

DIGOXIN-LIKE FACTOR IN INFANTS OF DIABETIC MOTHERS NOT RECEIVING DIGOXIN THERAPY*

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Digoxin levels have been detected in the neonatal blood of cases in which neither mother nor baby had received digoxin. This activity has been termed the digoxin-like factor (DLF)¹⁻⁴. It has been reported that DLF levels were found to be higher in the blood of infants born to preeclamptic mothers than in the blood of those born to healthy controls^{5,6}. Thus, the clinical utility of DLF measurements in newborn infants might be important. In this report we present data from DLF determinations in infants of diabetic mothers.

Material and Methods

Fifty-nine full term newborns aged less than 48 hours who had been delivered at the Hacettepe University Children's Hospital were enrolled in this study. The gestational ages of the patients ranged between 38-41 weeks. All the babies were delivered normally except for 12 who were born by cesarean section. With the exception of those mothers who had been delivered via cesarean section in which general anesthesia was administered, the infants and mothers did not receive any medication including cardiac glycosides during pregnancy or delivery. There were no Apgar scores less than seven at one and five minutes. All the babies were in good health and there was no evidence of cardiac disease clinically, radiologically or electrocardiographically (ECG). The infants were evaluated and then separated into four groups: healthy-appropriate for gestational age (AGA)-controls (n:25), large-for-gestational age (LGA) babies (n:15), infants of diabetic mothers who were diet-controlled (n:13), and infants of insulin-dependent diabetic mothers (n:6). Four diet controlled mothers and three insulin-dependent mothers had pregestational diabetes for 8.2 ± 2.4 years and

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5.7±2.1 years respectively. One milliliter of blood was taken from the infants to determine the digoxin levels in the first 48 hours of life and analyzed within the same day of collection using a commercial Fluorescence Polarization TDX System (Abbott Laboratories, Diagnostic Division North Chicago, IL 60064) having a sensitivity of 0.2 ng per milliliter.

The results were expressed as mean ± SD and statistical analyses were carried out using Student's *t* test.

Results

The results of this study are summarized in Table I. The serum DLF levels were similar in all the groups. The mean serum DLF levels were 0.33 ± 0.18 ng/ml, 0.37±0.09 ng/ml, 0.45±0.32 ng/ml, and 0.43±0.23 ng/ml in the AGA-controls, LGA-controls, infants of diabetic mothers and infants of insulin-dependent diabetic mothers, respectively, ($p>0.05$) There was no correlation between birth weight and serum DLF levels.

TABLE I: Serum Digoxin-Like Factor Levels in Infants of Diabetic Mothers and Controls.

	Control AGA	Control LGA	Infants of diabetic mother	Infants of insulin- dependent diabetic mother
n	25	15	13	6
Male/Female	18/7	10/5	6/7	4/2
Body weight (g)	3233± 385	4217±243	3498±573	3684±806
Digoxin-like factor (ng/ml)	0.33±0.18	0.37±0.09	0.45±0.32	0.43±0.23

Discussion

The digoxin-like factor increases in umbilical vein blood and in the serum of newborn infants for 2-8 days when the DLF levels are inversely correlated to the gestational age¹⁻⁴. Its correlation to birth weight is controversial^{1,2}. We did not find a correlation between DLF levels and birth weight in our study.

The fetal adrenals, and probably the placenta, are the most likely sources of DLF. Endogenous DLG may be involved in regulating blood volume and pressure. Digoxin – like factor similar to the cardiac glycosides, increases cardiac contractility, constricts blood vessels and reduces the renal tubular reabsorption of

sodium. The increased blood pressure and reduced sodium absorption results in excretion of the excess volume.¹⁻⁴

The incidence of hypertrophic cardiomyopathy in infants of diabetic mothers is known^{7,8}, and although it has not been documented this abnormality may affect the DLF of these infants. We excluded this possibility by clinical and laboratory studies. Our aim was to evaluate DLF in infants of diabetic mothers who had no cardiac abnormality prior to the structural changes. However, we did not find any difference in DLF levels of the infants of diabetic mothers and the controls. Our findings may add additional information to the literature regarding DLF in newborns.

Summary

Serum digoxin-like factor was detected in infants of diabetic mothers who were insulin-dependent or diet controlled. No statistical difference was found between the serum digoxin-like factor levels of the infants of diabetic mothers and the controls.

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