Pregnancy Anemia as a Favorable Factor of Premature Birth

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Hematological physiological changes during gestation are intended to compensate and support pregnancy-related changes in the woman's body. In pregnancy there is a dilution of the known Hb concentration known as gestational hemodilution or physiological pregnancy anemia. On a group of 300 pregnant women with different forms of anemia, we followed its implications on the evolution of pregnancy, its role in the determinism of premature labor, and its role in the apparition of intrauterine growth retardation. In 46 cases (15.33%) we reported premature births, in 23 (7.66%) of the cases we considered that anemia was the main (unique) cause of premature birth, in other cases (84.67%) anemia associated with other etiologic factors of premature birth. Comparing the incidence of preterm birth with a group of 300 pregnant women without anemia revealed the incidence of premature birth is 3 times less and is represented by 12 cases (4%) and 2 times less for intrauterine growth retardation represented by 16 cases (5.33%). Pregnancy anemia can cause a frequent pathology with major consequences in pregnancy development during birth and fetal development involving 15.33% of preterm births and 12.35% of cases of intrauterine growth retardation. In the current social and economic context, it is necessary to prophylactically administer iron for pregnant women from 20 weeks of gestation, at least 30mg / day for prophylaxis of pathology due to iron deficiency.

Keywords: pregnancy, anemia, prematurity

Introduction

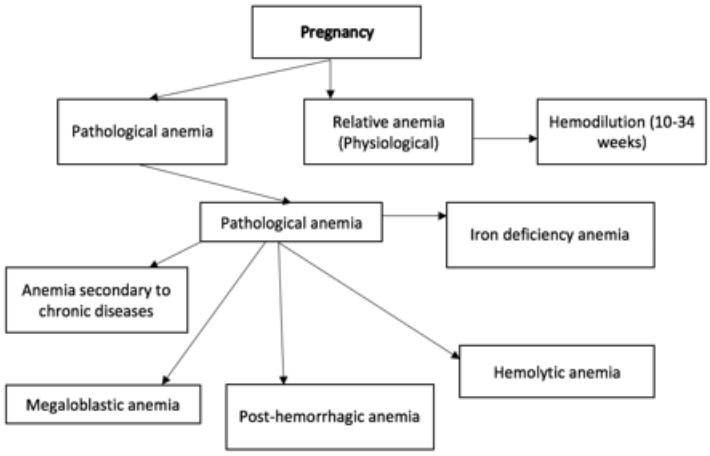
Anemia is one of the most common conditions associated with gestation, with an incidence varying between 5-75%. This may be preexistent to the pregnancy, being aggravated by it or may be induced by gestation [1-3].

During pregnancy, anemia may appear secondary to abnormal metrorrhagia, or due to small but persistent metrorrhagiasis which, by accumulation, may cause the onset of secondary anemia [4,18]. Generally, the most common form of anemia that occurs during pregnancy is 70% iron deficiency, followed by 10% megaloblastic anemia, and posthemorrhagic anemia of 20% of all forms of anemia. During pregnancy anemia may also occur in chronic, infectious diseases such as hemolytic anemia or hemoglobinopathies through genetic disorders, such as drepatocorticoidosis, so-called fanconi anemia, where there is persistence of HbS [4-6,16].

Anemia during gestation is a pregnancy-related condition representing one of the haematological physiological changes that occurs during pregnancy and is characterized by a reduction in hemoglobin concentration. Anemia in pregnancy may be physiological or pathological [7,17]. Anemia during pregnancy can cause or accentuate the phenomena of a hemorrhagic syndrome or is the leading cause of maternal mortality [8,9]. According to WHO [10], anemia rating criteria are when the Hg value is less than 11g% and Ht <35%, and after CDC (Center for Disease Control US) the recommended standard Hb and Ht limit values in pregnancy are the following [7]:

- for the first and third months of Hb = 11g% and Ht = 33%
- for the second quarter and the beginning of the third quarter Hb = 10.5g% and Ht = 32%

Physiological pregnancy anemia considered as *pregnancy dilution* anemia has as its main mechanism the hemodilution or is the result of an imbalance between 50% increase in plasma volume and increase in red blood cell and hemoglobin that is only 25% [11]. Pathological anemia is most often preexisting with the pregnancy being aggravated by it. Iron deficiency anemia has an incidence of 3.5-7.4% in the first trimester and 15.6-55% in the second and third trimesters [7], which also explains WHO recommendations [10,12,13] to start feriprival anemia prophylaxis as early as 20 weeks of gestation.



Scheme 1. Classification of the main types of anemia that may occur during pregnancy [3,12]

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Experimental part

Materials and methods

A study of 300 pregnant women with different forms of anemia was studied, followed by a number of parameters in which the iron deficiency was calculated. The following parameters are listed with the following reference ranges per unit:

- erythrocyte count (4010000 - 5290000 mm^3)
- the amount of hemoglobin (12.4 - 16.1 g / dL)
- hematocrit (Ht) (35.4 - 46.3%)
- ferritin (10-291 ng / mL)
- Mean erythrocyte volume (VEM) (79-98 fL)
- medium red blood cell hemoglobin (HEM) (27-32µg)
- mean red blood cell hemoglobin concentration (CHEM) (32-36 g / dL).

All of these values were determined in blood samples with a SYSMEX-XT 4000 ADVIA 2021, following each reference value, and paraclinical examinations performed in an emergency with a NIHON 6010.

Iron deficiency was calculated according to the following formula:

Total iron deficit (mg) = Body weight (kg) x (Target Hb - Actual Hb) x 0.24 + the iron rezerve value constantly estimated at 500mg [14,15]

Results and discussions

After the gestational age the studied group was presented as follows: 26% of pregnant women giving birth at 22-28 weeks of gestation, the remainder of 73.99% giving birth over 29 weeks of gestation.

Table 1

THE GROUP STUDY BY PERIOD

22-28 weeks	78	26%
29-32 weeks	106	35.33%
32-40 weeks	116	38.66%
Total	300	99.99%

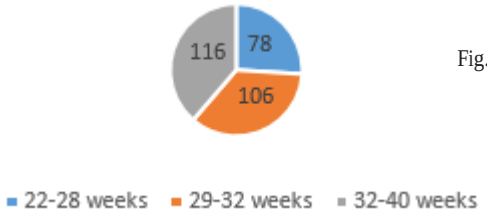

Fig. 1

After parity: The higher number of multiparous is explained by the lack of birth spacing, which leads to an accumulation of hemoglobin and erythrocyte losses over time.

Table 2

THE GROUP STUDY BY PARITY

Multiparous	121	40.33%
Tertiparous	104	34.66%
Secundiparous	45	15%
Primiparous	30	10%
Total	300	99.99%

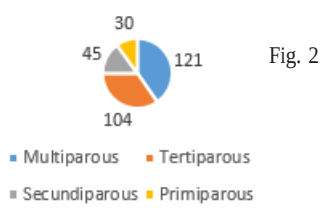

Fig. 2

After evaluating the number of erythrocytes, we found 1.33% of serious cases with a value of less than 2,000,000 erythrocytes / mL and 13% with a value between 2,000,000 - 2,500,000 erythrocytes / mL. In 203 (67.66%) cases, their value was between 2,500,000 - 3,000,000 erythrocytes / mL, and in the remaining 54 (18%) cases they were with mild anemia with red blood cells from 3,000,000 - 3,500,000 erythrocytes / mL.

Table 3

BATCH PRESENTATION BY NUMBER OF RED CELLS

Value	No. cases	%
3.000.000 – 3.500.000	54	18%
2.500.000 – 3.000.000	203	67.66%
2.000.000 – 2.500.000	39	13%
< 2.000.000	4	1.33%
Total	300	99.99%

After the hematocrit value in the studied group 31.32% had the value below 30%, in the remaining cases 68.66% the value of this being between 31% - 41% (table 4).

Table 4

BATCH STUDIED BY HEMATOCRIT VALUE

Hematocrit value	No. cases	%
<20%	5	1,66%
21-25%	28	9,33%
26-30%	61	20.33%
31-40%	206	68.66%
Total	300	99.98%

The other analyzed factors had values outside the reference biological range only in 14.33% (43 cases) except the ferritin that underwent changes in 38 cases representing 12.66%.

After correlation of clinical data with paraclinical examinations, we included anemias during pregnancy in table 5.

Table 5

WITH THE MAIN FORMS OF ANEMIA DURING PREGNANCY

iron deficiency anemia	237 cases	79%
post-haemorrhagic anemia	35 cases	11.66%
megaloblastic anemia	16 cases	5.33%
other forms of anemia	12 cases	4%

The group of 300 pregnant women with different types of pregnancy-related anemia was compared with a similar unselected group of 300 pregnant women who went through pregnancy without anemia comparing the observed results at the end of delivery. The analysis of the births in the studied group revealed that in 46 cases 15.33% were premature births, in 37 cases 12.34% gave birth to fetuses with intrauterine growth retardation. In 217 cases, 72.33% of the births occurred at a gestational age of 37 weeks of gestation, with newborns weighing between 2600g and 3600g. Of the premature births of 18 (6%) were premature infants with a gestational age of 25-28 weeks of gestation. We mention that in 7.66% (23 cases) we estimated that anemia was the main cause of premature birth, in the remaining 92.34% of cases, anemia was associated with other etiological causes of premature birth.

Lot 300 pregnants with different types of anemia

- 46 cases 15.33% premature births of which 18 cases 6% extreme prematurity
- 37 cases 12.35% intrauterine growth retardation
- 217 cases 72.33% term deliveries
- 23 cases 7.66% anemia the unique cause of premature birth
- 277 cases 92.34% anemia associated with other etiologic factors of premature birth

Lot 300 unselected pregnants without anemia:

- 12 cases 4% premature births of which 2 (0.66%) extreme prematurity
- 16 cases 5.33% intrauterine growth restriction
- 272 cases 90.66% term deliveries
- 0 cases anemia as the single cause
- 0 anemia cases associated with other etiologic factors of premature birth

Prophylaxis of anemia during gestation can be done through a rational diet that encompasses all food principles and supplementation with at least 30mg iron / day starting with 20 weeks of gestation. The absence of the two elements will outline in time the so-called poor *pregnant*, precursor state of the pregnant woman with increased obstetrical risk [19,20].

Statistical analysis

It has been noticed that in the pregnant group with anemia several cases of premature birth were recorded than in the group of pregnant women without anemia, 15.33% vs. 4%, $p < 0.001$ (Chi-square test $\chi^2(1) = 22.06$, $p < 0.001$). Also, in the pregnant group with anemia and premature births there were more cases of extreme prematurity than in the group of pregnant women without anemia, 6% vs. 0.66%, $p < 0.001$ (Chi-square test $\chi^2(1) = 13.24$, $p < 0.001$). The proportion of cases with anemia and retardation of intrauterine growth was higher than in the case of pregnant women without anemia, 12.35% vs. 5.33%, $p = 0.003$ (Chi-square test $\chi^2(1) = 9.13$, $p = 0.003$). In addition, the proportion of term births in pregnant women with anemia was lower than in the case of pregnant women without anemia, 72.33% vs. 90.66%, p & lt; 0.001 (Chi-square test $\chi^2(1) = 33.44$, $p < 0.001$).

Conclusions

Preterm birth and intra-uterine growth restriction (RCIU) are the fetal complications caused anemia during gestation in 7,66% of cases, anemia being the single factor that triggered premature birth). Anemia during pregnancy can cause a frequent pathology with major consequences in pregnancy development during delivery and fetal development, being involved in 12.33% of cases in intrauterine growth retardation. Evolution of pregnancy, birth, and fetal development depend on the quality of nutrition during gestation. The association of anemia should be corrected according to the type of anemia by the therapeutic administration of iron, folic acid and other elements. In the present socio-economic context, prophylactic iron administration is required from 20 weeks of gestation, at least 30 mg / day. Administration of intravenous iron in the emergency treatment of severe anemia during pregnancy allows for the avoidance of certain complications that may occur at birth or in the fetus.

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