

## GUIDELINES AND PROTOCOLS OF DIABETES EMERGENCIES FOR THE YEAR-2025

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### Abstract

**Background:** The significant emergencies in diabetic patients include Hypoglycemia, Diabetic ketoacidosis (DKA) and Hyperglycemic Hyperosmolar state (HHS). These emergencies possess a high risk of mortality and morbidity if not managed timely. The 2025 ADA *Standards of Care*, published in *Diabetes Care*, and the June 2024 ADA consensus report offer updated evidence-based recommendations for clinical practice. **Objective:** This review aims at overviewing the latest protocols and guidelines of diabetic emergencies. **Methodology:** This review is a comprehensive research of PUBMED and Google Scholar. **Conclusion:** The 2025 ADA guidelines and accompanying consensus report usher in significant advancements in the management of diabetic emergencies. A strong focus is given on educating the patients, explaining preventive strategies and a system wide coordination. These updates promise improved patient outcomes, reduced hospital burden, and enhanced preparedness for clinicians. Future endeavors should prioritize dissemination, training, and equitable access to technology and emergency readiness tools.

**Keywords:** Diabetes ketoacidosis(DKA), Hyperglycemic Hyperosmolar state(HHS), Continuous glucose monitoring(CGM), Hypoglycemia

### INTRODUCTION

The significant emergencies in diabetic patients include Hypoglycemia, Diabetic ketoacidosis (DKA) and Hyperglycemic Hyperosmolar state (HHS). These emergencies possess a high risk of mortality and morbidity if not managed timely. Management of diabetic emergencies require a certain set of guidelines and protocols for a standardised treatment. The 2025 ADA *Standards of Care*, published in *Diabetes Care*, [1] and the June 2024 ADA consensus [2] report offer updated evidence-based recommendations for clinical practice. These consensus include strategies for both inpatient and outpatient departments which help in the enhancement of diagnosis, treatment and prevention of diabetes crisis. Additionally, improvement in the integration of technology and structured education is leading to a paradigm shift towards proactive patient centred care.

#### Inpatient Glycemic Management and Hypoglycemia

##### Glycemic Targets and Monitoring

According to the 2025 ADA standards, treatment therapy should be initiated in hospitalized patients with persistent hyperglycemia ( $\geq 180$  mg/dL). For patients who are critically ill, the target range lowers down to 140-180mg/dL and if an even lower range of 110-140mg/dL can be achieved safely, that's the preferred range. The acceptable range for noncritical patients varies from 100-180mg/dL and a reading of 250mg/dL is acceptable for terminally ill, dialysis-dependent, and high-hypoglycemia-risk individuals [1-2]. According to the monitoring protocol, a point-of-care(POC)

glucose test should be done prior to every meal in patients who are actively eating. Patients who are not eating should be tested every 4-6 hours and patients who are on IV insulin therapy should be tested every 30-120 minutes. The devices used for glucose testing should meet the FDA calibration standards. Instances when the clinical presentation does not seem consistent with results of the POC glucose test, a confirmatory test is warranted [3].

### Hypoglycemia Protocols and Prevention

According to the latest ADA guidelines a structured hypoglycemia surveillance and management system should be implemented in hospitals. To minimize recurrence rates, all readings below 70mg/dL should be recorded and the treatment plan should be reevaluated; any underlying systemic issue should be addressed and treated [4]. At the clinical level, all patients with glucose level  $\leq 70$  mg/dL are advised to use 15 g of fast-acting carbohydrate then recheck after 15 minutes. If needed this process is repeated. The treatment protocol is targeted towards triggering evaluation and deintensification of Level 2 or 3 hypoglycemia [1]. For recurrent or impaired awareness, individualized education and temporary relaxation of glycemic targets may restore counterregulation. A universal access to ready to use glucagon for high risk patients is highlighted in the 2025 protocol.

### Integration of Diabetes Technology

If the institutional protocol allows, a continued use of personal CGM (Continuous Glucose Monitor) and insulin pump system is endorsed in hospitalised patients with simultaneous verification by POC to decide the insulin dosing and hypoglycemia management. CGM excels in detecting nocturnal and asymptomatic hypoglycemia, offering a preventative tool with potential integration into EHRs to guide clinical workflows [5].

### DKA and HHS: Updated Diagnostic and Therapeutic Paradigms

#### Diagnostic Enhancements

According to the June 2024 ADA consensus report quantitative  $\beta$ -hydroxybutyrate (BOHB) has been prioritized for accurately diagnosing and monitoring DKA. This replaces the earlier dependence on acetoacetate-based nitroprusside tests. Defined cutoffs categorize severity: mild-to-moderate DKA (BOHB 3–6 mmol/L) and severe ( $>6$  mmol/L) [2]. The anion gap which was initially used in the diagnosis had limitations due to fluid shift and acid-base complexity has now been easily replaced. The revised diagnostic parameters for HHS incorporate reduction in the osmolality threshold to  $>300$ mOsm/kg and inclusion of total osmolality instead of only effective osmolality. Altered Mental status is no longer required to establish diagnosis. Quantitative cutoff of bicarbonate threshold is lowered to  $\geq 15$  mmol/L to reflect possible acidosis [1, 6].

#### Therapeutic Simplification: Fluids, Insulin, Potassium

In the 2024 consensus a much simplified treatment algorithm was underscored focusing mainly on fluids, insulin and potassium, this eliminates routine arterial blood gasses from assessment. Saline is replaced with a more balanced crystalloid—like Ringer’s lactate as it shows a faster resolution and reduced metabolic acidosis [6]. Insulin infusion is standardised at 0.1 units/kg/h. Dextrose is added to the insulin when the glucose level falls below 250mg/dL which helps in the prevention of hypoglycemia. Isotonic or balanced crystalloids are started at the rate of 500-1000mL/h for 2-4 hours and are adjusted according to the sodium levels and hemodynamics. Routine bicarbonate is only used in case of profound acidosis. Potassium should be monitored every 4 hours and should be constantly replenished to maintain levels around 4-5mmol/L. In case potassium is  $<3.5$ mmol/L, insulin is delayed. Summarises the treatment strategies for DKA and HHS (Table 1).

**Table 1: Treatment strategies for DKA and HHS [6].**

| Domain                   | DKA                                                                                                                                              | HHS                                                                                                                                        |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Clinical presentation    | Hyperglycemia or known diabetes with ketosis and metabolic acidosis; may be euglycemic (e.g., SGLT2-i)                                           | Marked hyperglycemia, hyperosmolality, severe dehydration, minimal/absent ketosis                                                          |
| Immediate treatment goal | ABCs, fluids, insulin, potassium; search triggers                                                                                                | ABCs, aggressive yet cautious fluids, then insulin; monitor osmolality closely                                                             |
| Fluids (initial)         | Isotonic crystalloids; adjust based on corrected $\text{Na}^+$ and hemodynamics                                                                  | Isotonic crystalloids with greater total volumes; slow osmolality correction to prevent cerebral edema                                     |
| Insulin                  | Fixed-rate IV 0.1 U/kg/h (bolus optional per local protocol). When glucose $\sim 200$ mg/dL, add dextrose and reduce to $\sim 0.05$ U/kg/h until | Start after initial fluids; often lower/slower rate than DKA; early dextrose once glucose $\sim 250$ – $300$ mg/dL to avoid too-rapid fall |

|                     |                                                                                                                |                                                                              |
|---------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                     | ketones clear                                                                                                  |                                                                              |
| Potassium           | Hold insulin if $K^+ < 3.3$ mEq/L; replace per labs; monitor closely (risk of hypokalemia once insulin starts) | Same principles; anticipate large deficits due to osmotic diuresis           |
| Monitoring          | Glucose hourly; BMP q2–4h; track anion gap & $\beta$ -hydroxybutyrate                                          | Glucose hourly; BMP q2–4h; track effective osmolality and mentation          |
| Resolution criteria | Anion gap closure and ketone clearance; patient eating                                                         | Improved osmolality and hydration; mentation normalized; stable hemodynamics |

### Expanded Treatment Options and Transition Strategies

For mild to moderate cases of DKA outside the ICU, a subcutaneous rapid acting insulin regimen is used as management mainstay but it has to be supported by adequate fluids, constant monitoring and follow up. In order to prevent any rebound hyperglycemia, basal insulin should be started 2-4 hours before iv insulin infusion is stopped. Standard IV insulin remains the mainstay for HHS and severe DKA.

### Discharge Planning and Preventive care

Before discharging the patient proper documentation of the precipitating cause and resolution matrix is ensured. For DKA cases it is made sure that anion gap is closed and ketones are cleared and for HHS the osmolality should be improved. Patient's home care is ensured confirming insulin access and a written insulin dosing plan. Glucagon is prescribed for emergent cases. Patients are educated on ketone testing, insulin adjustment and hydration guidance. A follow up after 1-2weeks is scheduled and in case of high risk patients an even earlier appointment is given [7]. According to the 2025 standards, hyperglycemic crises should be evaluated at each OPD visit, and the patients with type 1 diabetes should be well educated in crisis management. Patients are screened for insulin availability and access to CGM, CGM access helps in reduction of DKA. A system based protocol should be adopted by hospitals which includes consultation with diabetes specialists, education of the patient, structured transitions. Such measures reduce the risk of both hyper- and hypoglycemia [7].

## CONCLUSION

The 2025 ADA guidelines and accompanying consensus report usher in significant advancements in the management of diabetic emergencies. Key innovations include Quantitative  $\beta$ -hydroxybutyrate for enhanced DKA diagnosis and monitoring. A robust algorithm which emphasizes fluids, insulin, and potassium. DKA and HHS were assigned clear resolution criteria. A strong focus is given on educating the patients, explaining preventive strategies and a system wide coordination. These updates promise improved patient outcomes, reduced hospital burden, and enhanced preparedness for clinicians. Future endeavors should prioritize dissemination, training, and equitable access to technology and emergency readiness tools.

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