Hyperglycemic Hyperosmolar State: An Emerging Problem in Obese Children with Diabetes

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Diabetic ketoacidosis (DKA) and hyperglycemic hyperosmolar non-ketotic state (HHS) are both diabetic emergencies associated with hyperglycemia and can be fatal if not recognized and promptly treated. Although both are defined as a hyperglycemic condition, the management of each may be different and the importance of appropriate management can significantly impact the outcome. HHS has historically been rarely seen in the pediatric population. However, with the recent rise in pediatric obesity epidemic, HHS has emerged as not infrequent problem in children. We report an obese adolescent with new onset type 2 diabetes presented with HHS. There are several problems associated with obesity but perhaps none as acute and life-threatening as HHS. This condition is characterized by severe hyperglycemia (> 600 mg/dL), a marked increase in serum osmolality (calculated > 320 mOsm/L) no or mild acidosis (bicarbonate 15 mmol/L), altered mental status and clinical evidence of dehydration without significant accumulation of β-hydroxybutyric or acetoacetic acids. Mild ketosis is not uncommon. It is important that physicians have a high index of suspicion in obese patients presenting with altered mental status to obtain serum glucose and osmolality. HHS is usually associated with type 2 diabetes which has prolonged and insidious course leading to severe dehydration compared to DKA (15% versus10%). These patients are also significantly insulin resistant. Management protocol for DKA with fluid restriction to 4000 ml/m2/day may not be applicable to HHS due to severe intravascular dehydration. Requirement of insulin may be higher than required in DKA. Early recognition and aggressive resuscitation with fluids is critical to survival.