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Maternal Anemia and its Effects on the Placental Weight

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Abstract

Background: Maternal anemia affects the health and well-being of women and increases the risk of maternal and neonatal harmful outcomes. It is of variable causes, and it is estimated that more than half of cases are due to iron deficiency which is the major nutritional problem especially among pregnant women and it results in fetal hypoxemia and also stimulates the growth of the placenta.
Objective: To determine whether placental weight is influenced by maternal anemia.
Patients and Methods: A case-control study was undertaken in Baghdad, 50 anemic women in their third trimester; and matched with non-anemic pregnant mother (control group). A full history was obtained from each woman, followed by examination and investigations as hemoglobin concentration, hematocrit level, MCV and serum ferritin, women are regarded anemic when their hemoglobin levels are less than 11gm/ dl and hematocrit value is less than 0.33
Results: 100 pregnant women, 22-44years old (31.7±4.9), there was a significant statistical association between increasing age and the development of iron deficiency anemia. The placental weight of anemic pregnant women was 400-650gm (549.4±58.3) and 500-670 gm (561.6±35.6) for the control. No significant statistical association had been detected between iron deficiency anemia and the placental weight
Conclusions: There were morphological placental changes in association with maternal anemia, even not significant, however, detailed studies considering the biochemical and physiological changes are needed in order to support the findings of the present study.

Keywords: Maternal Anemia; placental weight; iron deficiency anemia

INTRODUCTION

Anemia is an important topic in gynecology it means a condition in which the number of red blood cells, in addition to size, or the haemoglobin concentration, falls below an established reference value, consequently impairing the capacity of the blood to transport oxygen around the body. Anemia is an indicator of both poor health and poor nutrition (1). Maternal anemia affects the health and well-being of women and increases the risk of maternal and neonatal harmful outcomes. Anaemia affects half a billion reproductive-aged women worldwide. In 2011, 29% of non-pregnant women and 38% of pregnant women aged 15–49 years were anaemic (1). It is of variable causes, and it is estimated that more than half of cases are due to iron deficiency (2). Worldwide, iron deficiency anemia is the major nutritional problem, mostly in women of reproductive age, especially among pregnant women (3). WHO has defined Hb of less than 110 g/l as anemia in pregnancy [(4)] and it may occur in as many as half of pregnant women worldwide (5). Maternal anaemia leads to fetal hypoxemia and stimulation of placental growth. In anaemia, significant changes occurred in gross morphology and in histology of the placenta (6). A trend towards an increase in placental weight and in the placenta weight/newborn weight ratio in patients fulfilling the anemia criteria was observed (7).

PATIENTS AND METHODS

A case-control study was undertaken in Baghdad, from September 19th till October 30th _ 2015. Informed verbal consent was obtained from all women included in this study. 50 of them were diagnosed as anemic in their third trimester and were soon to deliver after 37 weeks either vaginally or by caesarian section, and matched with non-anemic pregnant mother (control group). A full history was obtained from each woman, followed by a complete physical and obstetrical examination. The following investigations were done for all women: Haemoglobin Concentration, hematocrit level, MCV, serum ferritin. According to WHO criteria, women are considered anemic when their hemoglobin levels are less than 11gm/ dl and hematocrit value is less than 0.33. A comparison was made between the two groups regarding maternal age, maternal hematological parameters, placental weight; Data were analyzed by computer using spss version 20.

RESULTS

100 pregnant women who were enrolled were classified as iron deficiency anemic pregnant (50patients) and pregnant women without iron deficiency anemia (50 patients) as a control group. The age of anemic ranged between 22-44years old (31.7±4.9). 31pregnants with iron deficiency anemia (62% of the sample) were 30 years and over. There was a significant statistical association between increasing age and the development of iron deficiency anemia. (P value= 0.001). Table (1).

Table 1: Patients' distribution according to their age

Age(years)	Pregnant with IDA	Control(pregnant without IDA)
15-19	0(0%)	4 (8%)
20-24	1(2%)	9 (18%)
25-29	18(36%)	15 (30%)
30-34	17(34%)	15 (30%)
35-39	10(20%)	6 (12%)
40-44	4(8%)	1 (2%)
Total	50(100%)	50 (100%)
Range, mean± SD	22-44, 31.7±4.9	17-41, 28.1±5.6

The placental weight of anemic pregnant women was 400-650gm (549.4±58.3), compared to that of the control group which ranged from 500-670 gm (561.6±35.6). 11 anemic pregnant (22% of the sample) had a placental weight less than 500 gm. No significant statistical association had been detected between iron deficiency anemia and the placental weight (P value= 0.21). Table (2).

Table 2: Patients' distribution according to their Placental weight.

Placental weight(gm)	Pregnant with IDA	Control(pregnant without IDA)
400-449	1(2%)	0(0%)
450-499	10(20%)	0(0%)
500-549	8(16%)	13(26%)
550-599	16(32%)	27(54%)
600-649	12(24%)	9(18%)
650-699	3(6%)	1(2%)
Total	50(100%)	50(100%)
Range, Mean ±SD	400-650, 549.4±58.3	500-670, 561.6±35.6

Table 3: Patients' distribution according to their different hematological parameters and their effect on placental weight.

According to maternal Hb concentration						
Hb concentration	**Placental weight(gm)**					
	400-449	450-499	500-549	550-599	600-649	650-699
7-7.9	0(0%)	3(30%)	1(12.5%)	2(12.5%)	0(0%)	0(0%)
8-8.9	1(100%)	7(70%)	4(50%)	2(12.5%)	1(8.3%)	0(0%)
9-9.9	0(0%)	0(0%)	3(37.5%)	4(25%)	7(58.3%)	2(66.7%)
10-10.9	0(0%)	0(0%)	0(0%)	8(50%)	4(33.3%)	1(33.3%)
total	1(100%)	10(100%)	8(100%)	16(100%)	12(100%)	3(100%)
According to maternal plasma ferritin						
maternal plasma ferritin	400-449	450-499	500-549	550-599	600-649	650-699
7-8	1(100%)	4(40%)	3(37.5%)	2(12.5%)	1(8.3%)	1(33.3%)
9-10	0(0%)	6(60%)	2(25%)	2(12.5%)	3(25%)	1(33.3%)
11-12	0(0%)	0(0%)	3(37.5)	12(75%)	6(50%)	0(0%)
13-14	0(0%)	0(0%)	0(0%)	0(0%)	2(16.7%)	1(33.3%)
total	1(100%)	10(100%)	8(100)	16(100%)	12(100%)	3(100%)

The placental weight of the women included in this study ranged from 450-650gm (549±58.3gm) in the anemic pregnant women, and 500-670 gm (561± 35.6gm) in the non –anemic pregnant women, 39 out of the 50 anemic pregnant had the placental weight of 500 gm and more (78% of the sample). Statistical analysis revealed no significant statistical association between anemia and placental weight (P-value = 0.21). Table (3) shows distribution according to their placental weight and different hematological parameters.

DISCUSSION

The estimated losses of iron associated with pregnancy are not less than a total of 1000 mg (8). Anemia during pregnancy showed that associated with adverse birth outcomes (5), in our study there was a significant statistical association between increasing age and the development of iron deficiency anemia which was inconsistent with Ronnenberg et al study (5) which had more young women and anemic. In our study there was no significant statistical association between anemia and placental weight which was inconsistent with Begum et al study (6) and Amalia Levy et al study (9) which show significant statistical association between anemia and placental weight, this is may be due to larger sample size and longer duration of the study.

CONCLUSION

There were morphological placental changes in association with maternal anemia, even not significant, however, detailed studies considering the biochemical and physiological changes are needed in order to support the findings of the present study.

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