**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
- Vomiting
- Confusion
- Difficulty breathing

**Clinical Signs generally include**
- Deep sighing respirations — (Kussmaul breathing)
- No snoring or ronchi
- Smell of ketones on breath
- Leukopenia/drovernosis
- Dehydration — mild to severe

**Confirm DKA**
- 

**Normal Saline**
- 

**Acidosis not improving** (in 3-4 hours)
- Check insulin delivery system
- Consider segus
- Contact Tertiary Pediatric Diabetes Centre
- Admit to ICU

**Acidosis improving**
- Blood glucose <15 mmol/L
  - OR
  - Blood glucose falls <5.5 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/h after 1st hour of fluids
- Change to D10/Normal Saline with Potassium as above

**Normal Saline**
- 7 ml/kg over 1st hour with Potassium Chloride as noted below
- THEN 3.5 - 5 ml/kg/hr

**No Vascular Decompensation**
- Clinically Dehydrated
- Hyperventilating
- OR
- Normal BP
- Normal BP (fying and sitting)
- Minimal dehydration
- Tolerating fluids orally
- Normal mental status
- Oro hydration
- 5% insulin (see illness rules)

**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 - 1.5 ml/kg over 1 hour) if:
    - Life-threatening hypokalemia
    - Intercurrent respiratory monitoring (with ICU tracing)

**Confirmation of DKA**
- Ketonuria
- Normal Saline 0.4 - 0.5 ml/kg/hr of standard solution as above
- Normal Saline @ maintenance IV rate
- AFTER 1st Hour of IV Fluids
  - If History of working within last hour and Potassium <5.5 mmol/L, add 40 mmol/L of Potassium Chloride to IV fluid
  - Aim to keep Potassium between 4 - 5.5 mmol/L
  - Continuous insulin infusion 0.1 units/kg/hr = 1 ml/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**
  - Continuous cardiac/respiratory monitoring (with ICU tracing)

**Neurological deterioration**
- Headache, instability, decreased level of consciousness, decreased HR
- Rapidly first episode hypoglycaemia by capillary blood glucose measurement

**After 1st hour of IV fluids**
- If History of working within last hour and Potassium <5.5 mmol/L, add 40 mmol/L of Potassium Chloride to IV fluid
- Aim to keep Potassium between 4 - 5.5 mmol/L
- Continuous insulin infusion 0.1 units/kg/hr = 1 ml/kg/hr (of solution of 25 units of Regular Insulin in 250 ml Normal Saline). Include this amount in total fluid intake

**Intercurrent Illness**
- **Observe and Monitor**
  - Capillary glucose
  - Venous blood — glucose, gases, electrolytes, urea
  - Urine ketones
  - If emesis 2x in past 4 hours, keep NPO for 4 - 6 hours
  - NO emesis BUT Not drinking
  - Capillary glucose
  - Venous blood — glucose, gases, electrolytes, urea
  - Urine ketones

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

**Hyperglycemic**
- Do not omit insulin
- Use S/C insulin unless acidic (see DKA guidelines)
- If Blood glucose >11 mmol/L and mild-large ketones, then give usual insulin PLUS extra short or rapid-acting 0.4U/kg (10 - 20% of TOTAL insulin at 30 min dose) daily dose

**Observation and Monitoring**
- Input & Output 4x
- Blood glucose 1 - 2x per 4 hours
- Test urine for ketones

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

**Observation and Monitoring**
- Input & Output 4x
- Blood glucose 1 - 2x per 4 hours
- Test urine for ketones

**Diabetes Ketoacidosis**
- **Observation and Monitoring**
  - Capillary glucose
  - Venous blood — glucose, gases, electrolytes, urea
  - Urine ketones

**Hypoglycemia (moderate or severe)**

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

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

**Obtain a blood glucose (capillary)**
- Electrolytes and gases usually necessary
- IF child is active, alert, and tolerating oral fluids well, then encourage
  - glucose-containing drinks: at least at maintenance fluid rate

**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
- Re-evaluate prescription for Glucagon if used

**Indications**
- Tolerating oral fluids
- Fully alert
- Clinically well
- Improvement
- Normoacidotic
- Normal mental status
- Normal BP
- Normal hearing
- Normal vision
- Normal BP
- Normal mental status
- Normal BP
- Normal vision
- Normal mental status

**Maintenance IV fluids**
- For the Child with Type 1 Diabetes
- **Discontinue**
  - 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
- Re-evaluate prescription for Glucagon if used

**Intercurrent Illness**
- **Observe and Monitor**
  - Capillary glucose
  - Venous blood — glucose, gases, electrolytes, urea
  - Urine ketones

**Maintenance IV fluids**
- For the Child with Type 1 Diabetes
- **Discontinue**
  - 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
- Re-evaluate prescription for Glucagon if used

**Intercurrent Illness**
- **Observe and Monitor**
  - Capillary glucose
  - Venous blood — glucose, gases, electrolytes, urea
  - Urine ketones

**Maintenance IV fluids**
- For the Child with Type 1 Diabetes
- **Discontinue**
  - 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
- Re-evaluate prescription for Glucagon if used

**Intercurrent Illness**
- **Observe and Monitor**
  - Capillary glucose
  - Venous blood — glucose, gases, electrolytes, urea
  - Urine ketones

**Maintenance IV fluids**
- For the Child with Type 1 Diabetes
- **Discontinue**
  - When child is
  - Fully alert
  - Tolerating oral fluids and
  - Free of neurological signs.