Study the levels of some trace elements in women with recurrent abortion

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Abstract

A pregnancy loss that happens during the first 23 weeks of pregnancy. Vaginal bleeding is the most visible indicator of a miscarriage. This research intends to compare the blood calcium and zinc levels of women who have undergone a miscarriage to those of healthy pregnant women. The research comprised 140 blood samples from women who had miscarriages and women who were pregnant and healthy. Calcium and zinc were measured in the serum of miscarriage patients and a healthy control group; the findings revealed a high incidence of miscarriage in the first trimester (62.2%), but a lower incidence in the second and third trimesters. Calcium levels were lower in women who had an abortion compared to a healthy pregnant control group. The serum zinc levels of women who had an abortion were lower than those of healthy pregnant women.

***Keywords**: Pregnancy, Miscarriage, Calcium, Zinc.*

دراسة مستويات بعض العناصر النزرة عند النساء مع الإجهاض المتكرر

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الخلاصة

فقدان الحمل الذي يحدث خلال أول 23 أسبوعًا من الحمل. النزيف المهبلي هو المؤشر الأكثر وضوحًا للإجهاض. يهدف هذا البحث إلى مقارنة مستويات الكالسيوم والزنك في الدم لدى النساء اللاتي تعرضن للإجهاض بمستويات النساء الحوامل الأصحاء. اشتمل البحث على 140 عينة دم من نساء تعرضن للإجهاض ومن نساء حوامل وبصحة جيدة. تم قياس الكالسيوم والزنك في مصل مرضى الإجهاض ومجموعة المراقبة الصحية. كشفت النتائج عن ارتفاع معدل حدوث الإجهاض في الأشهر الثلاثة الأولى (62.2٪) ، ولكن حدوث أقل في الثلث الثاني والثالث من الحمل. كانت مستويات الكالسيوم أقل لدى النساء اللائي أجهضن مقارنة بمجموعة التحكم في الحمل الأصحاء. كانت مستويات الزنك في الدم لدى النساء اللاتي أجهضن أقل من تلك الخاصة بالنساء الحوامل الأصحاء.

***الكلمات المفتاحية:** الاجهاض ، فقدان الحمل ، الكالسيوم ، الزنك.*

Introduction

Miscarriage, known as early pregnancy loss, occurs when a foetus dies in the uterus (woman's body) before 20 weeks of gestation [1]. Ten to fifteen percent of pregnancies end in miscarriage among women who are aware of their pregnancy. The majority of miscarriages occur in the first trimester, before week 12 of pregnancy. 1 to 5 of every 100 (1% to 5%) pregnancies have a

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miscarriage during the second trimester (between 13 and 19 weeks) [2، 3]. Miscarriage can occur in up to half of all pregnancies. Due to the fact that a miscarriage may occur before a woman realises she is pregnant, the actual number is unknown. The majority of women who miscarry have subsequent healthy pregnancies [4، 5].

Zinc is a component of more than 70 metalloenzymes and is essential for appropriate growth and development, cellular integrity, and other biological processes, such as protein synthesis and nucleic acid processing. 1 It is thought that zinc is essential for foetal development, growth, and immunological function [6]. Plasma zinc concentrations are routinely used to evaluate zinc nutrition. Plasma zinc concentrations change between pregnant and non-pregnant women. During the first trimester of pregnancy, blood zn concentration begins to decrease. It then continues to decrease until term, when it is around 35% lower than in non-pregnant women. There are differences in the rate of decline, which may be explained by the varied levels of zinc in the analysed women. A reduction in zinc-binding proteins, hormonal changes throughout pregnancy, active zinc transfer from the mother to child, and hemodilution have all been connected to this drop in zinc concentrations. Due to all of these factors, serum zinc is not as accurate as other zinc nutrition indicators when measuring it during pregnancy [7-9].

Materials and Methods

2.1. Study design

From February to August 2022, this research was conducted at two prestigious medical facilities in Baghdad, Karkh Maternity and Al Alawia Maternity Hospitals. 140 women between the ages of 18 and 43 were participated in this research; they were separated into two groups: patients (70) and healthy pregnant women (70).

2.2. Sample Acquisition

Counting the millilitres of venous blood from each patient by first coagulating the blood in plastic tubes. The tubes were then centrifuged for 10 minutes at 3000 rpm. The sera were then put in tiny, labelled tubes and frozen at -40 degrees Celsius until required.

2.3 Methods

Before testing for inorganic elements, serum and whole blood that had been frozen were defrosted at room temperature. Zinc and Calcium were analysed by use of Flam absorption atomic spectrophotometry (FAAS), whilst inorganic elements were assessed by means of graphite furnace

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atomic absorption spectrophotometry (GFAAS). FAAS is based on the dissociation of an element from its chemical bonds, resulting in the creation of unexcited or grounded atoms. When exposed to light with a certain wavelength, these neutral atoms absorb radiant energy and convert into excited states. The amount of radiant energy absorbed at the particular wavelength of each element is affected by the sample's content of trace elements. Typically, the concentration of an analyte is determined using a calibration curve derived from standards of known concentration [10].

2.3.1 Calcium and Zinc Evaluation in Serum Samples

This chemical is generated under alkaline conditions when calcium ions react with 5-nitro-5'-methyl-BAPTA (NM-BAPTA). In the second step, this compound and EDTA undergo a reaction. The variation in absorbance is photometrically measured at wavelength (340 - 378) nm and is directly proportional to the amounts of a few trace metals (Ca and Zn). Serum was collected from 5 in accordance with the levels of calcium. There was automatic sampling, reagent supply, mixing, processing, and publishing of results. Stock solutions of zinc and calcium with concentrations ranging from zero to at least three or more were used to generate working calibration solutions. Aspiration of blanks (standards of 0 concentration) was performed to prepare the baseline to read 0 absorbances; this process was done repeatedly to correct baseline drift. Working standards were evaluated one at a time, starting with the ones that were the weakest and going up to the ones that were the strongest [10].

Results

Calcium aids in preserving this quick bone development. For women under the age of 18, calcium is especially crucial throughout pregnancy. At this stage, bones are still forming. For both their own and their unborn children's bone development, young women require calcium [13، 14]. Zinc helps the body deal with stress. The synthesis of oestrogen and progesterone in women is impacted by inadequate or excessive cortisol (the stress hormone). The effects of oestrogen levels that are either too high or too low include irregular periods, mood swings, early menopause, infertility, and other problems. Anti-inflammatory zinc [15،16].

Table (1) showed the Mean and standard error of the aborted maternal age was (25.95± 0.92) while it was (25.51± 0.92) in the healthy, non-aborted group. No significant differences were documented between them [17 – 19].

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Table (1): The Mean and SE of age of miscarriage women and healthy pregnant.

Parameter	Groups	N	Mean±SE	T-test	*P-value*	C.S
Age (Years)	miscarriage women	70	25.95±1.00	0.32	0.7	N.S
	Healthy pregnant women	70	25.51±0.92			

Differences between the groups of pregnant women that are statistically significant who had healthy pregnancies and those who had abortions were found, as shown in table 2 (9.44 0.07 at a p-value of 0.001). When compared to the pregnant control group of healthy women [20- 22].

Table (2): Mean and standard error (SE) of the concentration of calcium level in serum of studied groups (aborted and healthy pregnant women).

Parameters	Groups	No.	Mean±SE	T-test	P-value	
Calcium (mg/dl)	Aborted women	70	7.87±0.11	11.50	>0.001	High significant
	Healthy pregnant women	70	9.44±0.07			

Table 3 revealed highly significant differences between aborted women 53.55± 1.81 and healthy 80.37±1.53 compared with aborted women at a P value > 0.001 [18].

Table (3): Mean and Standard error (SE) of level of zinc concentration in aborted women and healthy pregnat groups.

Parameter	Study Groups	N	Mean ±SE	T-test	P-value	C.S
Zinc (mg/dl)	Aborted women	70	53.55±1.81	11.28	>0.001	H.S
	Healthy pregnant women	70	80.37±1.53			

Discussion

First, the first trimester (62.2 %) had the highest frequency of abortions, while the second (30 %) and third trimesters had the lowest frequencies. Second, in contrast to the pregnant, healthy control group, the Ca concentration in women who had abortions was lower.

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