Anthropometric and biochemical parameters in older women with a history of gestational diabetes

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INTRODUCTION

Gestational diabetes mellitus (GDM) is defined by glucose intolerance of variable severity with onset of first recognition during pregnancy (WHO, 2012). Hyperglycaemia during pregnancy is found to be associated with various maternal and perinatal adverse outcomes (HAPO, 2008; Landon et al., 2011). GDM is a condition that occurs during pregnancy when the body cannot produce enough insulin to handle the effects of a growing baby and changing hormone levels. Numerous studies reported that an increased risk of GDM among women who are overweight or obese compared with lean or normal-weight women.

The purpose of this study is to compare anthropometric and biochemical parameters in postmenopausal women with a history of GDM and controls.

MATERIAL AND METHODS

Subjects were 28 overweight/obese, postmenopausal and sedentary women who had a history of GDM and 27 postmenopausal without a history of GDM as healthy postmenopausal controls. All subjects were recruited to be overweight and obese (BMI>25 kg/m2, range 25–40 kg/m2) women. Only women who were weight stable (<2.0 kg weight change in past year) and sedentary (<20 min of aerobic exercise 2x/week) were recruited. The individuals aged 40–52 years referred to the Department of Endocrinology and Metabolic Diseases. The study protocol was approved by the Ethical Committee of Pamukkale University. Written informed consent was obtained from all of the subjects and/or their parents or legal guardians before participation in the study. Height and weight were measured in light clothing without shoes. Body height was measured using a statometer and body weight was measured using a digital electronic weighing scale. Body mass index (BMI) was calculated as weight in kilograms divided by the square of height in meters. Waist circumference was measured using a flexible measuring tape, midway between the xiphoid and the umbilicus during the mid-inspiratory phase. Anthropometric measurements were carried out three times by a single tester. Body water and fat distribution were assessed by multiple frequency bioelectric impedance measurement with a portable impedance analyzer (Tanita, Tokyo, Japan). The average was taken of two values of blood pressure measured 2–3 min apart with the subject in the sitting position after resting for at least 15 min. Serum levels of fasting and postprandial glucose, total cholesterol, triglyceride, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, and uric acid were analyzed with commercial kits (Beckman-Coulter, Pasadena, CA, USA) in an LX-20 autoanalyzer (Beckman-Coulter). The levels of serum insulin, thyroid-stimulating hormone, and DHEAS were determined in an Immulite 2000 immunoanalyzer (Siemens, Erlangen, Germany).
Descriptive statistics, proportions for categorical variables, and means and standard deviations for continuous variables were used to describe the study groups. Comparisons between obese male and female groups were analyzed using a Student's t test. A one-way analysis of variance was performed to evaluate the findings, as well as to perform statistical comparisons between the male and female groups. Significance assessment was carried out by the Duncan test. The results were expressed as mean ± standard deviation. The values were considered to be statistically significant when $P<0.05$. All statistical analysis was done using SPSS v 13.0 (SPSS Inc., Chicago, IL, USA).

RESULTS:

We observed significantly higher Albumin, Prospandial insulin, Anti-throglobulin antibody and GGT levels in patient with gestational diabetes while decreased FSH, LH and Thyroglobulin levels. We couldn't find any differences in fasting glucose, BMI, WHR, TSH and ALT levels. This study supported that GDM is a predisposing factor for DM after menopause. Physical characteristics, total and regional body composition of overweight, sedentary women with a history of GDM and controls are shown in Table 1.

DISCUSSION:

Women with a history of GDM are at an increased risk for the development of type 2 diabetes mellitus (T2DM) within 5 years following pregnancy (Metzger et al., 1993; Kaufmann et al., 1995) with the reported incidence of T2DM ranging from almost 3% to >70% in studies on women examined between 6 and 28 weeks post partum (Kim et al., 2007). Younger and more physically fit, premenopausal women with prior GDM display similar central obesity, glucose, and metabolic profiles as postmenopausal controls. Postmenopausal women with prior GDM are more insulin resistant than controls of similar age, adiposity, and fitness levels and display comparable glucose utilization rates as similar as women with T2DM suggesting that a prior history of GDM may be an early manifestation of increased risk of later T2DM (Ryan et al., 2013). Although the majority of women with GDM will be normoglycemic in the immediate postpartum period, studies suggest that 11% to 33% will display evidence of impaired glucose tolerance, and 1% to 8% will have diabetes, at 6 to 12 weeks postdelivery (Lawrence et al., 2010). In many cases, these individuals likely had some degree of glucose intolerance, pre-diabetes or even undiagnosed T2D, that preceded the pregnancy, but their condition was not recognized until the postpartum screen. Even when postpartum glucose levels are within normal limits, women with a history of GDM are at much higher risk of developing GDM in subsequent pregnancies (Getahun et al., 2010).Our study results showed that GMD is predisposing factor in older women.

Table 1: Baseline and demographic characteristics of obese patients with history of GDM and control group

	Control (n=27)	Patient with GDM history (n=28)	P
Ages (Years)	45.44±7.02	40.96±6.80	>0.05
Height (cm)	154.59±6.86	157.82±5.15	>0.05
Weight (kg)	83.53±14.70	88.16±13.85	>0.05
BMI (kg/m^2)	34.27±5.55	35.45±5.78	>0.05
Waist circumference (cm)	96.81±9.55	98.23±10.23	>0.05
Hip circumference (cm)	110.75±7.12	114.14±9.32	>0.05
Waist hip ratio(cm)	0.86±0.07	0.85±0.09	>0.05
Fasting blood glucose (mg/dl)	109.11±35.26	101.92±13.21	>0.05
Postprandial blood glucose (mg/dl)	118.13±63.46	117.77±27.61	>0.05
SGOT (IU/l)	19.07±7.12	17.25±3.53	>0.05
SGPT (IU/l)	18.53±8.51	20.60±11.96	>0.05
ALP (IU/l)	78.96±20.78	72.57±19.68	>0.05
ALB (gr/dl)	4.55±0.23	6.27±8.96	<0.05*
Ca (mg/dl)	9.38±0.43	9.25±0.39	>0.05
P (mg/dl)	3.59±0.57	3.53±0.49	>0.05
Total cholesterol (mg/dl)	195.76±43.32	189.22±36.80	>0.05
Trigliserides (mg/dl)	152.70±99.58	150.71±58.88	>0.05
LDL (mg/dl)	124.47±37.23	189.22±36.80	>0.05
HDL (mg/dl)	42.77±10.87	48.41±12.53	>0.05
Fasting ınsulin (µIU/ml)	11.10±4.89	12.17±4.30	>0.05
Postprandial insulin (µIU/ml)	33.33±24.82	59.96±43.40	<0.05*
Cortisol (µg/dl)	13.71±5.72	13.69±8.84	>0.05
ACTH (pg/ml)	21.21±11.02	24.71±12.54	>0.05
GH (ng/ml)	1.09±1.54	0.95±1.43	>0.05
TSH (µIU/ml)	2.32±2.34	1.93±1.13	>0.05
FT3 (pg/ml)	2.51±0.89	2.58±0.58	>0.05
FT4(ng/dl)	1.00±0.31	0.95±0.27	>0.05
Anti-microsomal antibody (IU/ml)	32.42±36.64	52.26±71.63	<0.05*
Anti-throglobulin antibody (IU/ml)	75.94±196.68	42.71±128.57	>0.05
Thyroglobulin (ng/ml)	37.45±64.76	16.55±20.62	<0.05*
FSH (mIU/ml)	47.65±62.74	21.20±22.49	<0.01**
LH(mIU/ml)	19.43±19.85	9.96±7.98	<0.001***
E2 (Pg/ml)	92.22±69.49	110.19±87.43	>0.05
SHBG (nmol/l)	54.31±37.86	49.28±38.03	>0.05
Total Testosterone (mg/ml)	58.28±27.01	69.49±31.59	>0.05
DHEAS (mg/dl)	117.17±61.58	124.60±56.45	>0.05
PRL (ng/ml)	15.68±10.31	17.80±10.56	>0.05
PTH (pg/l)	63.98±25.10	54.02±26.03	>0.05
Systolic blood pressure (mmHg)	122.96±16.12	120.89±20.27	>0.05
Diastolic blood pressure (mmHg)	81.85±10.01	78.92±12.57	>0.05
GGT (U/l)	18.32±9.50	26.00±16.68	<0.05*
Uric acid (mg/dl)	4.21±1.10	4.18±1.32	>0.05
HOMA	2.83±1.27	2.88±1.09	>0.05

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