

Diabetic Ketoacidosis (DKA)

Section Editor: seat open

Chief Editor: Maged Tanios, MD

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Disclaimer: This protocol is an educational reference intended to support — not replace — institutional policy, pharmacy and therapeutics review, and individual clinical judgment. Verify current dosing, contraindications, and local formulary/practice constraints before adopting into an EMR or using in patient care.

Overview

The 2024 ADA/EASD/JBDS/AACE/DTS consensus report substantially updated DKA management for the first time since 2009: diagnosis and resolution are now centered on **quantitative beta-hydroxybutyrate (BHB)** rather than anion gap, and mild/moderate uncomplicated DKA can be managed with subcutaneous insulin — potentially avoiding ICU admission altogether. This protocol also uses the local Basal-Bolus Insulin Calculation Tips reference for the IV-to-SQ transition step, since that dosing math is already institution-approved.

Steps

01 Diagnose Using the D-K-A Criteria

Table 1. DKA diagnostic criteria (all three required)

CRITERION	THRESHOLD
D — Diabetes	Glucose ≥ 200 mg/dL, or known diabetes history
K — Ketosis	Beta-hydroxybutyrate ≥ 3.0 mmol/L, or urine ketones ≥ 2+
A — Acidosis	pH < 7.3, or bicarbonate < 18 mmol/L

Anion gap is **not** recommended as a first-line diagnostic criterion under the current consensus.

02 Classify Severity

Table 2. Severity classification

SEVERITY	BETA-HB (MMOL/L)	PH	HCO ₃ (MMOL/L)	MENTAL STATUS
Mild	≤ 6	> 7.25	≥ 15	Normal
Moderate	≤ 6	7.0–7.25	10–<15	Normal/drowsy
Severe	> 6	< 7.0	< 10	Stupor/coma

Severity determines the insulin route in Step 5 — this is the key triage decision for ICU vs. non-ICU management.

03 Initial Fluid Resuscitation

- Isotonic saline or balanced crystalloid, **500–1000 mL/hour** initially (absent cardiac or renal compromise, which warrants a slower rate).
- Once glucose falls below **250 mg/dL**, add dextrose 5–10% to the fluid to allow continued insulin infusion without hypoglycemia.
- Adjust subsequent fluid choice/rate based on hemodynamics and serum sodium trend.

04 Check and Correct Potassium Before/With Insulin

Table 3. Potassium repletion thresholds

INITIAL K ⁺	ACTION
< 3.5 mmol/L	Hold insulin. Replace at 10 mmol/hour first.
3.5–5.0 mmol/L	Replace concurrently with insulin; target 4–5 mmol/L.
> 5.0 mmol/L	Hold replacement; recheck before starting.

Recheck potassium **2 hours after starting insulin**, then every 4 hours.

05 Start Insulin — Route Depends on Severity

- **Severe DKA:** Fixed-rate IV insulin infusion, **0.1 units/kg/hour** (or a nurse-driven variable-rate protocol) — requires ICU-level monitoring.
- **Mild/moderate, uncomplicated DKA:** Subcutaneous rapid-acting insulin every 1–2 hours is an appropriate alternative and can avoid ICU admission — this is a genuine site-of-care decision, not just a route preference, and should be made explicitly with the admitting team.
- Continue insulin (IV or SQ) **until ketonemia resolves**, tracked by falling beta-hydroxybutyrate — not until glucose normalizes, which can happen well before ketosis clears.

06 Monitor

- Glucose hourly.
- Potassium at 2 hours, then every 4 hours.
- Beta-hydroxybutyrate trend to confirm resolution (or anion gap/venous pH trend if BHB is not available locally — see Adoption Notes).

07 Confirm Resolution

- Ketonemia resolved (BHB trending down toward normal).
- Acid-base status normalized (pH/HCO₃).
- Patient alert and tolerating oral intake.

08 Identify and Treat the Precipitant

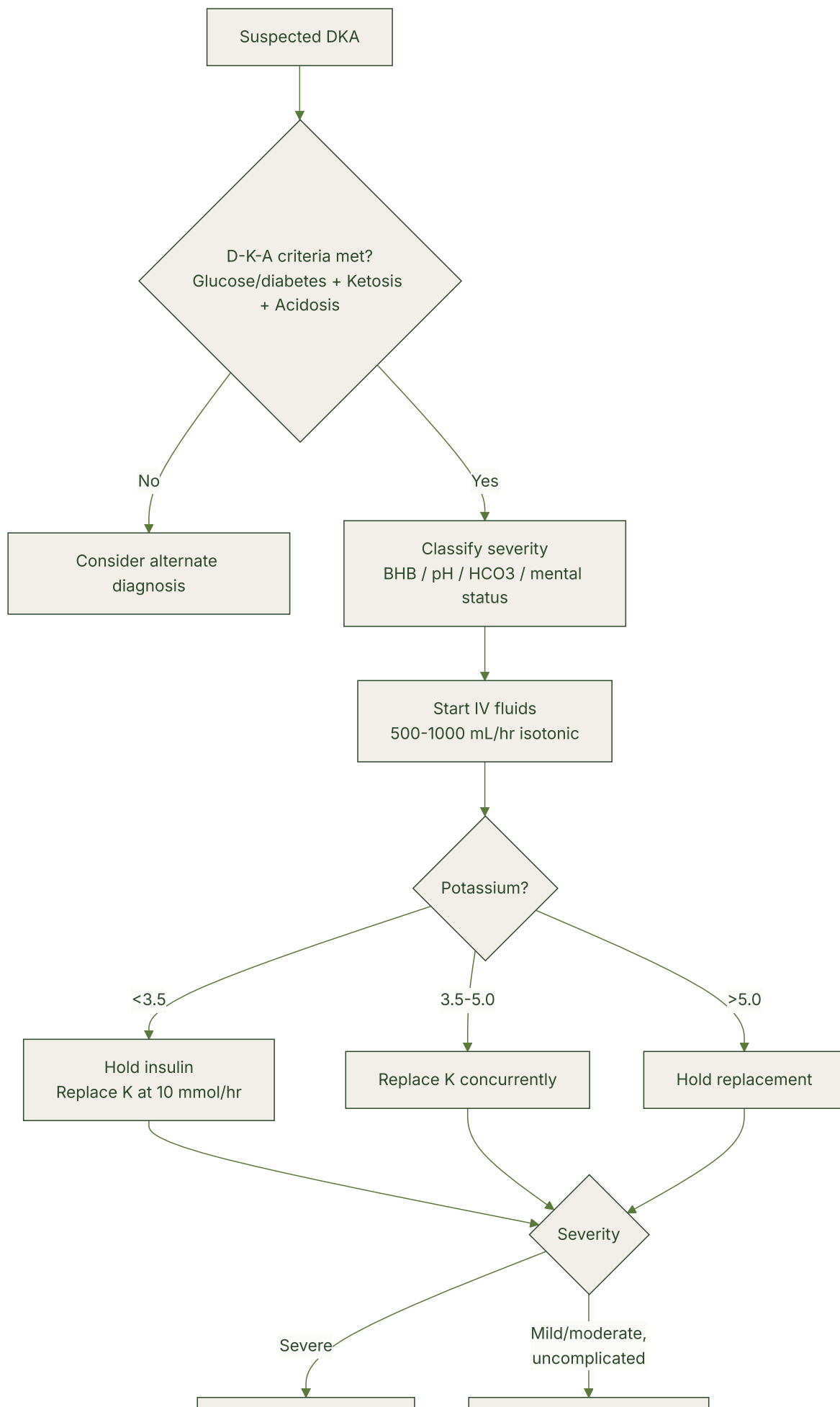
Common precipitants to actively screen for: infection, new-onset diabetes, insulin non-adherence/pump failure, MI, pancreatitis, and medications — including **SGLT2 inhibitors**, which can cause euglycemic DKA (normal or only mildly elevated glucose despite true ketoacidosis; don't let a normal glucose delay the diagnosis in a patient on an SGLT2 inhibitor).

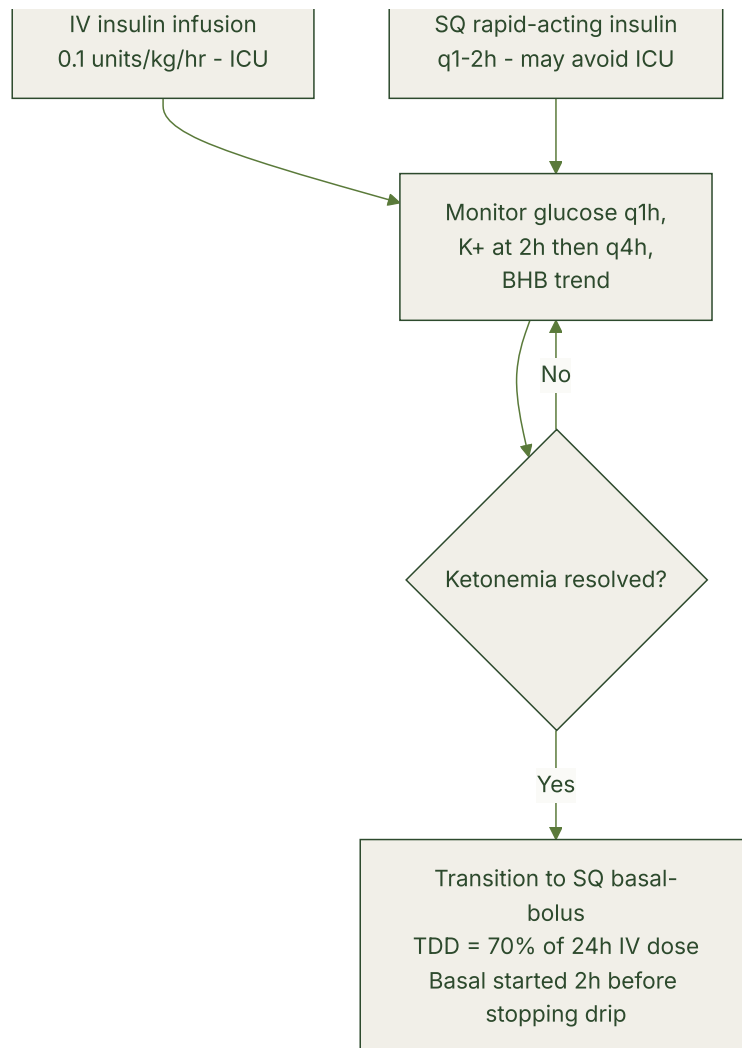
09 Transition to Subcutaneous Basal-Bolus Insulin

Using the local Basal-Bolus Insulin Calculation Tips reference:

- **Total Daily Dose (TDD) = 70%** of the current estimated 24-hour IV insulin infusion dose.
- Initiate basal insulin **2 hours before** discontinuing the IV infusion — do not stop the drip first and start basal later.
- Split: 50% of TDD as basal (glargine daily, or detemir twice daily); 50% as meal-time bolus (rapid-acting, divided across meals) if eating, or per the continuous/bolus tube-feed or NPO schedule if not.
- **Worked example:** IV insulin averaging 2 units/hour $\times$ 24 h = 48 units $\rightarrow$ $\times$ 0.7 = 34 units TDD $\rightarrow$ $\div$ 2 = 17 units basal + 17 units bolus ($\approx$ 5–6 units per meal if divided across 3 meals).
- Weight-based starting alternative (if no IV infusion rate to convert from): 0.3 units/kg/day for hypoglycemia-risk patients (lean, hepatic impairment, renal/cardiac disease, elderly), 0.4 units/kg/day for no clear risk factors, 0.5–0.7 units/kg/day for obesity/insulin resistance/steroid use.

Algorithm





EMR Order Set

PHYSICIAN ORDERS

- DKA order set trigger, capturing severity classification at entry.
- IV insulin infusion order (weight-based 0.1 units/kg/hr) **or** SQ rapid-acting insulin protocol order (mild/moderate uncomplicated pathway) — mutually exclusive selection, not both.
- Potassium replacement order, gated to the K⁺ threshold table (Step 4).
- Transition-to-SQ order, timed to start basal insulin 2 hours before the IV infusion stop order executes.

NURSING ORDERS

- Hourly glucose (POC).
- Potassium at 2 hours post-insulin-start, then every 4 hours.
- Beta-hydroxybutyrate trend per protocol interval (or anion gap trend if BHB unavailable).
- Strict I/O.

PHARMACY ORDERS

- Insulin infusion concentration/rate verification against weight-based dosing.
- Potassium repletion verification and renal-dosing check.

DIETARY ORDERS

- NPO until clinically improving; carbohydrate-controlled diet consult once tolerating oral intake (per admission workflow in the local basal-bolus reference).

Build notes — severity classification and the IV-vs-SQ insulin route decision should be a structured field captured at DKA order-set entry, so ICU-avoidance rate (mild/moderate managed via SQ pathway) can be tracked as a metric.

Adoption Notes

- **Confirm local BHB (point-of-care beta-hydroxybutyrate) availability before building this order set** — the whole severity/resolution framework above assumes it. If unavailable, define a fallback using anion gap and venous pH/HCO₃ trend, and flag that as a known deviation from the current consensus criteria.

- The mild/moderate SQ-only pathway is a genuine site-of-care decision — align with ED/hospitalist leadership on where those patients are managed (ED observation, step-down, floor with frequent POC glucose) before building the order set, since it changes ICU utilization.
- Step 9's dosing math mirrors the hospital's existing Basal-Bolus Insulin Calculation Tips reference — coordinate with the Diabetes Program team rather than duplicating a separate numbering scheme.

Success Metrics & Monitoring

Time to ketosis resolution, ICU length of stay for DKA, hypoglycemia rate during insulin therapy, hypokalemia events, rate of appropriate SQ-only (ICU-avoidance) pathway use, and 30-day DKA readmission rate. Track via the critical care database and glycemic management program data; review monthly during rollout.

Suggested Reading

- 1 Umpierrez GE, Davis GM, ElSayed NA, et al. Hyperglycemic Crises in Adults With Diabetes: A Consensus Report. **Diabetes Care**. 2024;47(8):1257–1275. doi:10.2337/dci24-0032. Primary current guideline — first update since 2009; introduces BHB-centered diagnosis/severity/resolution and the SQ-only pathway for mild/moderate uncomplicated DKA that this protocol is built from.
- 2 LBMC Diabetes Program and Services. Basal-Bolus Insulin Calculation Tips (internal reference), 2024. Local, already-approved dosing reference behind this protocol's Step 9 IV-to-SQ transition math and weight-based starting doses.

Revision History

VERSION	DATE	EDITOR	SUMMARY
0.1	2026-07-19	FunctionalHealth editorial team	Initial version; source DKA.pdf in the local folder was image-based and could not be auto-extracted, so this version is built from the 2024 ADA/EASD consensus report and the local basal-bolus insulin reference instead

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