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Approach to Hypoglycaemia at the Emergency Department: Diagnosis, Treatment, and Follow-up

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Abstract

Hypoglycemia is an important metabolic emergency that must be recognized rapidly and treated without delay in the emergency department, with a clinical spectrum ranging from mild autonomic symptoms to seizures, coma, and permanent neurologic injury. In adults without diabetes, Whipple's triad remains a practical guide in diagnostic evaluation; it consists of symptoms compatible with hypoglycemia, documentation of low plasma glucose, and resolution of symptoms after correction of the glucose level. Treatment-related hypoglycemia is among the most common causes, particularly in patients using insulin or sulfonylureas; however, sepsis, hepatic and renal failure, adrenal insufficiency, alcohol use, prolonged fasting, and critical illness should also be considered in the etiologic assessment. In recent years, postprandial hypoglycemia after bariatric surgery has also emerged as a distinctive clinical entity that should be considered in emergency presentations. The cornerstone of emergency management is early recognition, simultaneous glucose measurement, prompt initiation of appropriate treatment, and follow-up planning according to the risk of recurrence.

Keywords: Hypoglycemia; Emergency Department; Whipple's Triad; Bariatric Surgery; Follow-Up

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Introduction

Hypoglycemia is a reversible clinical condition that may present to the emergency department with altered mental status, agitation, sweating, tremor, palpitations, syncope, seizures, or focal neurologic symptoms, and may lead to substantial morbidity when diagnosis is delayed [1, 2]. For this reason, capillary or bedside glucose measurement should be one of the first steps in the evaluation of any patient presenting with altered mental status [2]. In adults without diabetes, demonstration of a low glucose value alone is not sufficient; confirmation of Whipple's triad helps establish the clinical significance of a true hypoglycemic disorder [1]. This approach helps identify clinically meaningful cases while reducing unnecessary advanced investigations [1].

Etiology

The most common cause of hypoglycemia in the emergency department is antidiabetic therapy [1, 3]. Glucose-lowering agents, particularly insulin and sulfonylureas, may precipitate more severe hypoglycemia when combined with missed meals, dosing errors, unexpected physical activity, impaired renal function, or concurrent acute illness [1, 3]. In addition, sepsis, hepatic failure, renal failure, adrenal insufficiency, malnutrition, alcohol use, and prolonged fasting are important causes that should be considered [1, 2]. In individuals without diabetes, unexplained hypoglycemia may warrant a broader systemic and endocrine evaluation [1]. Although sickness exempt them from fasting, Ramadan intermittent fasting is being carried out in the muslim world each and every year [4] even its higher risk of hypoglycaemia for people with diabetes [5] who are on insulin therapy [6], especially when the holy month arises in longer and warmer summer days.

Hypoglycemia after Obesity Surgery

Post-bariatric hypoglycemia is a distinctive clinical entity, particularly observed after Roux-en-Y gastric bypass, and typically occurs in the postprandial period [7]. According to current guidelines, this condition usually develops approximately 2-4 hours after a meal and may manifest with sweating, palpitations, tremor, weakness, confusion, or syncope-like symptoms [7]. Therefore,

a history of previous obesity surgery should be specifically questioned when evaluating a patient with hypoglycemia, because the underlying mechanism in this group may differ from that of classic drug-related hypoglycemia and may lead to recurrent emergency presentations [2].

Diagnostic Approach in the Emergency Department

In a patient with suspected hypoglycemia, the initial approach should include simultaneous glucose measurement together with assessment of the airway, breathing, and circulation (A, B, C) [2]. When hypoglycemia is clinically suspected, treatment should not be delayed while awaiting laboratory confirmation [2]. The history should address medication use, timing of the last meal, alcohol intake, signs of infection, kidney and liver disease, the possibility of adrenal insufficiency, a history of bariatric surgery, and prior similar episodes [1, 2, 7]. Persistence of neurologic abnormalities after correction of hypoglycemia should prompt evaluation for an accompanying alternative pathology [2].

Treatment

Treatment should be guided by the patient's level of consciousness and the safety of oral intake [2, 3]. In patients who are alert and able to swallow safely, rapid-acting oral carbohydrate is an appropriate first-line option [2, 3]. In patients with impaired consciousness, seizures, vomiting, or aspiration risk, intravenous dextrose should be preferred [2]. Glucagon may be used as an alternative when intravenous access cannot be established [2]. However, normalization of the glucose value alone should not be accepted as sufficient; the risk of recurrent hypoglycemia, the duration of action of the implicated drug, and the underlying cause must be assessed together [1-3]. Closer observation is particularly necessary in sulfonylurea-related cases [2], as well in the elderly for the risk of repetitive hypoglycaemia due to longer duration of glucose lowering agents [8].

Follow-up and Disposition

Clinical observation remains important after the hypoglycemic episode has resolved [2]. Patients using long-acting insulin, those with sulfonylurea-related hypoglycemia, those with major comorbid conditions, those with inadequate social support, and those presenting with a first unexplained episode should be considered for longer observation or hospital admission [2, 3]. Safe discharge requires complete neurologic recovery, adequate oral intake, stable glucose levels, and at least a clinical assessment of the likely cause [2]. Accordingly, management of hypoglycemia should rely not only on raising blood glucose, but also on a comprehensive follow-up plan aimed at reducing the risk of recurrence [2, 3].

Conclusion

The emergency department approach to hypoglycemia requires the integration of early diagnosis, prompt treatment, and careful decisions regarding follow-up. Familiarity with Whipple's triad facilitates the identification of clinically meaningful hypoglycemia, particularly in adults without diabetes. In addition, inclusion of postprandial hypoglycemia after bariatric surgery in the differential diagnosis provides a more current and comprehensive framework for emergency practice.

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