Introduction

Inspite of clinicians apparently appreciating the risks of maternal diabetes to the baby, babies of mothers with diabetes are still at increased risk compared to those of non-diabetic women **(CEMACH, 2005).** Macrosomia is a hallmark of maternal diabetes in the fetus **(Lepercq et al., 2001)**.

Infants of diabetic mothers are at risk of having hypertrophic cardiomyopathy, a condition that is characterized by thickening of the interventricular septum and ventricular walls, and by systolic and diastolic dysfunction of the neonatal heart. This condition is normally asymptomatic in utero and may result in congestive heart failure in the immediate postnatal period, although this is uncommon and transient **(Rizzo et al., 2000).** At the same time; it may be sufficiently severe to cause fetal or neonatal death **(Sardesai et al., 2001).**

The metabolic processes that are responsible for the fetus pathophysiology of the diabetic mother included increased levels of maternal, placental and fetal insulin-like growth factors and leptin **(Eidelman and Samueloff, 2002)**.

Alterations in the expression of Insulin-like growth factor I (IGF-I) may result in developmental abnormalities, macrosomia

and intrauterine growth retardation, which occur at a higher incidence in diabetic pregnancies. Alterations in the growth hormone (GH)–IGF-I axis are also associated with cardiovascular disease (CVD) **(Koklu et al., 2007).**

There is a growing body of evidence that the metabolic abnormalities, which lead to coronary heart disease as well as some other diseases, are programmed by nutrition in utero and during infancy **(Abou Ghalia et al., 2003)**. Maternal diabetes mellitus (DM) may lead to an altered fetal serum lipoproteins composition consistent with high atherogenic risk **(Merzouk et al., 2000)**.

Macrosomia is associated with alterations in lipoprotein composition and concentration at birth, some of which persist after 1 month of life. Hence, it may play a role in the pathogenesis of diabetes and atherosclerosis in adult life **(Merzouk et al., 1999)**.

Exposure to diabetes in utero has been established as a significant risk factor for some of the components of metabolic syndrome. Although the clinical complications of atherosclerosis occur in adult life, the process of atherogenesis begins in childhood **(Koklu et al., 2007)**.

The ultrasound-based measurement of the distal segment of the dorsolateral aortic intima-media thickness (aIMT) in newborns is a sensitive marker of atherosclerosis risk **(Jarvisalo et al., 2001)**.

Aortic intima-media thickness was not extensively studied in infants of diabetic mothers.

Aim of the Study

To investigate the relationship between abdominal aortic intima media thickness (aIMT), Left ventricular mass and lipid profile in neonates of diabetic mothers.

Subjects and Methods

This study will be conducted on 60 neonates delivered in Ain-Shams University Obstetrics and Gynecology Hospital. These neonates will be divided into 3 groups:

Group 1: 20 macrosomic neonates of diabetic mothers

Group 2: 20 non-macrosomic neonates of diabetic mothers

Group 3: 20 healthy appropriate for gestational age (AGA) neonates (3-5 days old) of non-diabetic mothers (serve as control group).

Inclusion Criteria:

Infants of diabetic mothers (IDDM and GDM) including macrosomic neonates (≥ 4.000 kg birth weight) and non-macrosomic neonates.

Exclusion Criteria:

Neonates with congenital heart disease, asphyxiated at birth and with major congenital abnormalities.

After informed consent, all infants included in this study will be subjected to:

1. **Full history taking laying stress on Perinatal history including:**
   - Type of maternal diabetes and its duration. Insulin dose, regimen and the degree of compliance to treatment and glycemic control. Any diabetic complications. Family history and previous siblings with CVD.
   - Gestational Age, sex and birth weight.
2. **Clinical Examination with Special Emphasis on:**
   - Anthropometric measures including weight, length and body surface area (BSA).
   - Ponderal Index (PI) = $\frac{\text{weight (g)}}{\text{length (ccm)}} X\,100$.
   - Blood pressure and heart rate.
   - Full cardiac examination.
3. **Random blood glucose of mother and infant and HbA1C of mother.**
   - Glycosylated Hb will be measured with HPLC (high performance liquid chromatography).

4. **<u>Neonatal Serum HDL, LDL, VLDL, triglycerides and cholesterol.</u>**
   - Lipid concentration will be measured using Synchron CX9 autoanalyzer, Brea, California, USA.
5. **<u>2D M Mode, continuous wave, pulsed wave, colored Doppler echocardiography:</u>** for detection of any congenital abnormality, assessment of left ventricular end diastolic and end systolic dimensions, Interventricular septal thickness and posterior wall thickness as well as left ventricular mass that will be indexed to BSA.

6. **<u>Abdominal intima media thickness (aIMT) assessment:</u>** in a straight non branched 1 cm longitudinal segment of the distal abdominal aorta (the dorsal wall of the most distal abdominal aorta will be chosen for assessment as it was shown to be the most prone site for atherosclerosis) using a 7.5MHZ pediatric phased array transudation **(McGill et al,. 2000).**

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Introduction

Review of Literature

Diabetes and Pregnancy

Lipid metabolism in infants of diabetic mothers