73.88%, 43.50%, 63.78% and 45.08% respectively. It is low accuracy to employ clinically on anemia detection. It needs more sophisticated measurements on infant screening. The anemic infants have more deleterious effect on cognitive performance and behavioral development than controls and might persist into adulthood. We have recommended that all 9 months old infants, even looked healthy, have to measure hemoglobin routinely and early treated.

Key words: Anemia, Well-baby clinic, infant, Prevalence

Introduction

Iron deficiency anemia is an old and common clinical problem throughout the world and an enormous public health problem in developing countries. This is in contrast to the fact that iron is the most abundant metal in the earth's crust. It effects roughly 25% of the population or more than one billion1 thoughout the world. Infants are highly susceptible populations groups due to low birth weight, early consumption of cow's milk, fast growth rate and poor dietary iron intake [2]. One-half or more of anemic infants have iron deficiency anemia1. The clinical features are koilonychia, cheilosis, glossitis, dysphagia, impaired exercised capacity and congestive heart failure in advanced severity. They are even now rarely found on clinical practice. The most important systemic abnormality is the alteration in cognitive performance and behavioral development [3,4,5,6]. Most infants with iron deficiency anemia did not improve in developmental tests scores [5,6,7], even though they had a good iron status. Concerning on this problem that was our motivation to evaluate the prevalence of anemia in healthy 9 months old infants in our Well-baby clinic.

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Methods

The study of 9 months old infants was conducted in Well-baby clinic of Pakchong Nana hospital, Nakorn Ratchasima province during July to December 1996. The population of this community were mainly on low to middle class. They were regularly visited to our Well-baby clinic on schedule and selected for the study. Only infants who met the following criteria were eligible: birth weight more than 2.5 kilograms with uncomplicated birth, no congenital malformations, no family history of thalassemia, no acute or chronic medical problems, normal weight and height for ages and appropriate development for ages. The infants entered the study by allowing from their parents. They were examined by pediatrician and drawn 1 milliliter blood from superficial vein of their hands by trained nurse. Hemoglobin concentration, mean corpuscular volume, and mean corpuscular hemoglobin were measured by electronic cell counter. (Hycel Model HC 680 Plus) Anemia was defined as hemoglobin less than 11 g/dL.

Results

The sample included 182 infants enrolled the study. The prevalence of anemia was 60%. Boys and girls was 107:75. Boys had more anemia than girls 1.73 times. The means for weight and height were 8.84 kilograms and 69.56 centimeters in anemic group and 8.78 kilograms and 69.92 centimeters in nonanemic group respectively. It did not significantly differentiate in both groups. The values of Hemoglobin, mean corpuscular volume and mean corpuscular hemoglobin in anemic group were 9.73 + 0.80 g/dL, 67.26 + 2.39 fL/dL and 20.69 + 2.90 pg/dL. The values of Hemoglobin, mean corpuscular volume and mean corpuscular hemoglobin in non-anemic group were 11.65 + 0.69 g/dL, 73.69 + 6.26 fL/dL and 23.4 + 2.14 pg/dL respectively. The prevalence of anemia was 60%. It was divided by severity into three groups. The first was mildly anemic group (hemoglobin=10.4-10.5 g/dL), there was 17.43%. The second was moderately anemic group (hemoglobin=84-10.4 g/dL), there was 76.15%. The last was severely anemic group (hemoglobin less than 8.4 g/dL), there was 6.42%. The characteristics of infant study showed on table 1. Forty-one percents of infants who received breast feeding of 5 or 6 months at least had prevalence of anemia seventy percents. Only one infant received has oral iron supplement since four months of life.

TABLE 1 The characteristics of infant study

INDEX	anemia	non-anemia
Ages (months)	9	9
Boy:Girl	69:40	38:35
Weight (kg)	8.84+1.00	8.79+1.06
Height (cm)	69.56+2.39	69.92+2.32
Hemoglobin (g/dL)	9.73+0.80	11.65+0.69
MCV (fL)	67.26+7.86	73.69+6.26
MCH (pg)	20.69+2.90	23.4+2.14

MCV=mean corpuscular volume
MCH=mean corpuscular hemoglobin
Values are expressed as means +SD

TABLE 2 comparison of "Look pale" and "Blue sclera" as screening signs on anemia detection

Signs	Look pale	blue sclera
Sensitivity	25.69%	62.39%
Specificity	86.30%	46.58%
PPV	73.88%	63.78%
NPV	43.50%	45.08%

PPV=Positive predictive value
NPV=Negative predicitive value

Sensitivity and specificity of Look pale were 25.69% and 86.30% and were 62.39% and 46.58% in blue sclera as well. PPV and NPV of Look pale and blue sclera were 73.88%, 43.50%, 63.78 and 45.08% respectively. They had been summarized on table 2. These signs were too low accuracy on anemia detection.

Discussion

In this descriptive study we evaluated a group of apparently healthy 9 months old infants visiting to our Well-baby clinic. The prevalence of anemia was 60%, with mean hemoglobin 9.73 g/dL. It was higher than we expected. The moderately anemic infants were mostly found. And the most important evaluation was seven percents of severely anemic infants. This group must be paid attention and reevaluation. They had coincidentally other causes of anemia such as thalassemia. This hospital was one of the mother-child relationship hospital that has been approved by the public health ministry since 1996. But only forty one percents of infants received breast feeding of 5 or 6 months at least. In this group, the prevalence of anemia was seventy percents. We thought that they perhaps received partially breast feeding. We can not discriminate exactly the causes of anemia in infants. We agreed with DeMaeyer et al.[1] that the leading cause of anemia in infants was iron deficiency. The population of this community have a high incidence of thalassemia and sometimes misdiagnosed as having iron deficiency anemia. They may be inappropriately treated with iron for a long time. This a weak point of this study that did not discriminate thalassemia from iron deficiency anemia. It needs more sophisticated instruments for proper diagnosis. The study of Bessman et al [2] and Flynn et al [3] showed that red blood cell dis-

tribution width elevated in iron deficiency anemia but not in thalassemia. So a low mean corpuscular volume and hemoglobin coupled with an elevated red blood cell distribution width were strongly suggestion of iron deficiency anemia. The other method of detecting iron deficiency anemia was to give a therapeutic trial of iron. If hemoglobin increased at least 1.0 g/dL within 4–6 weeks of starting treatment, iron deficiency anemia should be considered. All six studies[4,5,6,7,8,9] showed that the anemic infants scored lower on mental development tests than comparison groups. Five [4,6,7,8,9] of the studies showed that the anemic infants scored lower on motor tests as well. After completing or nearly completing correction of iron status, the anemic infants could not be improved psychomotor performance in study by Iozoff et al. [7,9] and Walter et al. [8], was unequivocally recovery by idjradinata et al. [11] Sensitivity and specificity of "look pale" were 25.69% and 86.30% respectively and were 62.39% and 46.58% in blue sclera as well. Positive predictive value and negative predictive value of "look pale" were 73.88% and 43.50%. It was 63.78% and 45.08% in blue sclera. These signs were too low accuracy to employ clinically detection anemia. This study showed that all apparently healthy 9 months old infants had to measure hemoglobin for anemia detection. Concerning to this problem that motivated us to evaluate the prevalence of anemia in 9 months old infants. Intervention [8] at 9 months of age should have a high priority and proper time, particularly in view of the possibility of irreversible psychomotor would delay in 12 months old infants The guidelines for the prevention iron deficiency have been summarized [12,13] as follow:

　　　1. Encourage breast milk for at least five to six months. If an infant remains exclusively breast-fed beyond six months of age, and iron supplement should be given to provide 1 mg per kilogram per day.

　　　2. The infant who is not breast-fed should be provided with an iron-fortified formula for the first 12 months of life.

　　　3. When solid foods are introduced into the diet, an iron-enriched cereal should be among the first foods provided.

　　　4. Avoid feeding of whole cow's milk during the first 12 months of life.

　　　The study of Nelle et al. [14,15] reported that delayed cord clamping can prevent or delay depletion of iron stores during late infancy. It endowed about 30–50 mg of "extra" iron. It does not significantly increase neonatal jaundice, nor detrimental hemodynamic changes. So it is a physiological and effective way to prevent anemia in late infancy. It may provide a change of early contact between a mother and her baby and in other words it may promote breast feeding. It should be more studied before routinely used instead of immediate cord clamping. This study emphasizes on detection and prevention of iron deficiency anemia in late infancy.

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