Pediatric Diabetic KetoAcidosis (DKA) Algorithm

Recognition of DKA

DKA can occur in existing or new onset type 1 or type 2 diabetes

Diagnostic criteria: Diabetes (random blood glucose ≥11.1 mmol/L) + Ketonuria + Acidosis

Clinical features: Polyuria, polydipsia, weight loss, dehydration, Kussmaul breathing, headache, decreased level of consciousness, abdominal pain, vomiting

Alert Pediatric Referral Centre

DKA Severity

	Mild	Moderate	Severe
pH	7.2 – 7.29	7.1 – 7.19	<7.1
HCO_3	10 – 14	5 – 9	<5

Hyperosmolar Hyperglycemic State (HHS)

Consider if:
- Glucose ≥33 mmol/L; HCO_3 >15
- Minimal acidosis/ketosis; negative or trace urine ketones
- Osmolality ≥330 mOsm/L

Discuss with Pediatric Referral Centre

Initial Management

- Assess ABCs, vital signs (including BP) + neurovitals (GCS, pupils)
- Rapid bedside glucose, bedside blood ketones (if available)
- O_2 10-15 Lpm non-rebreather mask (if signs of shock)

- IV Access x 2 lines (consider intraosseous if unsuccessful)
- Serum glucose, electrolytes, venous gas, urea, creatinine, serum osmolality
- Urinalysis for glucose, ketones; bladder catheterization if needed

- Consider other investigations:
  - Obtain cultures (e.g. blood, urine, throat) if clinical evidence of infection
  - ECG for baseline assessment of K^+ status (if delay in obtaining serum K^+)

CAUTION!

Intubation and ventilation are ***high-risk procedures*** for DKA patients, and should never be undertaken without consultation with your pediatric referral centre or transport team.

Signs of CEREBRAL EDEMA?

- GCS <14 and/or irritability in younger children
- And/or Cushing's triad: ↑BP, ↓HR, ↓RR

YES →

Cerebral Edema Management

- Call Pediatric Referral Centre
- Assess and manage ABCs
- Bed rest, elevate head of bed to 30°
- If hypoperfused (tachycardia, cap refill >2 sec, cool extremities), give 10 mL/kg NS bolus over 30 minutes; reassess after bolus and repeat x 1 if persistent hypoperfusion. Discuss further fluid management with Pediatric Referral Centre.
- Run IV fluids at 60% of rate outlined in Rehydration Table
- 3% NaCl (5 mL/kg IV over 10 min) OR Mannitol (0.5 – 1 g/kg IV over 15 min)
- Start insulin infusion 0.1 units/kg/hr IV after 1 hour of IV fluids
- Head CT not required prior to transport

NO ↓

Fluid Resuscitation (Based on recent evidence)

Administer 10 mL/kg NS bolus over 30 minutes.

Persistent tachycardia, or other signs of hypoperfusion (cap refill >2 sec or cool extremities)?

NO ↓

YES ↓

Repeat 10 mL/kg NS bolus over 30 min. Reassess after each bolus and repeat if persistent hypoperfusion. Discuss with Pediatric Referral Centre. →

Rehydration Table: Total IV Fluids

Weight	mL/kg/hr
5 - <10 kg	6.5
10 - <20 kg	6
20 - <40 kg	5
≥40 kg	4 (MAX 250 mL/hr)

Pediatric Referral Centre Discussion

CONSIDERATION OF:
- Difficult vascular access
- Additional treatment of cerebral edema
- Airway management
- Ongoing fluid management

IV Fluids and Insulin

- Rehydrate with IV NS. Change to D10NS when glucose is <15mmol/L **OR** glucose is <25mmol/L and decreases by >5 mmol/L/hr‡
- Add 40 mmol/L KCl into IV fluid (if K+ <5 mmol/L and patient has voided in ED)
- Start **insulin infusion 0.1 units/kg/hr IV after 1 hour of IV fluids**

NEVER use IV insulin bolus
NEVER administer sodium bicarbonate

‡See DKA instructions in Drug Dosing Binder

Ongoing Monitoring Until Transfer

- Q 1 hour: Blood glucose
  Fluid ins and outs
  Neurovitals (GCS, pupils) HR and BP
- Q 2-4 hours: Electrolytes and venous gas
  Monitor ECG for T-wave changes

Dedicate one IV line to use as saline lock for serial bloodwork

CPEG GCEP Canadian Pediatric Endocrine Group Groupe canadien d'endocrinologie pédiatrique

PedsPacs Point-of-Care Tools by TREKK

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