

*Research Article***Vascular Endothelial Growth Factor Levels in Serum of Anaemic Infants and Breast Milk of Their Mothers.****Mohamed F. Afify, Salwa H. Swelam, Hend M. Moness and Christina k. kamel**

Department of Pediatric, El-Minia Faculty of Medicine

**Introduction**

Anaemia remains the most prevalent nutritional disorder among children in the Middle East and North Africa region. Between 2000 and 2005, the prevalence of anaemia increased from 37.04% to over 52% among Egyptian children between 12 months and 36 months of age. Children under the age of 24 months who had recently been sick and those who resided in Upper Egypt were significantly more likely to be anaemic. (Austin et al., 2012)

The major problem in anemia is insufficient oxygen supply to meet the requirement for tissue oxygenation. Systemic oxygen delivery depends on cardiac output and arterial oxygen content. Although anemic infants have increased cardiac output, echocardiographic measurements are not very useful for determining the need for transfusion. Because arterial oxygen content is determined by the amount and type of hemoglobin, most RBC transfusion guidelines are based on hemoglobin threshold levels. However, hemoglobin is a poor predictor for oxygen delivery (Alkalay et al., 2003).

Because direct measurement of tissue oxygenation is not possible, various surrogate markers have been suggested. The reliability of clinical parameters such as tachycardia or poor weight gain has been questioned. Although measurement of fractional oxygen extraction by using near-infrared spectroscopy may be promising, a pilot study failed to identify infants who required RBC transfusion, and although serum lactate was considered predictive, values show great variability and added little information to the decision regarding whether to transfuse. Thus, there currently is not reliable method for assessing tissue oxygenation (Frey and Losa, 2001).

Vascular endothelial growth factor (VEGF) is known also as vascular permeability factor, is characterized by its highly specific mutagenic activity for endothelial cells and by its angiogenic effect observed in vitro and vivo (Ferrara and Gerber, 2002).

**Aim of work**

The study aims to estimate the level of vascular endothelial growth factor in the serum of anaemic infants and the breast milk of their mothers.

**Subjects and Methods****Type of the study**

Case control study

**Subjects**

The study was conducted on 46 infants who was attending Pediatric Hematology Clinic at Minia University hospital through the period April 2016 to September 2016.

**Inclusion criteria:**

All infants are breast feed Diagnosed anemic (based on clinical signs and laboratory investigations anemia defined as haemoglobin concentrations <11 g dL), age ranged from 3 month to two years.

**Exclusion criteria:**

Infants and mothers presented by major congenital diseases, cyanotic heart defect, have recent blood transfusion, or missing Parental consent were excluded from our study.

**Study groups:****Group A:**

Included 34 infant (22 males & 12 female) with chronic anemia who are breastfed, their age ranged from 3 to 19 months.

**Group B:**

Included apparently healthy 12 breastfeeding infant 6 males & 6 females their age ranged from 3 to 18 months as a control group.

**Ethical consent**

Written informed consent was obtained from parents of each baby after explanation of the

aim of the study and its benefit for their infants and others who have the same disease.

**Results****Table (1): Some Demographic data of the studied group:**

Data		Group A N=34 Anemic infants	Group B N=12 Control Group	P
<b>Age (month)</b>	Range Mean $\pm$ SD	3-19 9.5 $\pm$ 3.8	3-18 11.2 $\pm$ 4.8	0.2
<b>Sex</b>	Female male	12(35.3%) 22(64.7%)	6(50%) 6(50%)	0.3
<b>Weight (kg)</b>	Range Mean $\pm$ SD	3.5-11 7.6 $\pm$ 1.7	5.5-11.2 9.1 $\pm$ 1.8	0.02*

**Table (1)** showed that there were no significant difference between anemic and non-anemic infants regarding age and sex (P 0.2 and 0.3 respectively).

The table also showed that there was a significant decrease in weight of anemic infants compared with non-anemic infants (P 0.02).

**Discussion**

Anemia is a common disorder, particularly in early infancy. Between 2000 and 2005, the prevalence of anaemia increased from 37.04% to over 52% among Egyptian children between 12 months and 36 months of age. (Austin et al., 2012)

During anemia, a reduction in blood oxygen content occurs as a result of reduced Hb and there are acute and proportional increases in respiratory and cardiovascular responses, which maintain tissue oxygen delivery. However, as with most compensatory physiological responses, there is a threshold beyond which the balance between oxygen supply and demand is not maintained and mortality occurs (Hare et al., 2013).

Vascular endothelial growth factor (VEGF) is a polypeptide growth factor that promotes cell survival by inhibiting apoptosis pathway. It also increases vascular density through its potent

angiogenic property VEGF is known to increase during hypoxia as another compensatory mechanism in the body. VEGF is up regulated by tissue hypoxia, and increased VEGF levels have been used as an early indicator for severe birth asphyxia (Róka et al., 2013). If VEGF concentration reflects tissue oxygenation, high levels would be an alarming sign of tissue hypoxia in anemic infants that precedes hemodynamic compensation (Tschirch et al., 2009).

The present study was designed to estimate the level of vascular endothelial growth factor in the serum of anemic infants and the breast milk of their mothers, and correlate its level with the severity of anemia.

In our study, mean age among anemic infants was 9.5( $\pm$ 3.8) months, while control group was 11.2( $\pm$ 4.8) months, the mean weight of anemic infants was 7.6( $\pm$ 1.7) kg that was significantly lower than infants in control group whose weight mean was 9.1( $\pm$ 1.8) kg.

The Hb & Hct mean were 10.04 ( $\pm 0.9$ ) g/dl and 30.2 ( $\pm 2.7$ )% among anemic infants which is lower than Hb & Hct values in control group that were 13.05( $\pm 0.7$ ) g/dl & 39.5 $\pm 2.1$ %.

In the present study, there was a significant increase in VEGF level in anemic infants serum as mean VEGF was 111.9 ( $\pm 44.3$ )ng/dl in comparison with its level among non anemic infants that was 18.1( $\pm 4.9$ ) ng/dl.

### Recommendations

1. Vascular endothelial growth factor may be used as a reliable marker for tissue hypoxia.
2. Further large wide scale studies on VEGF are recommended.
3. Further studies on VEGF in breast milk are recommended.

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