Evaluation of Pediatric Diabetic Ketoacidosis Patients Admitted to the Pediatric Intensive Care Unit at Children’s Hospital and Research Center at Oakland: Epidemiology, Clinical Risk Factors and Subgroup Analysis

IRB# 2002-035
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Synopsis:
Recent estimates suggest that DKA is present in 25-40% of pediatric patients at the time of the diagnosis of diabetes and occurs at an estimated rate of 0.2 events/patient/year in the established patient (1). Clinically apparent cerebral edema occurs in approximately 1% of episodes of DKA in children and is associated with a mortality rate of 40-90%. Cerebral edema is responsible for 50-60% of diabetes related deaths in children (2). Despite this, the literature available on the management of DKA and its associated outcomes is sparse and often retrospective in nature (2-7). In our review of the literature, the largest prospective evaluation of pediatric patients with DKA to date involves 231 patients (8).

From 1997-1999, 3 patients admitted to CHRCO in DKA died of cerebral complications. As a result, a multidisciplinary group of attendings from the Critical Care, Endocrine and Emergency Department Divisions at CHRCO convened regularly in a year long Quality Improvement effort to review the existing literature and evaluate the DKA treatment protocol in use at the time. As a result of this MQIC taskforce, in November 1999, a new DKA protocol was instituted here at CHRCO. Since then, all patients admitted to the ICU with DKA have been treated using this protocol. The group felt that it would be unethical to administer the new protocol in randomized controlled trial fashion, given that the previous protocol, although standard of care at that time, yielded a higher than acceptable failure rate based on our review. Since the institution of the new protocol, 304 patients have been tracked prospectively (ending 5/04) and data incorporated into data collection forms.

Aim 1:
To evaluate the epidemiology of pediatric patients admitted to the PICU at CHRCO with diabetic ketoacidosis and to assess clinical risk factors associated with poor outcome (death or central nervous system dysfunction).

Progress: Data is currently being summarized and will hopefully be submitted for publication as a protocol paper in manuscript form.

Aim 2:
To analyse clinical characteristics of relevant subgroups of patients admitted with diabetic ketoacidosis.

Hypothesis 1: To analyze the presenting characteristics of pediatric patients admitted to the PICU at CHRCO in DKA who are ultimately found to have non-type 1 characteristics on follow-up evaluation in the CHRCO diabetes clinic.

Hypothesis 2: To analyze the presenting characteristics of pediatric patients admitted to the PICU at CHRCO in DKA who are currently enrolled in the Search for the IDDM genes within the HLA region and the diabetes prevention trial, Dr. Janelle Noble, Primary Investigator.

Progress: This subgroup analysis was completed and prepared in manuscript form by Dr. Anil Sapru.