(2) Will glucagon administration improve the subsequent adaptive response?

(3) Will enhanced ketone availability have measurable effects on neurodevelopment?

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Commentary

Dr Mehta's paper outlines many theoretical concepts which complement the more practical and pragmatic approach of our paper. More specifically, he agrees that ketone bodies may be important neonatal fuels especially for the brain, and that both neonatal hypoglycaemia and failure of ketone body production arise as a result of the failure of neonatal metabolic adaptation. In practical terms there is also agreement between ourselves regarding the difficulties of definition, the avoidance of a rigid 'cut-off' level, and the necessity for rapid accurate diagnostic methods without depending on reagent test strips. In terms of treatment of hypoglycaemia we agree that it is inadvisable to use high rates of glucose infusion or large intravenous boluses and that glucagon may be a useful additional treatment.

However, we feel that pragmatic recommen-
dations are needed for the benefit of nursing and medical staff and that theoretical issues should be viewed in this context. Dr Mehta over emphasises the role of hyperinsulinism in the aetiology of neonatal hypoglycaemia. We have recently demonstrated that, especially in babies with disordered blood glucose homeostasis, there are poor relationships among circulating blood glucose concentrations, plasma insulin concentrations, and glucose production rates. In addition, blood ketone body concentrations and plasma non-esterified fatty acid concentrations were not related to plasma insulin concentrations. This is not surprising in view of the many other factors which are essential for glucose and ketone body production, namely substrate availability, counter-regulatory hormones, and induction of enzyme systems.

The main area of controversy regarding management appears to be in the treatment of the asymptomatic term infant whose blood glucose concentration is <2.0 mmol/l. Dr Mehta has already suggested that the presence of ketone bodies may protect the brain and our paper out-
Prevention and management of neonatal hypoglycaemia

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Few topics in clinical paediatrics cause more confusion than the management of neonatal hypoglycaemia. Although it has been acknowledged as a clinical problem for many decades,1 its diagnosis and management continue to be controversial issues, with disagreement even between staff on the same nursery.2-4 This review presents our concept of the clinical situations in which hypoglycaemia most commonly occurs and the management of the condition. Rare disorders, such as inborn errors of metabolism and complex hormone deficiencies, which may present with hypoglycaemia are not discussed.

Neonatal hypoglycaemia most commonly occurs when the normal processes of metabolic adaptation after birth fail to occur. These processes enable the healthy infant to meet two major metabolic challenges. First, the need to maintain an adequate circulating concentrations of glucose or alternative fuels to supply the body’s organs, especially the brain, and second, the need to adapt to a new form of nutrition, namely intermittent feeding with milk. As the blood glucose concentration falls after the cutting of the umbilical cord and until milk feeding is established, the baby is entirely dependent upon its own resources to maintain fuel supply. Glycogenolysis is initiated as the initial counter-regulatory process. Once the glycogen stores are exhausted, however, substrates must be mobilised from body protein and fat stores so that gluconeogenesis can occur. These processes are induced by the counter-regulatory hormones (glucagon, catecholamines, growth hormone, and cortisol).

Although much is known of the basic biochemical processes which underlie these phenomena,5 6 clinical controversy exists surrounding the criteria for diagnosis of hypoglycaemia in the neonatal period, suitable monitoring policies, and the practical implications for management. This discussion first relates to the diagnosis of hypoglycaemia in general neonatal practice, then deals with monitoring and clinical management in specific circumstances.