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UTERINE BIOPHYSICAL PROFILE IN INFERTILE DIABETIC WOMEN IN MID LUTEAL PHASE

Sai Supriya. M	final year post graduate, Department of OBGYN, saveetha medical college and hospital
Shajni Krishna	final year post graduate,Department of OBGYN, saveetha medical college and hospital
Reshma Shanmukhi	final year post graduate,Department of OBGYN, saveetha medical college and hospital
Nidhi Sharma	Professor, Department of OBGYN, saveetha medical college and hospital.

ABSTRACT **Background and objective**: Being unable to conceive can be extremely discouraging and stressful and may eventually have negative social, physiological, and psychological effects like depression. This study's objective was to evaluate how well diabetic women with a history of infertility responded to uterine biophysical profile as a predictor of conception. **Method:** 137 women with primary infertility participated in a study. Women visiting our institute's infertility OPD and complaining of being unable to get pregnant were the cases chosen for this study. Patients were divided in to two (Non-diabetic) group 1 and group 2 (diabetic). All the women underwent UBP testing at mid-cycle, and it was determined using the uterine scoring system for reproduction (USSR). **Results:** Significant differences were seen in Uterine Biophysical Profile (UBP) score i.e.; more or less than 12 among diabetics and non-diabetics. Score of <12 was found to be significantly more among diabetics. **Conclusion:** Those with diabetes had a higher chance of miscarriage and infertility, as well as being more likely to be childless than women without the disease.

INTRODUCTION

An autoimmune condition known as type 1 diabetes mellitus (DM), which kills b cells, necessitates lifelong insulin replacement therapy.[1] Hypogonadism and hyper androgenism can be brought on by hyperglycemia, insulin insufficiency, and iatrogenic hyperinsulinemia, which can reduce fertility.[2] Numerous Cohort research has also demonstrated that compared to healthy women or their siblings, Less children are born to type 1 DM women, and congenital abnormalities are more common in these women..[3] Type 1 diabetes is frequently associated with other autoimmune diseases such Addison's disease (0.5%), celiac disease (4-9%), and autoimmune thyroid disease (15-30%).[4] Even in euthyroid individuals with just antibodies, autoimmune thyroiditis can reduce fertility and result in pregnancy loss.[5] However, prior studies on type 1 DM patients' fertility did not take this issue into consideration.

The causes of type 1 diabetes in females' decreased fertility.[1] First, hypogonadotropic hypogonadism, delayed puberty, and irregular menstrual cycles are brought on by low levels of leptin brought on by insufficient insulin and fat loss. The second is that subcutaneous insulin injections result in hyperinsulinemia by impeding hepatic clearance, which raises androgen output and accelerates the onset of polycystic ovarian syndrome (PCOS). Finally, advanced glycation end products and hyperglycemia both have the potential to lead to glucose toxicity and early menopause, respectively.[6]

The current definition of infertility (according to the medical community) is one year of unwelcome infertility accompanied with unprotected sexual activity throughout the fertile phase of the menstrual cycle.[7]

A severe condition called infertility damages its victims' capacity to reproduce at the most fundamental level. The spouses involved, as well as their family and friends, may be divided by this. The effects of infertility may be profound. The psychological aftereffects of infertility are just one of several medical and societal repercussions. Patients and their family that are affected experience low self-esteem, disappointment,

and sadness.[8] One of the most important steps in prenatal care is the assessment of fetal health, which aims to identify at-risk fetuses and prevent problems (e.g. fetal and infant mortality).[9] FBPP was first studied by Manning et al. and combines NST with four embryonic ultrasonography characteristics.(1985).[10] One prenatal test used to identify fetal problems is the BPP.[11] The BPP method is used to evaluate the five elements of fetal movement: breathing, tonicity, fluid level, and NST..[12] In high-risk pregnancies, it is a reliable test with the lowest proportion of false positives and the highest accuracy for assessing the fetal health.[13]

The purpose of this study was to assess how well diabetic infertile women's mid-luteal phase uterine biophysical profile predicted conception.

MATERIALS AND METHOD

On 137 women with primary infertility, a study was done. Women who complained of being unable to conceive and visited our institute's infertility OPD were chosen as cases. 137 women with primary infertility in the age range of 20–35 years and a regular menstrual cycle were taken into consideration for the study following the completion of the standard diagnostic workup in these patients. Two groups of patients were created: group 1 (non-diabetic) and group 2 (diabetic). The study participants were informed of the study's goal. The data's confidentiality and anonymity were guaranteed. The Institutional Ethical Committee granted their ethical approval.

The patients' written informed consent was obtained. By using the uterine score system for reproduction, the UBP was calculated (USSR). Out of a possible 20 points, a score of 16 or higher was seen to be advantageous for conception. Pregnancy frequency was associated with both the overall score and the component variables. Correlation significance was determined to be p < 0.05.

Sampling technique: consecutive enumerative sampling

Sample size: 137

Statistics Analysis

A statistical software program called SPSS, version 21.0, was used to conduct the statistical analyses. The cutoff for statistical significance was set at p 0.05 for all statistical analyses. The Shapiro-Wilk test was run to ensure normality.

RESULTS

Patients were divided in to two groups based on UBP scoring. Group 1 (non- diabetic) and group 2 (diabetic).

Data analysis

A Microsoft Excel spread sheet was used to enter the data, and any discrepancies were examined. Tables and graphs were used to present the summarized data. SPSS was used to analyze the data (21.0 version). The normalcy was examined using the Shapiro-Wilk test. Data were normally distributed, hence parametric tests like the Independent t test were used for bivariate analysis (for comparing two groups). The p-value cutoff for statistical significance was 0.05.

The UBP score varied significantly between diabetics and non-diabetics. Non-diabetics were found to have a much higher rate.

Table 1: Comparison of mean Uterine Biophysical Profile (UBP) score among diabetic and non-diabetics

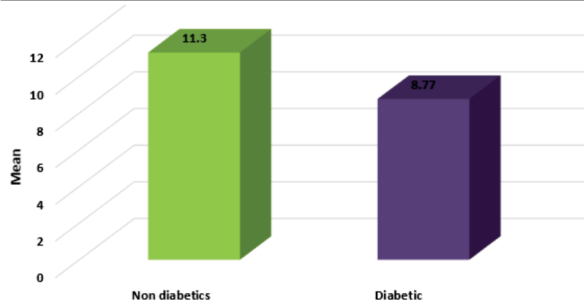|	N	Mean	Std. Deviation	Std. Error Mean
Non diabetics	124	11.30	2.888	.259
Diabetic	13	8.77	2.682	.744
P value				0.003*

Figure 1: Comparison of mean Uterine Biophysical Profile (UBP) score among diabetic and non-diabetics

Significant differences were seen in **Uterine Biophysical Profile (UBP) score** i.e. more or less than 12 among diabetics and non-diabetics. Score of <12 was found to be significantly more among diabetics

Table 2: Comparison of Uterine Biophysical Profile (UBP) score category among diabetes and non-diabetics

			Score 12		Total
			<12	>12	
Non diabetics		N	80	44	124
		%	64.5%	35.5%	100.0%
Diabetics		N	12	1	13
		%	92.3%	7.7%	100.0%
Total		N	92	45	137
		%	67.2%	32.8%	100.0%
P value					0.035*

DISCUSSION

Female fertility may be impacted by diabetes mellitus. Even if there are not enough objective factors, the introduction of insulin therapy helped diabetic women experience less amenorrhea, which improved female fertility.[14] Amenorrhea was a common occurrence in women with uncontrolled diabetes, and it contributed to the rise in infertility until insulin therapy was introduced in 1923, which helped to correct the condition. The reason of infertility is largely determined by endocrine issues that result in abnormal ovulation, tubal

illness that prevents oocyte pickup, unexplained subfertility in areas of fertilization, and impairment in gamete transit and implantation.[15] Due to their delayed menarche, women with diabetes mellitus who were prepubertal at the time of diagnosis may experience disturbances in the hypothalamic-pituitary-gonadal axis. Additionally, it has been suggested that women with diabetes experience menopause earlier than normal. Menstrual irregularities affect about 30% of insulin-treated diabetic women, and the development of diabetes appears to be a substantial contributing factor.[16] Regarding reproductive diabetic females, abnormalities of the hypothalamic-pituitary-gonadal axis are highlighted, including decreased baseline prolactin secretion and impaired prolactin response to metoclopramide.[17] In conclusion, these illnesses may have been caused by lactotrophs' increased dopaminergic inhibitory action.[18]
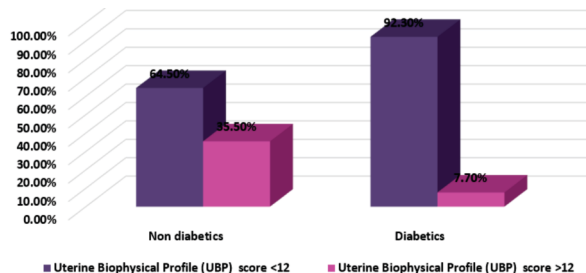

Figure 2: Comparison of total score category among diabetes and non-diabetics

USSR scoring is highly indicative of good pregnancy outcome in patients undergoing embryo transfer. A successful pregnancy rate of 80% was associated with a USSR score of 20, whereas a score of 17 to 19 was associated with a rate of 79% conception, according to **Narendra Malhotra et al.** Patients who received a score of 13 or less had a successful outcome of only 7.6%. Based on these past findings we have divided our patients in two groups, group 1 with UBP score of <12 and group 2 with UBP score of ≥12.

Patients in our study were split into two groups: (Non-diabetic) group 1 and group 2 (diabetic). By using the uterine score system for reproduction, the UBP was calculated (USSR). Out of a possible 20 points, a score of 16 or higher was seen to be advantageous for conception. Pregnancy frequency was associated with both the overall score and the component variables. Correlation significance was determined to be p <0.05. The UBP score between diabetics and non-diabetics was shown to differ significantly. It was found to be significantly more among non-diabetics. Mean value for non-diabetics and diabetics was 11.30 and 8.77 respectively. Significant differences were seen in Uterine Biophysical Profile (UBP) score i.e. more or less than 12 among diabetics and non-diabetics. Score of <12 was found to be significantly more among diabetics. The study's findings are consistent with a study by Yung-Hsiang Lin et al. (2017) that found that diabetics had a lower rate of live births than non-diabetics.

The study's findings are in accordance with the study conducted by **Kristina Mattsson et al. (2020)**[19] which shows that women with type 2 diabetes had a lower birthrate (62.6% vs. 83.8%) and were less likely to become pregnant.

The study's findings are in accordance with a study by **Zhao J et al. (2019)**[20], which found that after 12 months of follow-up, Compared to women with normal fasting glucose levels, those with raised fasting plasma glucose levels had greater amounts.

The study's findings are in accordance with the study conducted by **Whitworth KW, et al. (2011)**[21] that indicated that women with any form of diabetes have a longer time to

pregnancy and lower fecundity odds ratios than those without diabetes.

The study's findings conflict with a study by **Kjaer et al. (1992)**, which found that the overall number of pregnancies and sterility incidences were roughly the same (17%) in women with and without diabetes.

CONCLUSION

According to the study's limitations, a substantial distinction between diabetics and non-diabetics was found in UBP score. It was discovered that non-diabetics had a considerably higher rate. Between diabetics and non-diabetics, there were considerable variations in Uterine Biophysical Profile (UBP) score, defined as greater or less than 12. Diabetics had considerably higher scores (12) than non-diabetics. To identify infertility in diabetic women, there aren't enough research in the literature. However, to confirm the results of the current study, more clinical research is required.

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