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Hyperglycemic Emergencies in Minority Children with Diabetes

Introduction:
Hyperglycemic emergencies in children with diabetes more commonly include diabetic ketoacidosis (DKA) and less commonly (2%) hyperosmolar hyperglycemic state (HHS) which is associated with relative insulin deficiency and type 2 diabetes mellitus (DM). However, there have been increasing reports of mixed presentation affecting 14% in one case series.
Methods:
This was a retrospective chart review of children (ages 1-21 years) admitted for DKA or HHS between 2004 and 2019. Descriptive statistics, chi-square analysis, and t-tests were used
Results:
Out of 322 patients, 92% were African American with a mean age of 13.6 (SD 3.5) years, 39% males, comprising of 266 with DKA, 52 mixed DKA-HHS, and 4 HHS. Most (98%) of the DKA and DKA-HHS groups had type 1 DM. All 4 with HHS had type 2 DM. Compared to the DKA group, the mixed DKA-HHS group required higher IV fluids rates (p<0.0001), 4.3-fold greater odds of acute kidney injury (mean serum creatinine of 1.6 mg/dl vs 1.1 mg/dl), and 3.3-fold greater odds of developing altered mental status. Risk factors such as insulin adherence, precipitating factors like infection or stress were not different between both groups (p=0.06) and treatment of both groups was similar with respect to insulin dose (0.1 u/kg/hour). Time to resolution was also similar (p=0.4).
Among the HHS group, 50% presented with altered mental status and acute kidney injury (mean 1.1, SD 0.31) due to severe dehydration and required higher IV fluids rates (2 x maintenance or greater). CPK in 2 patients was slightly elevated (mean 1643 units/L, SD 77). None of the patients had venous thrombosis, rhabdomyolysis, cerebral edema, or death. The average time of resolution was 10 hours (SD 1.63).
Conclusion:
Identification of hyperosmolality whether with or without DKA in the emergency setting is important because treatment should be focused on the degree of dehydration and other complications such as acute kidney injury and mental status changes.

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