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Letters to the Editor

Plasma Noradrenaline in Infants of Diabetic Mothers

Sir,

Blood glucose concentration is lower in the immediate neonatal period in infants of diabetic mothers (IDM) compared to infants of non-diabetic mothers (INM), probably due to a higher plasma insulin in the former group [3]. Interestingly, counterregulatory hormones such as plasma glucagon and urinary excretion rates of catecholamines are not raised in IDM or may even be reduced compared to INM [1, 3, 4]. Although the intravenous glucose K-value is higher in IDM [3] King et al. [2] reported that continuous low dose IV glucose infusion resulted in higher blood glucose values in IDM compared to INM indicating impaired glucose regulation in the former group. Very recently, Young et al. [6] found elevated plasma noradrenaline in umbilical cord blood in IDM. The authors did not measure blood glucose in their infants but considered it unlikely that the elevated plasma noradrenaline concentrations were due to hypoglycaemia because the samples were taken immediately after delivery.

We have recently had the opportunity to measure capillary plasma noradrenaline and adrenaline by a single isotopederivative assay as well as blood glucose in five IDM at two hours of age and results were compared with corresponding values in eleven INM. None of them had any signs of perinatal asphyxia.

Blood glucose concentration was significantly lower in IDM compared to INM (mean 2.2 mmol/l and 3.8 mmol/l $p < 0.02$). Plasma noradrenaline averaged 1225 pg/ml (range 570 to 2512) and 748 pg/ml (192 to 1076) in IDM and INM, respectively. The corresponding values for plasma adrenaline were mean 349 pg/ml (44 to 1014) and 137 pg/ml (0 to 577). Although differences between plasma noradrenaline and adrenaline in IDM and INM, respectively, were not significant by the Wilcoxon's two-sample test, the variance especially of plasma noradrenaline was much greater in IDM compared to INM (two-tailed F-test, $p < 0.01$). The reason for this difference may be explained by the findings in Figure 1. In IDM plasma noradrenaline showed a close correlation to blood glucose concentration. The total variance of plasma noradrenaline was considerably reduced by regression ($r = -0.99$, $p < 0.01$). There was also a significant correlation between plasma adrenaline and blood glucose but only if results from both IDM and INM were combined ($r = -0.74$, $p < 0.01$). Plasma noradrenaline correlated more closely to blood glucose than plasma adrenaline. This fact may be explained by incomplete methylation of noradrenaline in the adrenal gland in infants or noradrenaline may be derived from the extra-adrenal chromaffin tissue which secretes only noradrenaline [5].

Our results suggest that a counterregulatory hormonal response to a low blood glucose concentration is present in IDM. It is possible that noradrenaline in IDM may explain a number of alterations in glucose metabolism and lipid metabolism observed in these infants [2, 3].

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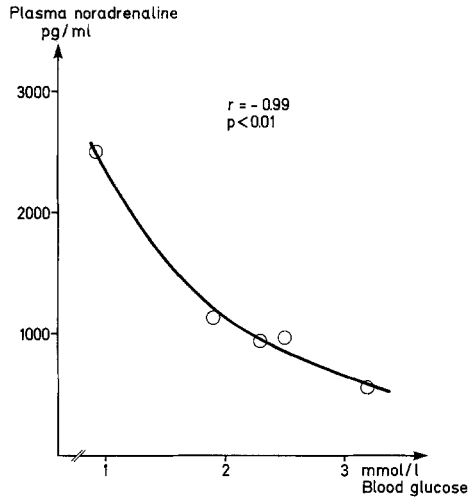

Fig. 1. Plasma noradrenaline concentration (pg/ml) obtained in five infants of diabetic mothers at two hours of age plotted on the ordinate versus blood glucose concentration (mmol/l)

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