

Hormonal and Lipid Profile in Correlation with Anthropometric Measurements Among Offspring of Diabetic Mothers

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OBJECTIVES

- There is increasing interest in how the intrauterine environment might influence cardiovascular and metabolic disease throughout life. This study was designed primarily to estimate whether there is an association between neonatal anthropometric parameters on one hand and cord blood levels of insulin, leptin, Insulin-Like Growth Factor-I(IGF-I) and lipid profile on the other hand in offspring of diabetic mothers

METHODS

- A total of 40 full term infants of diabetic mothers (IDMs) and 20 healthy infants of non-diabetic women participated in the study.
- Detailed anthropometric assessment of the newborn including : birth weight, height , ponderal index , head circumference, abdominal circumference, triceps skin fold thickness and sub scapular skin fold thickness were measured .
- Laboratory investigations including cord blood levels of insulin, leptin, IGF-I and lipid profile as markers for intrauterine growth were also assessed.

RESULTS

• Fig .1 Comparison between IDMs and control regarding Triceps and subscapular skin fold thickness

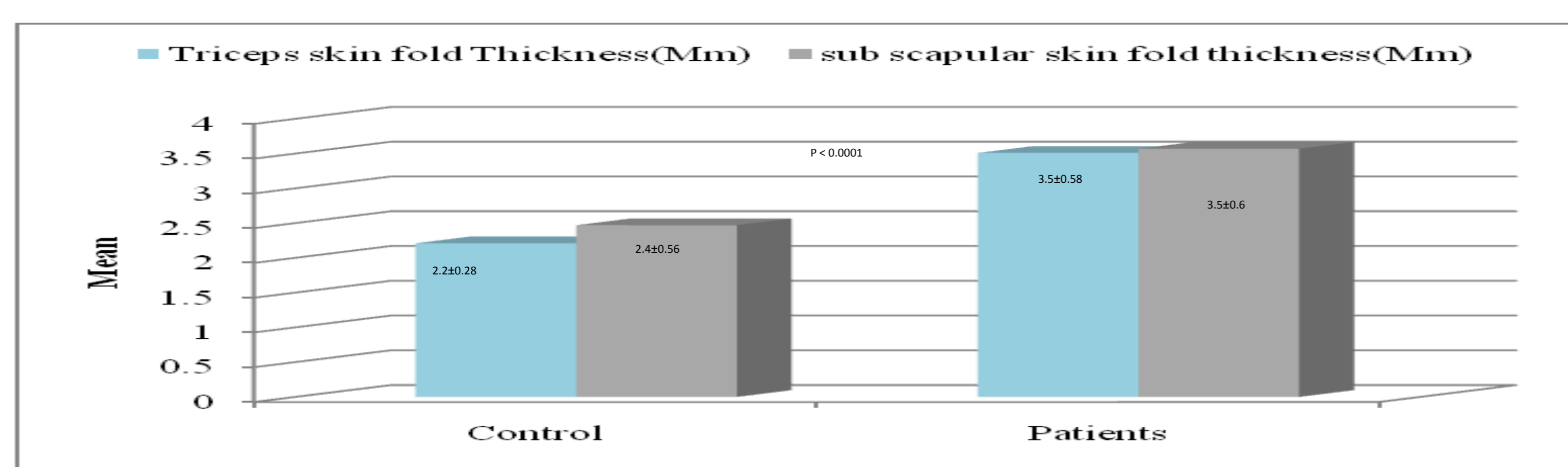
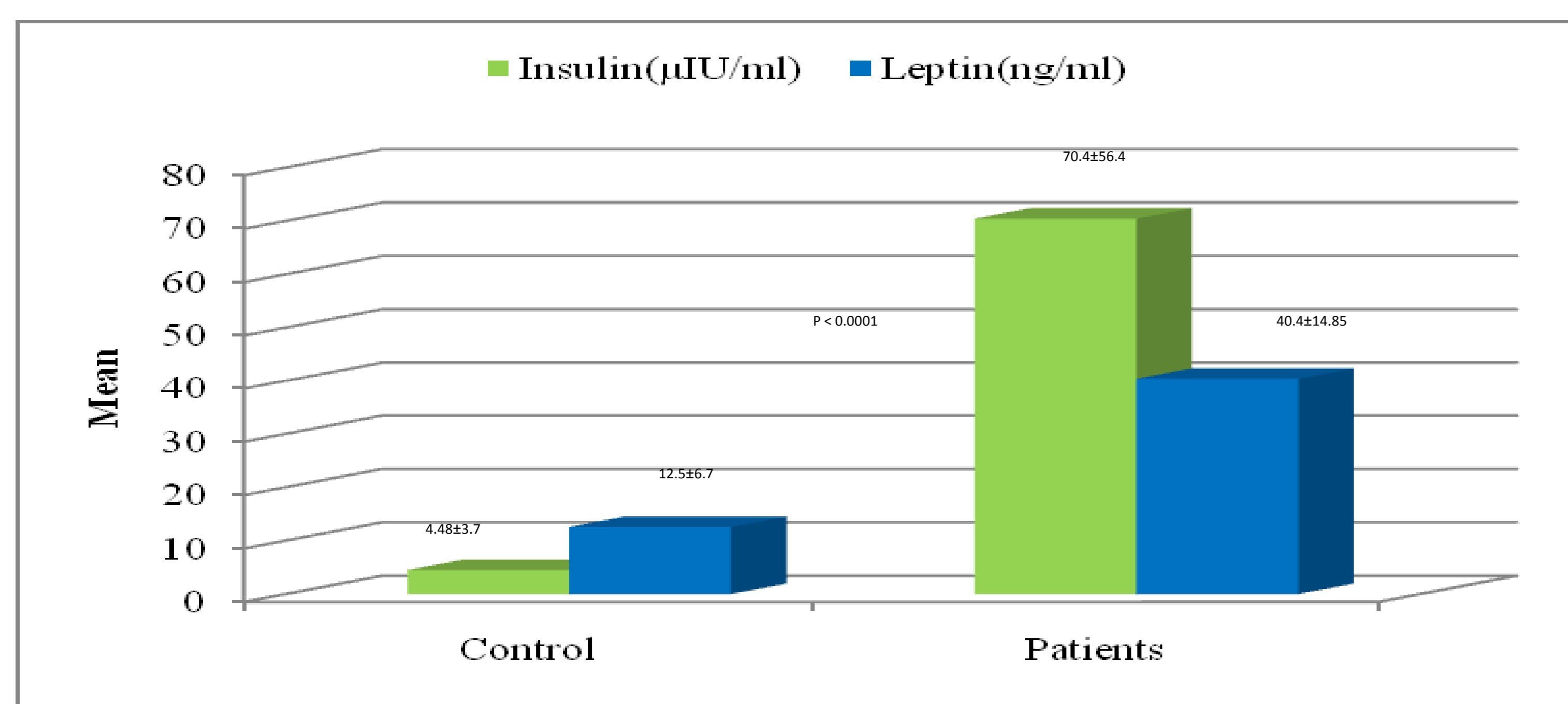
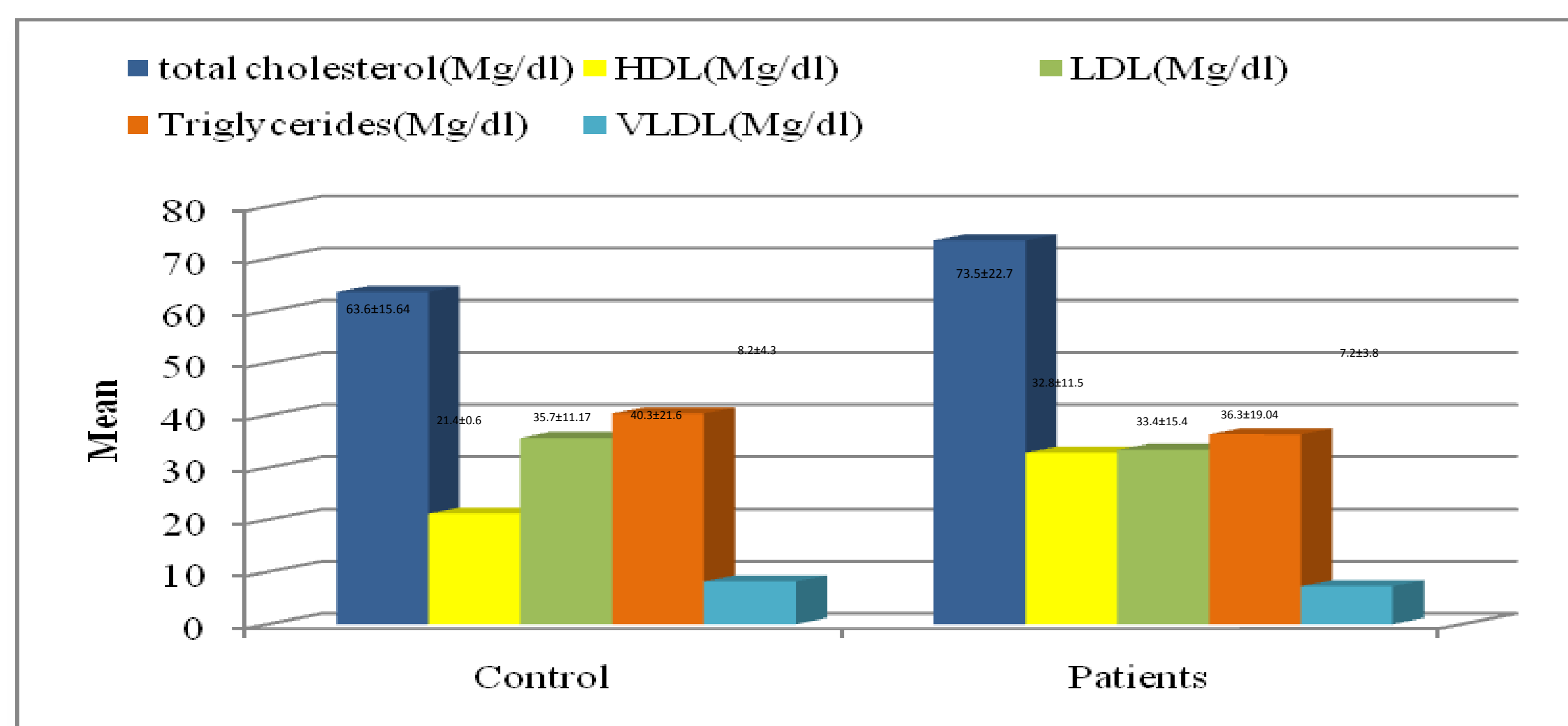


Fig. 2 Comparison between IDMs and control according to umbilical insulin and leptin levels

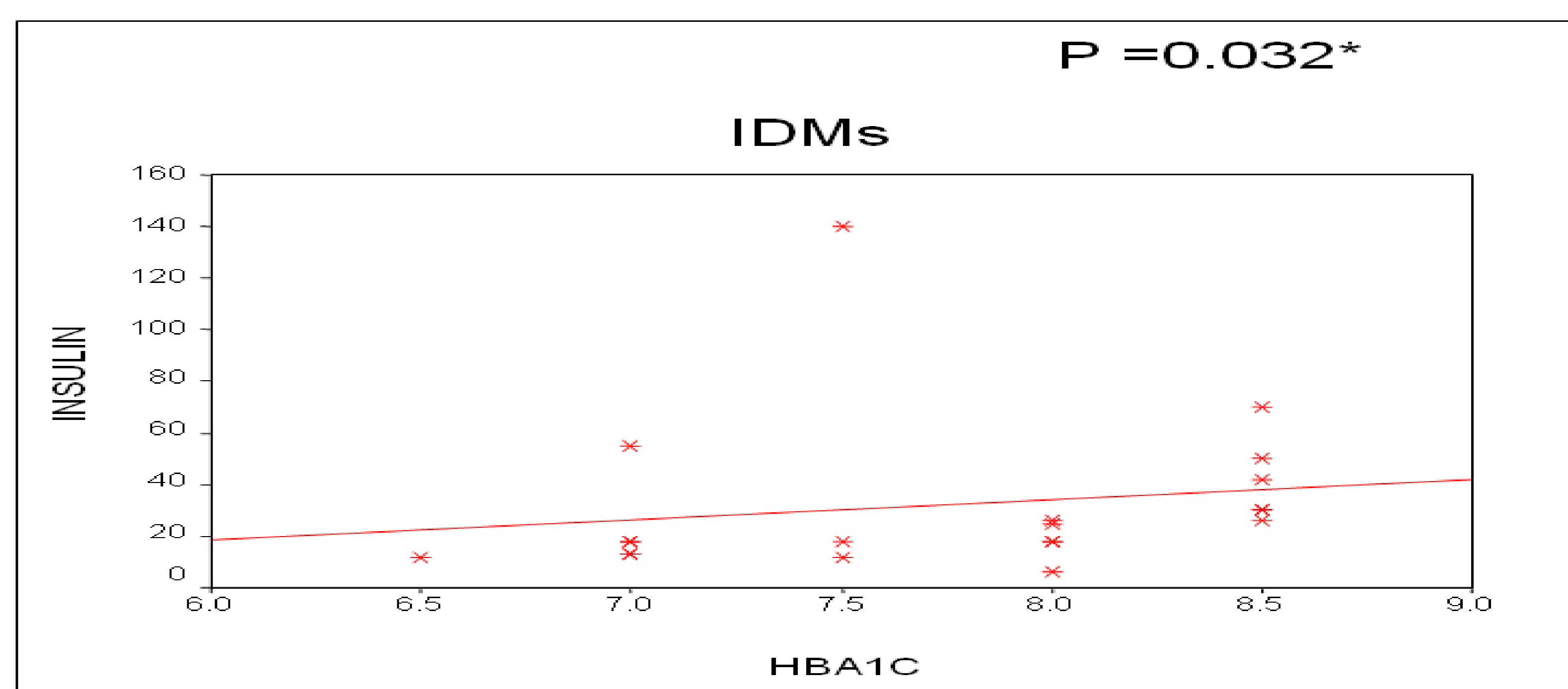


• Fig. 3 Comparison between IDMs and control according to fetal lipids .



- Infants of diabetic mothers showed significantly higher mean birth weight (3.9±0.48 vs 3.2±0.4Kg) , mean neonatal ponderal index (3.1±0.32 vs 2.7±0.46) , mean abdominal circumference (30.8±1.9 vs 28.5±1.32cm) , mean triceps skin fold thickness (3.5±0.58 versus 2.2±0.28 mm) and sub scapular skin fold thickness when compared to control group (3.57±0.6 versus 2.47±0.56 mm , P<0.0001 for all) (Fig. 1).
- Cord blood levels of biochemical growth factors were significantly higher in infants of diabetics when compared to control group; insulin (70.4±56.4 vs 4.48±3.7 µIU/ml) , leptin (40.4±14.85 vs 12.5±6.7 ng/ml and IGF-I (131±44.8 vs 77.3±21.9 ng/ml, p<0.0001 for all) .
- There are insignificant sex difference regarding anthropometric and laboratory measurements a part from higher mean insulin in female cases (79.4±69.1) compared to male cases (65.1±48.2 µIU/ml p= 0.04) Fig(2).
- As regards fetal lipid, mean HDL was lower in infants of diabetic mothers (21.4±0.6) when compared to control group (32.8±11.5mg/dl, P = 0.02) whereas other lipid profile were the same between both groups including: LDL; triglycerides ; total cholesterol ;and VLDL (Fig.3) (P=0.56, P=0.40, P=0.46, P=0.09 respectively).
- A significant positive correlation between umbilical serum insulin and mean maternal HbA1c (r=0.481, P=0.032) (Fig.4).
- There was a positive correlation between maternal HbA1c and triceps and sub scapular skin fold thickness (r=0.5 , P = 0.001, r=0.32 , P=0.05, respectively). Also, positive correlation between IGF-I and birth weight (r=0.67, P = 0.02) and abdominal circumference (r=0.59 0.05).

• Fig. 4 Correlation between maternal HbA1c and umbilical serum insulin .



CONCLUSIONS

- Exposure to maternal diabetes in fetal life results in characteristic changes in affected neonatal anthropometric measurements and caused abnormalities of lipid and biochemical growth factors (Insulin, leptin and Insulin-Like Growth Factor-1) which may lead to metabolic and cardiovascular complications in later life.