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ORIGINAL ARTICLE

Pattern of glucose intolerance among pregnant women with unexplained IUFD

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Abstract *Purpose:* To determine the possible causes for IUFD and to investigate for the pattern of glucose intolerance as a cause of unexplained IUFD among pregnant women.

Methods: For one year, 420 pregnant women with IUFD at or after the 28th week of pregnancy and another 200 women carrying normal looking fetuses were recruited as a control group.

Random venous samples and HbA1c were tested to assess the glucose control in the studied women.

Results: Of the studied women, 68.09% had unexplained cause for their IUFD. Other causes for IUFD included Hypertensive disease with pregnancy (6.9%), accidental hemorrhage (5.5%), and small for gestational age (11.4%). Overt DM was diagnosed at 1.7%. Women who had unexplained IUFD showed higher HbA1c and Random Blood Sugar (RBS) than control group. 18% of women carrying unexplained IUFD and had normal RBS showed abnormally high HbA1c level.

Conclusions: Unexplained IUFD represented the major category of IUFD (68.09%). Laboratory indices of diabetes mellitus are more prevalent in this category of patients. Accordingly, screening for diabetes is recommended for these women. However, the use of RBS alone is not sufficient to exclude poor metabolic control. HbA1c may be a better alternative.

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1. Introduction

Gestational diabetes mellitus (GDM) is currently defined as any degree of glucose intolerance with onset or first recognition during pregnancy. This definition does not exclude glucose intolerance that may have antedated pregnancy (1).

Gestational diabetes generally has few symptoms and it is most commonly diagnosed by screening during pregnancy. Diagnostic tests detect inappropriately high levels of glucose in blood samples. It affects 3–10% of pregnancies, depending on the population studied (2).

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GDM is associated with increased incidence of maternal hypertension, pre-eclampsia, obstetric intervention and risk of developing diabetes mellitus (DM) in later life (3).

The major morbidities associated with infants of diabetic mothers include respiratory distress, growth restrictions, polycythemia, hypoglycemia, congenital malformations, hypocalcemia and hypomagnesemia (4). Perinatal outcome associated with poor glycemic control in mothers is associated with as high as 42.9% mortality (5). Appropriate diagnosis and management of GDM can improve maternal and perinatal outcome.

An improved outcome of pregnancy complicated by diabetes mellitus has been reported in recent studies. However, this achievement is not shared in full by African countries where the Perinatal morbidity and mortality is still high, although reports are scarce (6).

Unfortunately, there are no national figures about the magnitude of gestational diabetes among pregnant women in Upper Egypt, especially those with IUFD. The aim of this study was to determine the possible causes for IUFD and to investigate for impaired glucose tolerance as a possible cause of death among pregnant women with unexplained IUFD presented to the women's health Hospital of Assiut University.

2. Materials and methods

This hospital based case control study was conducted in the Women's Health hospital, Assiut University, Egypt. For one year, starting from the 1st of July 2012 through the 30th of June 2013. Four hundred and twenty pregnant women who attended antenatal care clinic with IUFD at or after the 28th weeks of pregnancy or with estimated fetal weight of 1 kg or more by ultrasound were recruited for the study. Another two hundred women with normal looking fetuses at or after the 28th week of pregnancy were recruited as a control group.

Patients meeting the inclusion criteria were counseled about participating in the study. A written informed consent was taken. The institutional Review Board approved the study.

Clinical work-up of the mothers included: entry history taking, with special emphasis on symptoms and signs suggestive of DM, date of IUFD, evidence of fetal anomalies by US, history of previous IUFD, fetal macrosomia, difficult labor, past history of gestational DM or family history of DM, history of genetic or herido-familial disease or medical disease of acute or chronic illness and the Pattern of antenatal care or obstetric problems in the investigated pregnancy. Clinical examination and ultrasound ****evaluation (detailed ultrasound evaluation especially on evidence of congenital anomalies, evidence of fetal macrosomia). Gestational age was determined on the basis of the last menstrual period, confirmed by ultrasound evaluation and calculated in menstrual weeks.

Clinical work-up of the newborns included: clinical examination at birth, photography, and report of anomalies, maceration, fatal weight and sex or other abnormalities.

Random venous samples were withdrawn from mothers carrying IUFD and control group mothers to test for blood sugar.

The first 200 mothers carrying IUFD of unspecified causes were selected and tested with HbA1c in addition to the control group mothers to assess the previous glucose control in the last few months.

The primary outcome measure was to determine the possible causes for IUFD and to investigate for impaired glucose tolerance as a cause of death among pregnant women with unexplained IUFD. Secondary outcomes included the validity of RBS as a screening test for gestational DM as a possible cause of IUFD, the role of HbA1c in the detection of previous glucose control in the last few months.

Statistical analysis was performed using SPSS computer package (SPSS, Inc., Chicago, IL) version 17.0. and has been revised by statistician. Student's t test was used for mean and standard deviation. Fisher's exact test was used to compare continuous data. A significance level of 5% was adopted. Risk ratio (RR) and 95% confidence interval (CI 95%) were calculated to assess the magnitude of the association between outcomes.

3. Results

Out of 20,887 deliveries in that year, 420 mothers carrying IUFD were recruited for the study.

Table 1 shows the demographic data of study group and control groups. There was no statistically significant difference between groups in the mean age, parity, gestational age, working status and education ($P > 0.05$). But there was a statistically significant difference in the abortion rate ($P < 0.05$).

Table 2 shows causes of fetal death in the study group. 68.09% of women had unexplained cause for their IUFD, 6.9% had hypertensive disease with pregnancy (Preeclampsia–eclampsia, chronic hypertension, Gestational hypertension), 5.5% had accidental hemorrhage and 11.4% were small gestational age. Overt DM was diagnosed in 7 cases only (1.7%).

Table 3 shows some different features in unexplained and explained groups. Women with unexplained IUFD showed tendency toward higher mean R.B.S level of more than 2 m mole than women with explained causes, this difference was statistically significant. There was a statistically significant difference between both group as regards parity, history of previous abortions and the mode of delivery with tendency toward low parity, more number of previous abortions and more women who achieved vaginal delivery in unexplained group. There was no statistically significant difference between both groups as regards fetal weight, sex and mother age ($P > 0.05$).

Table 4 shows HbA1c and Random blood sugar in study and control groups.

200 women were randomly selected from the group of unexplained IUFD in the study group to be compared for HbA1c and Random blood sugar with the control groups.

Women who had unexplained IUFD in the study group showed tendency toward higher HbA1c and RBS than the control group but this difference was statistically significant only in HbA1c.

Table 5 shows the relation between demographic data and the level of HbA1c in women with unexplained IUFD. Out of the two hundred women with unexplained IUFD who had normal RBS, 36 women (18%) showed high level of HbA1c.

Women with unexplained IUFD who had elevated HbA1c level showed tendency toward older maternal age, prolonged labor duration, higher parity and more previous abortion, these differences were statistically significant. They also showed bigger fetal weight (more than 350 gm), than women