Emergency Room Management Guidelines
for the Child with Type 1 Diabetes

Diabetic Ketoacidosis (DKA)

**History (some or all of)**
- Polyuria
- Polydipsia
- Weight loss
- Abdominal pain
- Tiredness
- Confusion
- Difficulty breathing
- Urine ketones/glucose
- Capillary glucose STAT in ER
- Venous blood – glucose, gases, electrolytes, urea, creatinine
- Other as indicated

**Confirm DKA**
- Ketonuria
- Serum bicarbonate < 18 mmol/L
- Glucose > 11 mmol/L
- Consult Pediatrician immediately
- pH < 7.3

**Resuscitation**
- Assess airway and breathing
- Apply 100% oxygen by mask
- Normal saline 10 ml/kg to expand vascular space
  THEN
  - Decrease to 5 - 7 ml/kg/hr with Potassium Chloride as noted below
  - Only infuse Sodium Bicarbonate (1 - 2 mEq/kg over 1 hour) if:
    1. Life-threatening hyperkalemia
    2. Inotrope-resistant shock
    3. Cardiac Arrest

After 1st Hour of IV Fluids
- If history of voiding within last hour and Potassium < 5.5 mmol/L, add 40 mEq/L of Potassium Chloride to IV fluid
- Aim to keep Potassium between 4 - 5 mEq/L
- Continuous insulin infusion 0.1 units/kg/hr = 1ml/kg/hr (of solution of 25 units of Regular Insulin in 250 ml Normal Saline). Include this amount in total fluid intake.
  - DO NOT GIVE BOLUS OF INSULIN
- Normal saline 7 ml/kg over 1st hour with Potassium Chloride as noted below
  THEN
  - 3.5 - 5 ml/kg/hr

Neurological deterioration
- Headache, irritability, decreased level of consciousness, decreased HR
- First rapidly exclude hypoglycemia by capillary blood glucose measurement
- Treat for cerebral edema

**Acetosuria**
- Check urine ketones
- Consider sepsis
- Contact Tertiary Pediatric Diabetes Centre

**Acidosis not improving (3 - 4 hours)**
- Check insulin delivery system
- Consider sepsis
- Contact Tertiary Pediatric Diabetes Centre

**Acidosis improving**
- Blood glucose < 15 mmol/L
- OR
- Blood glucose falls >5 mmol/L after 1st hour of fluids
- Change IV to D5/Normal Saline with Potassium as above
- Decrease insulin to 0.04 - 0.05 U/kg/hr = 0.4 - 0.5 ml/kg/hr of standard solution as above
- Blood glucose < 10mmol/L change to D10/Normal Saline with Potassium as above

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- Check urine ketones
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**Clinical Signs generally include**
- Deep sighing respirations – (Kussmaul breathing)
- With no wheeze or rhonchi
- Smell of ketones on breath
- Leithargy/drowsiness
- Dehydration – mild to severe

**Vascular Decompensation**
- Hypotension (see box)
- Hypothermia
- Decrease level of consciousness

**No Vascular Decompensation**
- Minimally dehydrated
- Tolerating fluids orally
- Normal mental status
- Oral hydration
- S/C insulin (see illness rules)

Hypokalemia (Peds Unit Values)

<table>
<thead>
<tr>
<th>Age</th>
<th>Serum K+ (mmol/L)</th>
</tr>
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<tbody>
<tr>
<td>&lt;1 month</td>
<td>&lt; 4.0</td>
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**Observation and Monitoring**
- Hourly blood glucose (capillary)
- Aim for a decrease in blood glucose of 5 mmol/L/h
- Strict hourly documentation of fluids input/output
- Calculate and review fluids balance at least every 4 hours
- Hourly, at least, assessment of neurological status for a minimum of 24 hours
- Normal BP (lying and sitting)
- Normal bowel sounds
- Normal mental status
- Tolerating fluids orally
- S/C insulin (see illness rules)

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**Histology**
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**History**
Recent hypoglycemic event requiring treatment by another person with Glucagon or oral glucose especially if:
- Increased confusion
- Decreased consciousness

**Clinical Signs**
Sequels
Hemiparesis
Any localizing neurological findings
Altered state of consciousness

**Hypoglycemia (moderate or severe)**

**AND/ OR**
Obtain a blood glucose (capillary)
Electrolytes and Gases not usually necessary

**IF** child is active, alert, and tolerating oral fluids well, then encourage glucose-containing drinks at least at maintenance fluid rate

OTHERWISE
Start IV — at least 5% glucose in saline at maintenance rate, regardless of blood glucose level

**Discharge**
Discharge ONLY when child is:
- Fully alert
- Tolerating oral fluids and
- Free of neurological signs.

**Observation and Monitoring**
- Determine cause and arrange for follow-up
- Decrease all insulin doses by 20% for next 24 hrs
- Renew prescription for Glucagon if used

**Intercurrent Illness**

**Maintenance IV fluids**
- 4 ml/kg/hr for 1st 10 kg
- 2 ml/kg/hr for next 10 kg
- 1 ml/kg/hr for next 10 kg

**Hypoglycemic**
- Do not omit insulin
- Decrease next scheduled insulin dose by 10–20%
- If not tolerating oral fluids then follow IV as per hypoglycemia guidelines
- Otherwise encourage carbohydrate-containing fluids

**Hyperglycemic**
- Do not omit insulin
- Use S/C insulin unless acidotic (see DKA guidelines)
- If Blood Glucose >11 mmol/L and most-late ketones, then give usual insulin PLUS extra short or rapid-acting O4H (10–20% of TOTAL (N&R or H) daily dose)

**Discharge**
- Tolerating oral fluids
- No other reason for hospitalization
- Replace usual meal plan with carbohydrate-containing fluids

Catalogue No. 013306  17,800  April/09  © 2009 Queen’s Printer for Ontario