Diabetic Ketoacidosis/Hyperosmolar Hyperglycemic Crisis

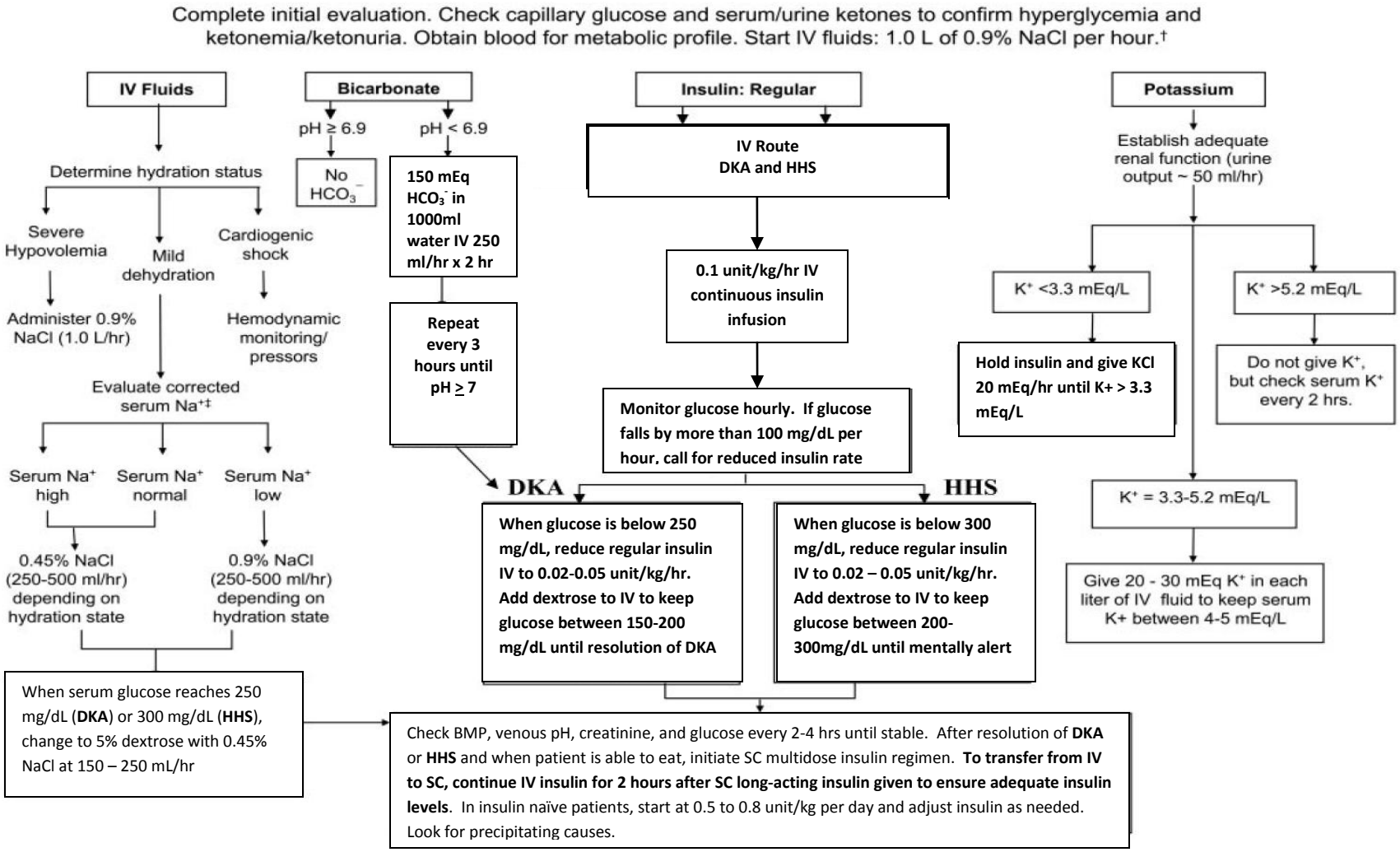

Figure 2—*Protocol for management of adult patients with DKA or HHS. DKA diagnostic criteria: blood glucose 250 mg/dl, arterial pH 7.3, bicarbonate 15 mEq/l, and moderate ketonuria or ketonemia. HHS diagnostic criteria: serum glucose >600 mg/dl, arterial pH >7.3, serum bicarbonate >15 mEq/l, and minimal ketonuria and ketonemia. †15–20 ml/kg/h; ‡serum Na should be corrected for hyperglycemia (for each 100 mg/dl glucose 100 mg/dl, add 1.6 mEq to sodium value for corrected serum value). (Adapted from ref. 13.) Bwt, body weight; IV, intravenous; SC, subcutaneous.*

Adapted from Hyperglycemic crises in adult patients with diabetes. *Diabetes Care*. 2009; 32(7):1335-1343

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Table 1—*Diagnostic criteria for DKA and HHS*

	DKA			HHS
	Mild (plasma glucose >250 mg/dl)	Moderate (plasma glucose >250 mg/dl)	Severe (plasma glucose >250 mg/dl)	Plasma glucose >600 mg/dl
Arterial pH	7.25–7.30	7.00 to <7.24	<7.00	>7.30
Serum bicarbonate (mEq/l)	15–18	10 to <15	<10	>18
Urine ketone*	Positive	Positive	Positive	Small
Serum ketone*	Positive	Positive	Positive	Small
Effective serum osmolality†	Variable	Variable	Variable	>320 mOsm/kg
Anion gap‡	>10	>12	>12	Variable
Mental status	Alert	Alert/drowsy	Stupor/coma	Stupor/coma

*Nitroprusside reaction method. †Effective serum osmolality: 2[measured Na^+ (mEq/l)] + glucose (mg/dl)/18. ‡Anion gap: $(Na^+) - [(Cl^- + HCO_3^-$ (mEq/l)]. (Data adapted from ref. 13.)

Most common complications of treatment are:

1. Hypokalemia – K+ replacement should be proactive in DKA and should begin as soon as serum K+ is lower than 5.2 mEq/L with adequate urine output
2. Hypoglycemia - hyperglycemia resolves faster than acidosis: dextrose is added to IVF to prevent hypoglycemia and allow the insulin to continue to close the anion gap and oppose ketogenisis
3. Recurrence of DKA - due to insulin infusion being discontinued without appropriate subq basal and bolus insulin coverage administered before the drip is stopped
4. Hypophosphatemia – Regular monitoring is recommended
5. Advise a gradual reduction of glucose correction and avoidance of aggressive glycemic targets until serum osmolality is normalized and mental status improves to minimize the risk of cerebral edema.

DKA *resolves when blood glucose is less than 200 mg/dL along with 2 of the following: anion gap is less than or equal to 12, bicarb greater than or equal to 15, and venous pH is greater than 7.3. Blood glucose often normalizes long before acidosis resolves.*

H*yperosmolar Hyperglycemic Syndrome* *resolves when fluid and electrolyte balance are restored and mental status returns to baseline.*

<u>These guidelines are designed to assist the clinician by providing a framework for Hyperglycemic Crisis Treatment and are in no way intended to replace a clinician's independent judgment</u>

Adapted from Hyperglycemic crises in adult patients with diabetes. *Diabetes Care*. 2009; 32(7):1335-1343