

Pediatric Diabetic Ketoacidosis (DKA)

Clinical Guideline

Condition	Not DKA	Mild DKA	Moderate DKA	Severe DKA
HCO <sub>3</sub> mEq/L	15 to 33	less than 15	less than 10	less than 5
Venous pH	7.3 or more	less than 7.3	less than 7.2	less than 7.1

1. Initial management: No bolus of insulin or bicarbonate in first hour

What	How much
<ul style="list-style-type: none"><li>Use isotonic fluid (LR or NS)</li><li>Nothing by mouth</li><li>Draw venous pH, glucose, Na, K, Cl, HCO<sub>3</sub>, BUN, and creatinine.</li><li>Check urine ketones</li></ul>	<div>Isotonic fluid: 20 ml/kg bolus</div> <ul style="list-style-type: none"><li>Give total over first hour of treatment</li><li>Bolus may be repeated if child is in shock</li></ul>

Fluid and insulin guide by weight

Weight in kg (1 kg = 2.2 lb)	10	12	15	16	20	25	32	40	50
1st hour bolus (ml) using LR or NS	200	240	300	320	400	500	640	800	1000
IV rate (ml/hour) (1.5x maintenance)	60	66	75	78	90	98	108	120	135
Insulin rate (units/hour)	0.1 units/kg/hr								

After initial management, if patient is not in DKA, has no changes in mental status, and is tolerating fluids, call Physician Referral Call Center (414) 266-2460.

2. Following isotonic fluid bolus (approximately 1 hour)

What	How much
<ul style="list-style-type: none"><li>Use 0.45 NS with 40 mEq/L K+ (K+ = ½ as K phosphate, ½ as K acetate)</li><li>Continue nothing by mouth</li><li>Regular insulin infusion 0.1 units/kg/hr</li></ul>	<div>1.5x maintenance rate (up to maximum of 250 ml/hr)</div> <div>Maintenance rate = 4 ml/kg x first 10 kg</div> <div>+ 2 ml/kg x next 10 kg</div> <div>+ 1 ml/kg x every 1 kg over 20 kg</div> <div>If blood glucose &lt;300mg/dL, see below for dextrose concentration</div>
Normal saline-containing (0.9 NS) fluids can be used if 0.45 NS fluids are not available.	

Checkpoints		
✓ Blood tests	✓ Urine tests	
<ul style="list-style-type: none"><li>Electrolytes: Hourly until HCO<sub>3</sub> above 17</li></ul>	<ul style="list-style-type: none"><li>Strict input and output.</li></ul>	
<ul style="list-style-type: none"><li>Blood glucose hourly.</li></ul>	✓ Assessments <ul style="list-style-type: none"><li>Neuro checks hourly while HCO<sub>3</sub> is less than 15; then every 4 hours.</li></ul>	
If:	You should:	
<ul style="list-style-type: none"><li>Blood glucose is:</li></ul>	less than 300 mg/dl	<ul style="list-style-type: none"><li>Infuse Dextrose 5% in 0.45 NaCl with electrolytes.</li></ul>
	less than 150 mg/dl	<ul style="list-style-type: none"><li>Infuse Dextrose 10% in 0.45 NaCl with electrolytes.</li></ul>
	less than 100 mg/dl	<ul style="list-style-type: none"><li>Decrease insulin infusion to 0.05 units/kg/hr; use Dextrose 10% fluids.</li></ul>
<ul style="list-style-type: none"><li>Cerebral edema (mental status changes in DKA)</li></ul>	<ul style="list-style-type: none"><li>Give 3% sodium chloride 5 ml/kg over 20 minutes. Repeat, if needed.</li><li>OR</li><li>Give mannitol 1 gm/kg by IV push. Repeat, if needed.</li></ul> <div>If treating with either agent, contact Children's Wisconsin Transport/ICU team because if mental status is not improved in addition to repeat of treatment additional further emergent interventions may be indicated.</div>	
<ul style="list-style-type: none"><li>K+ is less than 3</li></ul>	<ul style="list-style-type: none"><li>Give 1 mEq/kg KCl by mouth OR increase IV K to 60 mEq/L.</li><li>Use cardiac monitor for serious or critical DKA. Observe for long QRS complex or low T-wave.</li></ul>	

Discharge parameters

Normal electrolytes: HCO<sub>3</sub> greater than or equal to 17 | No vomiting; able to tolerate oral fluids; well hydrated  
Normal neurological exam; normal fundoscopic exam | Appropriate follow-up scheduled

Children's Wisconsin Transport Team AND Physician Referral Call Center

(800) 266-0366 or (414) 266-2460

Please contact [clinicalguidelines@childrenswi.org](mailto:clinicalguidelines@childrenswi.org) for questions or comments

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### Medical Disclaimer

This Clinical Guideline (CG) is designed to provide a framework for evaluation and treatment. It is not intended to establish a protocol for all patients with this condition, nor is it intended to replace a clinician's judgement. Adherence to this CG is voluntary. Decisions to adopt recommendations from this CG must be made by the clinician in light of available resources and the individual circumstances of the patient. Medicine is a dynamic science; as research and clinical experience enhance and inform the practice of medicine, changes in treatment protocols and drug therapies are required. The authors have checked with sources believed to be reliable in their effort to provide information that is complete and generally in accord with standards accepted at the time of publication. However, because of the possibility of human error and changes in medical science, neither the authors nor Children's Hospital and Health System, Inc. nor any other party involved in the preparation of this work warrant that the information contained in this work is in every respect accurate or complete, and they are not responsible for any errors in, omissions from, or results obtained from the use of this information. Readers are encouraged to confirm the information contained in this work with other sources.

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