ORIGINAL ARTICLE

Prevalence of Vulvo-Vaginal Candidiasis in Diabetic and Non-diabetic Pregnant Females

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ABSTRACT

Aim: To determine the prevalence of vulvo-vaginal candidiasis (VVC) in diabetic and non-diabetic pregnant females.
Design: Cross-sectional Survey
Place & duration of study: Outpatient department, Akhter Saeed Trust Hospital, EME Sector, Lahore from July 2016 to June 2017.
Methods: A total of 300 patients were selected from outpatient obstetrics clinic and divided into two groups: Group A having diabetic patients and Group B having non-diabetic patients. Sterile speculum examination was done and vaginal specimens were collected with sterile cotton swabs. Glycated hemoglobin A1c (HbA1c) was done in all diabetic patients to check their glycemic control.
Results: Mean age in each group was similar. No difference in terms of multi parity was noted (p> 0.05) among the two groups and majority were already pregnant 2 or 3 times prior to the current pregnancy. At the time of the study majority of the patients were in the second trimester in group B and third trimester in Group A. No difference in terms of itching as the main complaint was noted among the two groups (p>0.05). On vaginal speculum examination discharge was more frequent in Group A. Vaginal culture for Candida was positive in only 108 (36%) of subjects and significantly more common in diabetics (p = 0.001). 45% of diabetics developed VVC compared to 27% in non-diabetics (p = 0.001). All patients with poor control had VVC.
Conclusion: Diabetic pregnant patients have higher frequency of VVC and it is correlated with the level of sugar control.
Key words: Vulvo-vaginal candidiasis, diabetes mellitus, glycemia control.

INTRODUCTION

Diabetes mellitus (DM) is a leading cause of morbidity and mortality worldwide. In 2014, there were 422 million adults with diabetes which will raise to 642 million By 2035.[1] International Diabetes Federation (IDF) reported that in 2015 Pakistan had 7.0 million people of age group 20-79 years suffering from diabetes. By 2040, this number is expected to cross 14.4 million. In 2015, 7.9 million people had impaired glucose tolerance and this number is expected to cross 15.1 million in 2040. Moreover, 84,364 deaths were recorded due to diabetes in same year[2].

Diabetes mellitus is a chronic, insidious disease that can affect any organ of the body. One of the problems associated with this condition is infection.[3] Patients with diabetes mellitus are at increased risk of vulvovaginal candidiasis (VVC).

Candida or yeast is a usual commensal organism colonizing the vagina; normally their overgrowth is prevented by Lactobacilli. VVC is the second most prevalent cause of vaginal infections in the United States of America (USA) and it affect 75 % of women at some stage of their lives[3,4]. VVC is four times more common in diabetic pregnant females caused by malfunctioning leucocytes in the presence of uncontrolled blood sugar levels[5-7]. VVC is more disturbing in serve hyperglycemic conditions and the intensity of symptoms is very severe and response therapy slower and resistant[8-10].Diabetes along with pregnancy is also responsible for the recurrent VVC. The incidence of candidiasis is almost doubled in pregnant women – particularly in the third trimester[5].

In a study done by Aslam, M. et al., the mean incidence of VVC was 48% in pregnant females4. Majority of the women (60%) were multi-gravidae while (40%) were primi-gravidae, in this study[6].

In a study from Poland prevalence of VVC of 40.4% was observed in diabetic pregnant females[11].VVC can lead to candida chorioamnionitis and preterm delivery hence endangering the lives of premature neonates by generalized fungal infection. In case of breast feeding it can cause nipple candidiasis as well[6,8,11].

Prevalence of fungal infection in Pakistan pregnant women was reported to be as high as (38%) in another study[12]. In their study, Parveen et al. included only 7 (6.7%) diabetic women with a higher prevalence of VVC (26%). This number is too small to make any reasonable assessment of VVC in diabetic pregnant women in Pakistan[12].

Only few studies have been done so far in Pakistan to find out the incidence of VVC in diabetic pregnant women. The true prevalence of VVC especially in diabetic pregnant females is not well known in our population. The purpose of the present study was to determine the incidence of VVC in diabetic and non-diabetic women during pregnancy and was aimed towards providing guidelines for early detection, intervention and better monitoring of cases of VVC in pregnant diabetics and non-diabetics in order to prevent subsequent feto-maternal morbidity.

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METHODOLOGY

It was a cross-sectional study done in Outpatient department, Akhter Saeed Trust Hospital, EME Sector, Lahore from July 2016 to June 2017. Non-probability purposive sampling was used. Inclusion criteria was: 18-45 years of age, up to gravida 5, women in their 2nd or 3rd trimester, singleton pregnancy on ultrasonography, diabetes mellitus Type I or II, non-diabetic pregnant women, Gestational Diabetes Mellitus and Glycemic control [Good(HbA1c<7.0), Average (HbA1c7.0-9.0), Poor HbA1c>9.0)].

Exclusion criteria was: gestational diabetes with less than 4 weeks of treatment with insulin, women with history of treatment for vaginal infection during the current pregnancy before enrollment, nephropathy (patients having microalbuminuria or creatinine greater than 1.5mg/dl, Immunocompromised patients (patients with malignancy, renal transplant, patients using immunosuppressive drugs or those who have received immunosuppressive therapy during last month), Use of antibiotics in last two weeks and Recurrent cases.

A total of 300 patients fulfilling inclusion and exclusion criteria were selected. Informed consent was obtained from patients. Patients were assured regarding confidentiality and expertise. Patients were then divided into two groups: Group A having diabetic patients and Group B having non-diabetic patients. For each patient, history was taken including demographic information (age & address). Patients were asked about vaginal discharge and itching. Sterile speculum examination was done and vaginal specimens were collected with sterile cotton swabs. Glycated hemoglobin A1c (HbA1c) was done in all diabetic patients to check their glycemic control. All this information was gathered in pre-designed proforma. SPSS version 23 was used for data analysis. For quantitative variables like age, parity, trimester of current pregnancy, mean and standard deviation were calculated. While for qualitative variable like vulvo-vaginal candidiasis during current pregnancy, percentages were calculated. Data was stratified for age, parity, trimester of pregnancy, diabetes mellites (Type I, Type II), gestational diabetes and glycemic control (Good, Average, Poor)

RESULTS

Total of 335 pregnant females were interviewed out of them 35 proformas were rejected due to incomplete information and remaining 300 pregnant females made up the study population: 150 in each group. Mean age in each group was similar. 04 patients in Group A and 20 patients in Group B were in 20-27 years age range, 118 patients in Group A and 116 patients in Group B were in 28-35 years age range while 28 patients in Group A and 18 patients in Group B were in 36-45 years age range. Majority of subjects were in the age group of 28-35 years.

No difference in terms of multi parity was noted (p> 0.05) among the two groups and majority were already pregnant 2 or 3 times prior to the current pregnancy (Table I)

At the time of the study majority of the patients were in the second trimester in group B and third trimester for Group A. Overall, 6(4%) patient had Type 1 DM, 72 (48%) were type 2 diabetics and 72(48%) were suffering from gestational diabetes.

In Group A, 82(55%) patients had HbA1c in range of 7 to 9% showing an average glycemic control, 52(36%) patients had good glycemic control (HbA1c below 7) and 14(9%) patient showed poor glycemic control (HbA1c above 9).

No difference in terms of itching as the main complaint was noted among the two groups (p>0.05) (Table II). On vaginal speculum examination discharge was more frequent in Group A. Vaginal culture for Candida was positive in only 108 (36%) of subjects and significantly more common in diabetics (p = 0.001) (Table III)

45% of diabetics developed VVC compared to 27% in non diabetics, p = 0.001 (Table IV). All patients with poor control had VVC. Patients with average control were again more likely to develop VVC (59%) compared to good glycemic control (15%).

Table I: Frequency of Parity in Both Groups (n=300)

Parity	Group A	Group B
1	26(17%)	22(15%)
2	48(32%)	52(34%)
3	42(29%)	48(32%)
4	26(17%)	22(15%)
5	8(5%)	6(4%)

Parity (Mean±SD):Group A: 2.61±1.12, Group B: 2.59±1.04. P-value > 0.05)

Table II: Comparison of Itching in Both Groups (n = 300)

Itching	Group A	Group B
Yes	74 (49%)	68 (45%)
No	76 (51%)	82 (55%)

P value=0.51

Table III: Comparison of Candida Infection in Both Groups (n = 300)

Candida	Group A	Group B	Total
Present	68 (45.0%)	40 (27.0%)	108 (36%)
Absent	82 (55.0%)	110 (73.0%)	192(64%)

P value=0.001

Table IV: Comparison of Vulvo-Vaginal Candidiasis (VVC) in Both Groups (n=300)

VVC	Group A	Group B
Present	66(44%)	40 (27%)
Absent	84 (56%)	110 (73%)

P value=0.001

DISCUSSION

Candidiasis is the most common opportunistic fungal infection. VVC is very common among pregnant females and affects 75% of the women of child bearing age. A study from Nepal confirmed the presence of VVC in 35% pregnant women[13]. Results of our study showed that pregnant diabetic females have a higher frequency of VVC compared to non-diabetics. To our knowledge this is one of the few studies done in Pakistan that correlates the diabetic status and VVC in pregnant females. Another study conducted in Brazil on diabetic and non-diabetic pregnant females also confirmed high ratio of candida infection in diabetic pregnant females hence supporting results of our study[14].

Diabetes is increasing in epidemic proportions in Pakistan similar to the data from around the world. Prevalence of diabetes mellitus in Pakistan is around 11% and almost equal number of adult population also suffers from impaired glucose tolerance.[2,] Diabetes Mellitus is associated with dysfunction in the immune system. These changes affect different pathways of the immune system and result in prevalence of different types of infections. For instance, experimental and clinical evidence exists showing that the neutrophil function is depressed, affecting its adherence to the endothelium, chemotaxis, and phagocytosis.[15] The antioxidant systems involved in bactericidal activity may also be compromised, and cell-mediated immunity is probably depressed. These impairments are exacerbated by hyperglycemia and acidemia but are reversed substantially, if not entirely, by normalization of pH and blood glucose levels[16].

Patients with diabetes are distinctly at high risk for infection with certain microorganisms e.g. prevalence of diabetes was 27.5 percent in a group of nonpregnant females with group B streptococcal bacteremia.[17]A disproportionately high incidence (30 to 60 percent) of diabetes has been found in some patients with klebsiella infections, encompassing bacteremia, thyroid &liver abscess and endophthalmitis. Diabetes has also been recognized as an important risk factor for infection with Salmonella enteritidis.[18]Other infections with high incidence in diabetic patients include mucocutaneous candida infections e.g., oropharyngeal candidiasis, candidal vulvovaginitis, and cutaneous candidiasis in the intertriginous areas of obese patients[19].

Altered defense mechanisms of the vaginal microclimate and reactions to the hormonal status are thought to play a major role in the development of a recurrent episode of candidiasis[20]. Although an increased vaginal content of glucose has never been proven in women with vaginal candidiasis, in vitro evidence has shown that Candida proliferates better in a broth that is enriched with different sugars[21]. In a study by Pizzo G et al, glucose, maltose, and sucrose all greatly enhanced the adhesion of Candida albicans to buccal epithelial cells, but lactose did not[22]. Sefa et al. tried to correlate with risk factors for the presence of VVC in pregnant females without gestational diabetes mellitus. They clearly were able to demonstrate that the clearance of glucose after the oral intake of 75 gm of glucose was significantly impaired in pregnant women with vaginal candidiasis.[23]It is therefore plausible that hyperglycemia provides an environment in the vaginal secretions that enhances the occurrence of infection by promoting its growth and adherence to the vaginal epithelium.

Candida colonization is common in young females and various risk factors including diabetes mellitus can result in increased incidence of VVC. Pregnancy itself is a risk factor for VVC due to hormone excess. Diabetes itself being a risk factor for VVC, pregnancy may further increase the likelihood of VVC due to hormonal changes. Diabetic pregnant female may therefore have a higher incidence of VVC[24,25]. The Polish study mentioned a 40% prevalence similar to ours of 45%[25]. Our study also supports the previous report by Parveen et al from Pakistan. Although they had a much smaller population of diabetic pregnant females nevertheless 26% of these patients still had VVC. In our larger population of 75 females it is therefore not surprising to observe a true and even higher prevalence of 45%, similar to the world literature.

The risk association of VVC with glycemia control is further strengthened by the presence of VVC in all of our pregnant females with poor control of blood sugars. Majority of our patients had average control of blood sugar and among them 59 % had VVC compared to only 15% with good glycemia control p <0.001.VVC presents usually with a symptomatic increased vaginal discharge. Other symptoms associated with this condition are itching, dyspareunia, dysuria, and foul odor. Itching in our patients was not the differentiating feature, however discharge was more obvious in patients with the diagnosis of VVC. Laboratory evaluation, if indicated, for a patient with VVC consists of checking vaginal pH, performing microscopy, and obtaining a culture[26]. Vaginal fungal culture is the criterion standard for fungal infection. However, it takes 7 days to run and is expensive. Rapid immunoassay testing is being developed that is as accurate as cultures[27].

Nevertheless, we performed fungal cultures in all pregnant females where VCC was suspected to confirm the true presence of candida. It is also important since misdiagnosis and empiric treatment although common, is accurate only in 28%.[28] This could also result in misdiagnosis of other potentially bacterial infections that have significant morbidity on the pregnancy outcomes.Our study is important in several aspects. Firstly, it has documented the frequency of VVC in our diabetic pregnant females. Secondly, it has clearly shown the association of glycemia control and VVC. Thirdly, it has shown a general lack of good control of blood sugars in randomly selected diabetic females. Could this also influence the pregnancy outcome is still not documented and needs further study in a larger prospective study.

Shortcomings of our study is probably the lack of further sub classification of Candida species and culture sensitivity of antifungal agents. This can further help in the treatment strategies for this common problem, since empiric treatment resulting in resistant species is well known[29].

CONCLUSION

VVC is a common occurrence in Pakistani pregnant females with diabetes and lack of good blood sugar control is directly associated with the development of VVC. Timely medical examination, proper ante-natal services including treatment of women suffering from VVC should be recommended to prevent the complications related with VVC.

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