

Glucose Tolerance in Pregnant Women Inflicted with *Candida Albicans*

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Abstract

Background: Many previous studies were concerned with the relationship between gestational diabetes and the development of vaginal candidiasis in pregnant women. In this study, our aim is directed to uncover glucose tolerance status in non-diabetic pregnant women inflicted with candida albicans.

Methods: Thirty-four pregnant women with vaginal candidiasis (as demonstrated by microscopy) were enrolled in this study. The patients were nearly similar in their anthropometric and demographic criteria with those of the healthy pregnant women (control group, forty –two women). Fasting plasma sugar and glucose tolerance test were alone for all patients and control group.

Results: fasting plasma sugar was significantly higher in the candidiasis-positive pregnant women in comparison to those of candidiasis-negative subjects (5.09 mmol/L vs. 4.71, $p < 0.02$). Plasma glucose level after 30 minutes of performing oral glucose tolerance test was also significant (8.47mmol/Lvs. 7.84, $P < 0.04$). The same trend of significance was noticed after 60 minutes and 120 minutes of performing the corresponding test.

The results were (8.13 mmol/L vs. 7.10, $P < 0.02$) and (6.90mmol/L vs. 6.15, $P < 0.05$) respectively.

Conclusion: the results reveal an impaired oral glucose tolerance test in pregnant women with candida albicans

Keyword: Glucose, pregnanc , candida albicans

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Introduction

Hyperglycemia that develops for the first time during pregnancy affects 4% of pregnant women, most have returned to normal glucose tolerance after delivery and about 60% becomes diabetic in the next 16 years⁽¹⁾. diagnosis is quiet necessary for short term identification of increased risk of fetal morbidity which include still birth macrosomia ,birth trauma , hypoglycemia, hyperbilirinuria , hypocalcemia and polycythemia⁽²⁾.

Candida albicans (*C. albicans*) is the most commonly identified organism in vaginal yeast infections. These organisms are present in 10% to 20% of healthy women without causing symptoms and alteration of the host vaginal environment usually is necessary before the organism can cause biologic effects⁽³⁾. Causes for the overgrowth of *C. albicans* include antibiotic therapy, which suppresses the normal protective bacterial flora, high hormone levels owing to the pregnancy or to the use of oral contraceptives which causes an increase in the vaginal glycogen stores⁽⁴⁾. Manifestation of vulvovaginal candidiasis includes vaginal irritation, pruritis, swelling, and erythema, dysuria and dyspareuria⁽⁵⁾. The characteristic vaginal discharge, when present, is usually odorless, thick and cheesy⁽⁶⁾.

Previous studies reported a close relationship between gestational diabetes and the growth of *C. albicans* in pregnant women^(7,8). The possible interrelationship between hyperglycemia and the developmental growth of *C.albicans* are still in debate⁽⁹⁾. In this study oral glucose tolerance tests (OGTT) were performed on pregnant women with vaginal candidiasis and compared the results with non-candidiasis pregnant women.

Methods

Thirty-four Iraqi pregnant women with vaginal candidiasis were enrolled in this study. The patients were referred to the department of gynaecology and obstetrics – AL-Yarmook teaching hospital, AL-Alwiyah hospital, Baghdad city for the period starting from April 2005 to June 2007. Fourty-two healthy pregnant women (with no vaginal candidiasis) as control group. Mean age, body mass index, gestational age and duration of vaginal candidiasis were registered for each patient. All the patients and control were Non-diabetic and had no previous history of diabetes mellitus. All the groups subjects were within 22nd to 24th week of gestation. No antibiotic or corticosteroid treatments were taken by any subject included in this study.

The restrictions of oral glucose tolerance test (OGTT) were followed for patients and control. Glucose dose of 75 gm dissolved in 300 milliliter distilled water was ingested by all the subjects during the test. No exercise, smoking, eating or drinking were permitted during the performance of the test. Blood withdrawal was carried out after ten hours of fasting, and after exactly 30 minutes, 60 minutes and 120 minutes following the ingestion of glucose dose. All blood samples were introduced in tubes containing anticoagulant and sodium fluoride. Plasma was separated from cellular components by centrifugation at 2000xg.

Statistical analysis of results was carried out using SPSS program included in windows. Student's t-test was performed to compare the results of patients with those of the control. The value of $p < 0.05$ was considered statistically significant.

Accurate diagnosis of *Candida albicans* was made by identification of budding yeast filaments (i.e., hyphae) or spores on a wet-mount slide using 10% potassium hydroxide preparation. The PH of the discharge was checked with litmus paper it was mostly less than 4.5.

Results

The results in (Table -1) reveal non significant variations in demographic and anthropometric parameters of both pregnant women with candidiasis and those with no candidiasis. (Table-2) shows the results of fasting plasma sugar and its values after 30, 60 and 120 minutes of performing oral glucose tolerance test. There is a significant increase in the fasting state in the cases of vaginal candidiasis compared with control group ($P < 0.02$). Also, a significant increase was determined in candidiasis patients after exactly 30 minutes of glucose tolerance test ($P < 0.04$), at 60 minutes ($P < 0.02$) and after two hours ($P < 0.05$).

Discussion

Vaginal candidiasis is a disease commonly present in patients with uncontrolled cases of diabetes mellitus⁽⁷⁾. There are no strict biochemical mechanisms linking the pathogenesis of these two diseases. Some studies reported the role of metabolic

syndrome and insulin resistance as causative agents of vaginal candidiasis.

In our present study we selected pregnant patients and control group who are comparable in their demographic and anthropometric induces in order to exclude any variations due to age, parity status, body mass index and gestational age. This may induce hormonal changes which may affect fasting plasma sugar levels and other values of glucose tolerance.

Previous studies indicated the dependency of candidiasis albicans growth on the presence of monosaccharide and disaccharides in the culture media^(10,11). Enhanced growth was especially seen with glucose which was shown to assist in candidiasis albicans adhesion to the buccal cavity in pregnant women.

Conclusion

The results of glucose tolerance tests besides the results of fasting plasma glucose levels in the studied two groups indicates clearly to the discreet glucose tolerance in pregnancy associated with candidiasis. Therefore, performing glucose tolerance tests is quiet necessary and must be added to the list of follow-up tests in pregnancy in order to prevent perinatal mortality and morbidity in vaginal candidiasis-positive pregnant women.

(Table-1)
Demographic and Anthropometric Criteria of Pregnant Women with Vaginal Candidiasis and Without Vaginal Candidiasis

| Parameter | Pregnant with candidiasis albicans (M±S.D.) | Pregnant with no candidiasis albicans (M±S.D.) |
|---|---|--|
| Age (years) | 23.4 ± 8.2 | 24.1 ± 6.9 |
| Body mass index (BMI, Kg/m ²) | 22.8 ± 6.4 | 23.2 ± 5.6 |
| Gestational age (weeks) | 23.4 ± 1.2 | 22.1 ± 1.82 |
| No. of births | 4.3 ± 1.8 | 4.0 ± 1.6 |

(Table -2)
**The Results of Oral Glucose Tolerance Tests Performed on Patients
 with Candidiasis and Condidiiasis –Negative Group**

| Type of measurement | Pregnant with candidiasis albicans | Pregnant with no candidiasis albicans |
|-------------------------------|------------------------------------|---------------------------------------|
| Fasting plasma sugar (mmol/L) | 5.09 ± 0.26 | 4.71 ± 0.34 |
| At 30 minutes | 8.47 ± 0.75 | 7.84 ± 0.53 |
| At 60 minutes | 8.13 ± 1.26 | 7.10 ± 1.02 |
| At 120 minutes | 6.90 ± 0.63 | 6.15 ± 0.46 |

References

- 1-Alberti KG, Zimmet p., Shaw J. The metabolic syndromes. *A new worldwide definition. Lancet.* (2005); 366; 1059-60.
- 2-Porth CM - Endocrine System in; *Essentials of pathophysiology.* Lippincott Williams and Willsins, USA .(2007).
- 3-Owen MK, Cleney TL, Management of vaginitis. *American family physician .* (2004):70: 2125-32.
- 4-Rahman T, Khan H , Begum J, . High vaginal swab routine microscopy and culture sensitivity in diabetic and non-diabetic , a comparative retrospective study of five years. *Indian J. Med. Sci.;*(1991): 45; 212-4.
- 5-Forbes BA, Sahm DF , Weissfeld AS .Vaginal candidiasis , *Baily & Scotts Diagnostic Microbiology,*21th Ed.(2007).
- 6-Lewis D.A. Chancroid; Clinical manifestations diagnosis and management. *Sexually Transmitted Infections* (2003):79; 68-71.
- 7-Donders GG, Prenen HV, Reybrouk R Impaired tolerance for glucose in women with recurrent vaginal candidiasis. *AM. J. Obstet. Gynecol.* (2002); 187; 989-93.
- 8-Aberg A., Rydhstroem H., Frid A. Impaired glucosetolerance associated with adverse pregnancy outcome. A population-base study in southern Sweden, *Am. J. Obstet. Gynecol.* (2001): 183: 77-83 .
- 9-Seymond IM . Genital tract infections IN:*Essentials of obstetrics & Gynaecology.*4th Ed. Churchill livingstone.(2004).
- 10- Samayarnake LP, Macfarlane TW . The effect of dietary carbohydrates on the in vitro adhesion of candida albicans to epithelial cells. *J. Med. Microbiol*(1982): 15: 511-7.
- 11-Reinhart H. , Muller G. , Sobel JD . Specificity and mechanism of in vitro adherence of *Candida albicans.**Clin. Lab.Sci.*(1985) : 15 : 406-12.

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