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DIABETIC PROTOCOLS FOR TREAT AND RELEASE IN PREHOSPITAL CARE: CLINICAL CRITERIA, OUTCOMES, AND EMS PRACTICE PATTERNS

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Abstract

Hypoglycemia remains one of the most common causes of altered mental status encountered by prehospital providers and represents a significant proportion of emergency medical services (EMS) activations and refusals of transport. While rapid correction of hypoglycemia is often achievable in the field, the decision to transport or release patients after treatment remains controversial and varies across jurisdictions. This review synthesizes epidemiological data, pathophysiology of diabetes mellitus, types of therapeutic interventions, and evidence-based criteria guiding EMS treat-and-release protocols. Studies indicate that although many patients with corrected hypoglycemia may be safely managed without transport, a subset remains at risk for adverse outcomes, including hospital admission. Standardized clinical criteria and adherence to regional protocols are essential to ensure patient safety while reducing unnecessary healthcare utilization.

Keywords: diabetes mellitus, hypoglycemia, emergency medical services, treat and release, prehospital care, transport refusal, EMS protocols.

1. Introduction

Altered mental status in the prehospital setting encompasses a wide range of etiologies commonly recalled using the mnemonic AEIOU TIPS (Alcohol/acidosis, Endocrine, Epilepsy, Electrolytes, Encephalopathy, Infection, Opiates/Overdose, Uremia/Underdose, Trauma, Insulin, Poisoning/Psychosis, Stroke/Seizure/Syncope). Among these causes, hypoglycemia is one of the most frequent and rapidly reversible conditions encountered by emergency medical providers.

Estimates suggest that approximately 1–2% of all prehospital encounters and up to 7% of refusals involve hypoglycemia. With increasing global prevalence of diabetes mellitus, EMS systems are likely to encounter growing numbers of diabetes-related emergencies. This raises critical questions regarding optimal field management and safe non-transport (treat-and-release) protocols.

2. Overview of Diabetes Mellitus

Diabetes mellitus is a chronic endocrine disorder characterized by persistent hyperglycemia resulting from insufficient insulin production, impaired insulin action, or both. Insulin, an anabolic hormone produced by pancreatic beta cells within the islets of Langerhans, regulates carbohydrate, protein, and lipid metabolism by facilitating glucose uptake into hepatic, adipose, and skeletal muscle tissues.

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2.1 Type 1 Diabetes Mellitus (T1DM)

Type 1 diabetes mellitus accounts for approximately 5–10% of diabetes cases and results primarily from autoimmune destruction of pancreatic beta cells. Although commonly diagnosed in children and adolescents, it may occur at any age. Patients require lifelong exogenous insulin therapy, administered through injections or insulin pump systems.

2.2 Type 2 Diabetes Mellitus (T2DM)

Type 2 diabetes mellitus constitutes approximately 90% of all diabetes cases. It is characterized by insulin resistance and progressive beta-cell dysfunction. Although traditionally associated with individuals over 45 years of age, T2DM increasingly affects younger populations due to obesity, sedentary lifestyle, and high-calorie diets. Most patients are initially managed with oral hypoglycemic agents, with some eventually requiring insulin therapy.

2.3 Gestational Diabetes Mellitus (GDM)

Gestational diabetes mellitus is defined as hyperglycemia first identified during pregnancy, typically during the second or third trimester. It complicates approximately 7% of pregnancies and increases the long-term risk of type 2 diabetes for both mother and offspring.

3. Hypoglycemia: Definition and Clinical Impact

Hypoglycemia is defined as a plasma glucose concentration below 70 mg/dL, although most patients do not exhibit symptoms until levels fall below 55 mg/dL. Severe hypoglycemia refers to episodes requiring assistance from another individual — a category encompassing most EMS encounters.

Severe hypoglycemia is associated with increased morbidity, including falls, motor vehicle accidents, cognitive decline, reduced quality of life, and hospitalization. Mortality risk also increases, particularly in older adults and patients with comorbid conditions.

Data from the National Emergency Medical Services Information System (NEMSIS) indicate that diabetes-related emergencies account for approximately 2.3% of all EMS activations, with hypoglycemia representing the primary clinical presentation.

4. Prehospital Management of Hypoglycemia

Patients with severe hypoglycemia typically access care via emergency dispatch systems (e.g., 911). First responders may include EMTs, Advanced EMTs (AEMTs), or paramedics depending on jurisdictional protocols. Treatment commonly includes:

- Oral glucose (if conscious and able to swallow)
- Intravenous dextrose
- Intramuscular or intranasal glucagon

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Following correction of hypoglycemia, EMS providers must determine whether the patient requires hospital transport or may be safely released at the scene. This decision depends on state or regional protocols established by medical directors.

5. Treat-and-Release Criteria

One of the earliest studies evaluating prehospital treat-and-release protocols was published in *Prehospital and Disaster Medicine* in 1991. The investigators proposed five criteria for safe non-transport of hypoglycemic patients:

1. Known history of type 1 or type 2 diabetes
2. Pre-treatment blood glucose < 4.4 mmol/L (80 mg/dL)
3. Post-treatment blood glucose ≥ 4.4 mmol/L (80 mg/dL)
4. Return to normal mental status within 10 minutes of treatment
5. Absence of complicating factors (e.g., alcohol intoxication, chest pain, dyspnea, trauma, renal dialysis, or other conditions requiring emergency department evaluation)

These criteria aimed to standardize field decision-making while minimizing unnecessary transports.

6. Current EMS Practice Patterns

A 2016 study reviewing 185 EMS agencies in the United States found that fewer than half permitted non-transport following correction of hypoglycemia. This variability reflects ongoing concerns regarding patient safety, liability, and risk of recurrence.

In Alameda County (2013–2015), the transport rate for hypoglycemic patients treated by EMS was 13.5%. Patients more likely to be non-transported included:

- Adults younger than 60 years
- Male patients
- Finger-stick glucose > 60 mg/dL post-treatment
- Evening and nighttime EMS encounters (1800–0600 hours)

Despite these findings, approximately 50% of patients with severe hypoglycemia in some cohorts required hospital transport, and over 40% of transported patients were admitted, underscoring the potential severity of such presentations.

7. Discussion

Treat-and-release protocols for hypoglycemia offer potential benefits, including reduced emergency department overcrowding, lower healthcare costs, and increased EMS system efficiency. However, inappropriate non-transport may expose patients to recurrent hypoglycemia, underlying pathology, or delayed complications.

The literature suggests that carefully selected patients meeting strict clinical criteria may be safely managed without transport. Nonetheless, system-wide variability highlights the need for

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standardized, evidence-based national guidelines. Future research should focus on prospective validation of release criteria, long-term outcomes, and integration of telemedicine or community paramedicine follow-up programs.

8. Conclusion

Hypoglycemia remains a common and potentially life-threatening emergency in the prehospital environment. While field treatment is often effective, decisions regarding transport versus release must be guided by validated clinical criteria and regional protocols. Evidence indicates that selected patients with rapid and sustained clinical recovery may be safely managed without transport; however, ongoing surveillance and standardized practice guidelines are essential to ensure patient safety.

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