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Case:

60 yo male with PMH significant for DM, HTN, and HLD who presented to the emergency department from jail for AMS. Pt was found by police officers thirty minutes prior to arrival with decreased level of consciousness in his bed. No known trauma per the officers or recent illness. HPI and ROS are otherwise limited secondary to patient's acute change in mental status. On exam, patient had tachypnea, tachycardia, Kussmaul respirations, and GCS of 7. Initial stabilization was performed including intubation, fluids, labs, EKG, CXR, and CT head. Lab results came back with a K of 5, pH of 6.9, and anion gap of 20. With all other results being wnl, diagnosis of DKA was made. Fluid resuscitation and insulin drip was administered and patient was admitted to the MICU at which time he was started on a bicarbonate drip.

Clinical Questions:

Is the use of sodium bicarbonate indicated in the treatment of DKA?

Evidence:

One study in particular addressed this clinical question in a systemic review of the literature recently in 2011; Bicarbonate in diabetic ketoacidosis – a systemic review. The **evidence came up lacking** in the favor of sodium bicarbonate use. In the past it was thought using bicarbonate would decrease myocardial depression, help improve severe hyperkalemia, and overall replace the bicarbonate lost in the body as a whole. However, this study showed that there were only theoretical benefits to its use and transient reversal of acidemia with no clinically evident improvement. And as with any drug, there are always side effects and potentially harmful effects and sodium bicarbonate is not an exception including **hypotension, hypokalemia, hypernatremia, hypocalcaemia, alkalosis, and hypercapnia**. When it came to the pediatric population, the use of sodium bicarbonate has a negative impact with **increased risk of cerebral edema, increased demands for potassium repletion, and even worsening of the ketosis**. However, the study did have its limitations and no patients with a pH below 6.85 were studied and therefore no strong recommendations can be made regarding sodium bicarbonate use in extremes of pH below 6.9.

Conclusion:

In the setting of DKA, there is **no strong evidence to support the routine use** of sodium bicarbonate but showed detrimental evidence of its use in the pediatric population.

References:

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2. Chansky ME, Lubkin CL in Tintinalli JE, Kelen GD, Stapczynski JS (eds): *Emergency Medicine, A Comprehensive Study Guide*, ed 7. New York, McGraw-Hill, 2010, (Ch) 220:p 1432-1438.
3. <http://www.emdocs.net/myths-dka-management/>
4. <http://rebelem.com/benefit-sodium-bicarbonate-dka/>
5. <http://www.ncbi.nlm.nih.gov/pubmed/23737516>