

Pharmacology in Emergency Medicine

D10 vs. D50 for the Treatment of Hypoglycemia in the Emergency Department

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Abstract—Background: Studies in the prehospital setting comparing D10 and D50 for the treatment of hypoglycemia have demonstrated equivalent efficacy and fewer adverse effects with D10. Despite these results, D50 is commonly used first-line in the emergency department (ED). **Objective:** The purpose of this study is to compare the efficacy and safety of D10 and D50 for the treatment of hypoglycemia in the ED. **Methods:** This was a single-center retrospective cohort study of adult patients with a blood glucose (BG) <70 mg/dL and administered D10 or D50 in the ED. The primary outcome was time to achieve euglycemia. Safety outcomes included incidence of hyperglycemia (BG > 180 mg/dL) and rebound hypoglycemia (BG < 70 mg/dL) within 6 h. A subgroup of patients with severe hypoglycemia (BG < 40 mg/dL) was evaluated separately. **Results:** Three hundred seventy-five patients were included, with 246 receiving D10 and 129 receiving D50. Patients were predominantly African American (61.3%) and had a history of diabetes (56%). D50 administration resulted in a nonsignificant decrease in time to euglycemia compared to D10 (38.0 vs. 51.0 min, $p = 0.053$). More patients in the D50 group experienced rebound hypoglycemia (43.4% vs. 27.2%, $p = 0.002$). Time to euglycemia was not different between groups when only evaluating severe hypoglycemia (34.5 vs. 34.5 min; $p = 0.655$). **Conclusion:** D50 was associated with a clinically, although not statistically, significant decrease in time to achieve euglycemia and significantly higher rate of rebound hypoglycemia. Larger studies are warranted to confirm findings and compare D10 and D50 in patients with severe hypoglycemia. © 2026 The Author(s). Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Keywords—hypoglycemia; dextrose; hyperglycemia; emergency medicine; pharmacy

Introduction

Hypoglycemia accounts for approximately 202,000 emergency department (ED) visits in the United States, with 25% of these cases resulting in hospital admission (1). Hypoglycemia is defined as a blood glucose (BG) level < 70 mg/dL by the American Diabetes Association (ADA) can lead to weakness, confusion, seizure, and coma. If not treated in a timely manner, hypoglycemia leads to an increased risk of morbidity and mortality (2).

Standard of care for hypoglycemia management consists of oral glucose or intramuscular glucagon, as these can be self-administered in the outpatient setting. In severe cases, patients cannot tolerate oral intake, and glucagon may be insufficient, especially if the patient's glycogen stores are exhausted. The ADA recommends using IV dextrose for these cases; however, there is no recommendation for a preferred concentration (2). Traditionally, in the inpatient and ED setting, severe hypoglycemia is treated with 50% dextrose injection (D50). There are recurring shortages in D50 supply, dating back to 2015 (3). This has resulted in 10% dextrose injections (D10) becoming more widely accepted as an alternative hypoglycemia treatment. Besides availability, there are potential advantages to using D10 over D50, which have been demonstrated in prehospital studies. D10 has a lower

osmolarity than D50, which may result in less irritation to the veins. D10 has also been demonstrated to have a lower risk of hyperglycemia from the slower infusion time, which can also decrease the risk of rebound hypoglycemia that occurs due to stimulation of endogenous insulin production in response to hyperglycemia. D10 requires a larger volume to be administered to reach the BG goal and presents the potential for volume overload while also requiring more time to administer than D50, potentially delaying patient improvement (4–6).

D10 has been compared to D50 for the treatment of hypoglycemia in the prehospital setting. A randomized controlled trial that compared D10 with D50 reported no difference in the primary outcome of time to return to baseline Glasgow Coma Scale (GCS) (7). A retrospective study comparing D10 with D50 in hypoglycemic patients reported no difference in primary outcome of IV dextrose readministration by emergency medical services (EMS) between groups (8). There is only one study that compared D10, D25, and D50 for hypoglycemia management in the ED setting, and they reported no difference in primary outcome of time to achieve euglycemia (9). To our knowledge, D10 vs. D50 for the treatment of hypoglycemia has not been studied in an ED in the United States, nor has D10 been compared to D50 in the treatment of severe hypoglycemia ($\text{BG} < 40 \text{ mg/dL}$). The aim of this study is to determine if there is a difference in efficacy or safety with the use of D10 or D50 in the treatment of hypoglycemic events in the ED.

Methods

Study Design/Population

This was a retrospective cohort study at a 51-bed ED. D50, supplied in 50 mL syringes, has historically been used as the primary therapy for IV management of hypoglycemia at this ED. Following national shortages of D50 syringes, use of D10 for acute management of hypoglycemia increased in prevalence at this institution and is primarily given as a 250 mL IV bolus over 5–10 min. Both medications are stocked within the ED and are utilized based on provider preference when both are available. This institution does not have a protocol or order set that guides treatment and monitoring of hypoglycemia in the ED. Dextrose concentration, volume, and subsequent BG levels are ordered at the provider's discretion. During this study period, there were shortages impacting D50 availability, and to a lesser extent, D10 availability.

Patients were identified from our system's electronic medical record if they were at least 18 years old with an encounter for hypoglycemia, defined as a BG less than 70 mg/dL, and received a dose of D10 or D50 between

July 1, 2022, and July 31, 2024. Charts were reviewed manually, and patients were excluded if they were pregnant, prisoners, or did not have at least one documented postdextrose BG level. To minimize evaluation of iatrogenic causes of hypoglycemia, patients were excluded if they received insulin during the same ED encounter or first hypoglycemic BG level was more than 6 h after arrival to the ED. Patients who were initiated on a dextrose infusion prior to bolus of either D10 or D50 were also excluded to limit evaluation to bolus therapy.

Baseline characteristics collected included age, sex, race, weight, and height. Relevant comorbidities (diabetes, chronic kidney disease [CKD]) and home diabetes medications, which would be expected to impact incidence of rebound hypoglycemia, were collected from the ED provider note or admission history and physical. Administration of hypoglycemia treatments by EMS and during ED encounter was collected from the ED provider note and EMS transport report, where available. Baseline laboratory tests collected included serum creatinine and BG on arrival. BG levels were collected by serum chemistry results or point-of-care machines. Body mass index and creatinine clearance were calculated.

The time and dose of the first dextrose bolus and, if applicable, subsequent dextrose boluses were recorded. The total number of dextrose boluses and total dose in grams within 6 h of the first dose were collected. The times and levels of the first hyperglycemic or hypoglycemic levels within 6 h after the first dose were recorded.

Outcome Measures

The primary outcome was time to achieve euglycemia, defined as a BG between 70 and 180 mg/dL, within 6 h of the first dextrose dose in the ED. BG values for hypoglycemia, euglycemia, and hyperglycemia were chosen in line with the ADA recommendations (10). Six hours was selected for all outcomes as a predefined period where we would expect to see treatment effect and adverse effects associated with IV dextrose. Secondary outcomes included post-treatment BG level, total grams of dextrose administered, and initiation of a continuous dextrose infusion within 6 h of the first dose. Patient disposition and length of stay were also evaluated as secondary outcomes. Safety outcomes included incidence of hyperglycemia ($\text{BG} > 180 \text{ mg/dL}$), rebound hypoglycemia ($< 70 \text{ mg/dL}$), and extravasation (as documented in provider notes) within 6 h of the first dose.

To evaluate effect of D10 and D50 in severe hypoglycemia, patients with an initial $\text{BG} < 40 \text{ mg/dL}$ were assessed separately. While severe hypoglycemia is generally defined by hypoglycemia with the presence of altered mental status, GCS was not reliably documented and therefore $\text{BG} < 40 \text{ mg/dL}$ was utilized based on ADA

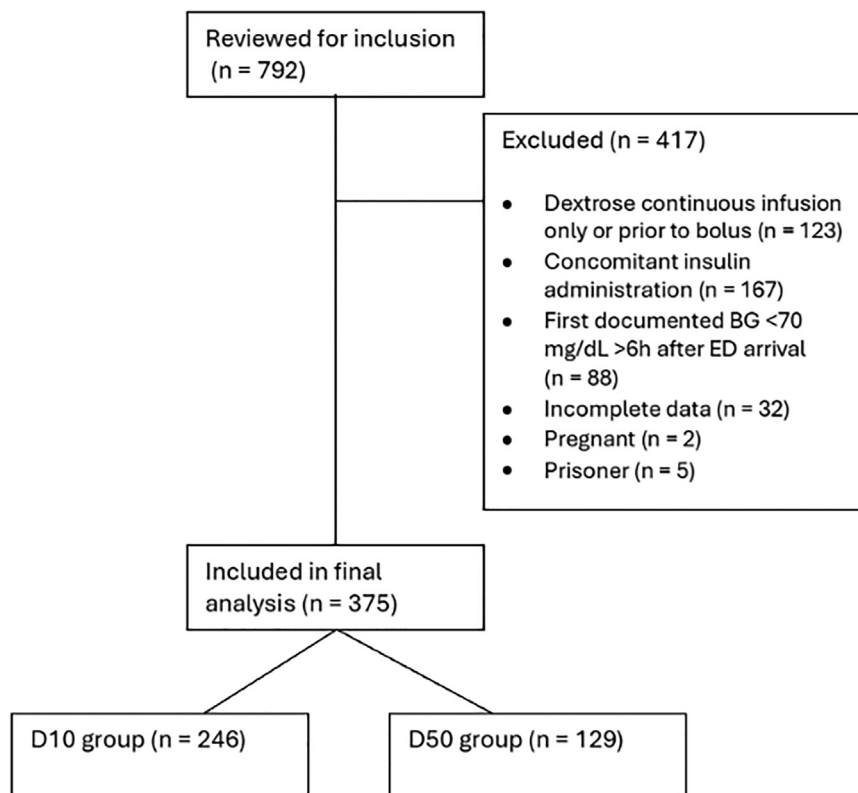


Figure 1. Inclusion CONSORT diagram. BG = blood glucose; ED = emergency department; h = hour.

recommendations (10). All primary, secondary, and safety outcomes were performed in this subgroup.

Data Analysis

Data analysis was performed using IBM SPSS. The Kolmogorov–Smirnov test was used to determine normality, assuming data were not normal if $p < 0.05$. Continuous data were analyzed by the Mann–Whitney U test, reported as median (IQR). Nominal data were reported using Chi-squared test, reported as n (%). If assumptions were not met for the Chi-squared test, Pearson’s test was used. Statistical significance was defined as a p value < 0.05 .

This study was assessed by the site’s institutional review board (IRB), and deemed IRB approval was not required.

Results

Seven hundred ninety-two patients were reviewed for inclusion, with 417 patients excluded from final analysis (Figure 1). One hundred twenty-three patients were excluded for receiving a dextrose continuous infusion only or prior to a bolus. One hundred sixty-seven patients were excluded for concomitant insulin administration during

their ED visit. Eighty-eight patients were excluded for having a first documented BG level less than 70 mg/dL greater than 6 h after arrival to the ED, and 32 patients were excluded for incomplete data postdextrose administration. Of the 375 patients included in the final analysis, 246 were treated with D10 group and 129 with D50 group. Baseline characteristics are displayed in Table 1. Patients were predominantly African American, with even numbers of male and female in both groups. Groups were evenly matched besides patients in the D50 group having a lower median initial BG than the D10 group (44.0 [IQR 34.0–55.0] vs. 55.0 mg/dL [IQR 44.5–52.0], $p < 0.001$), indicating a potential preference for treating lower BG with D50. More patients in the D50 group were treated with IV dextrose prior to arrival (19.4% vs. 10.2%, $p = 0.013$) and received a higher median initial dextrose dose in the ED (25.0 [IQR 25.0–25.0] vs. 25.0 [IQR 10.0–25.0], $p < 0.001$). Use of non-IV dextrose concomitant treatments for hypoglycemia was rare prehospital and ED.

Primary and Secondary Outcomes

Primary and secondary outcomes are summarized in Table 2. There was no statistical difference between the D50 and D10 group in the percentage of patients who achieved euglycemia within 6 h of dextrose administra-

Table 1. Baseline Characteristics.

Characteristic	D10 (<i>n</i> = 246)	D50 (<i>n</i> = 129)	<i>p</i> Value
Male, <i>n</i> (%)	129 (47.6)	74 (57.4)	0.363
Age, years, median (IQR)	59.5 (45.0–69.4)	60.8 (49.5–72.2)	0.290
Race, <i>n</i> (%)			
White	85 (34.6)	43 (33.3)	0.813
African American	152 (61.8)	78 (60.5)	0.803
Hispanic	4 (1.6)	4 (3.1)	0.454
Other/Unknown	3 (1.2)	4 (3.1)	
BMI, kg/m ² , median (IQR)	24.7 (19.9–29.2)	26.9 (21.8–30.6)	0.024
T1DM, <i>n</i> (%)	27 (11.0)	15 (11.6)	0.849
T2DM, <i>n</i> (%)	100 (40.7)	68 (52.7)	0.026
CKD, <i>n</i> (%)	82 (33.3)	49 (38.0)	0.369
Home DM medication, <i>n</i> (%)			
Insulin	100 (40.7)	66 (51.2)	0.052
Sulfonylurea	13 (5.3)	8 (6.2)	0.714
Creatinine clearance, mL/min, median (IQR)	55.3 (20.7–91.8)	40.1 (21.2–74.7)	0.055
Treated prior to arrival, <i>n</i> (%)	43 (17.5)	33 (25.6)	0.064
PO glucose	15 (6.1)	11 (8.5)	0.379
Glucagon	5 (2.0)	2 (1.6)	1.000
IV dextrose	25 (10.2)	25 (19.4)	0.013
Concomitant treatment in ED, <i>n</i> (%)			
PO glucose	10 (4.1)	2 (1.6)	0.232
Glucagon	7 (2.8)	1 (0.8)	0.272
Octreotide	4 (1.6)	1 (0.8)	0.664
NPO, <i>n</i> (%)	65 (26.4)	39 (30.2)	0.434
Initial Blood glucose, mg/dL, median (IQR)	55.0 (44.5–62.0)	44.0 (34.0–55.0)	<0.001
Initial dose of dextrose, median (IQR)	25.0 (10.0–25.0)	25.0 (25.0–25.0)	<0.001

BMI = body mass index; CKD = chronic kidney disease; DM = diabetes mellitus; IQR = interquartile range; IV = intravenous; NPO = nothing by mouth; PO = oral; T1DM = type 1 diabetes mellitus; T2DM = type 2 diabetes mellitus.

tion (93.8% vs. 91.9%, $p = 0.500$) or in the time to achieve euglycemia (38.0 min [IQR 26.0–79.0] vs. 51.0 [IQR 27.5–104.0], $p = 0.053$) although clinically, D50 administration resulted in faster time to euglycemia. Patients in the D50 group received higher initial and total dose of dextrose, with no difference in the total number of dextrose bolus readministrations, although clinically the dose of dextrose was similar between groups. Time to repeat BG was similar between groups (33.5 [IQR 19.25–51] vs. 37 [IQR 22–59], $p = 0.499$), as was the median BG level postdextrose administration (129.0 [IQR 97.0–170.0] vs. 113.0 mg/dL [IQR 84.0–157.0], $p = 0.082$). Significantly more patients in the D50 group were initiated on a continuous infusion of dextrose than in the D10 group (20.2% vs. 11.4%, $p = 0.022$) and subsequently admitted to the

intensive care unit (ICU) (27.1% vs. 14.6%, $p = 0.032$). There was no difference in median length of stay between groups (Table 2).

Safety

Safety outcomes are summarized in Table 3. No incidence of extravasation was reported in either group. Significantly more patients in the D50 group experienced rebound hypoglycemia within 6 h after administration of dextrose than in the D10 group (43.4% vs. 27.2%, $p = 0.002$) and, although not statistically significant, patients in the D50 group had a higher median postdextrose BG and subsequently more experienced hyperglycemia

Table 2. Primary and Secondary Outcomes.

Outcome	D10 (<i>n</i> = 246)	D50 (<i>n</i> = 129)	<i>p</i> Value
Postdextrose blood glucose, mg/dL, median (IQR)	113.0 (84.0–157.0)	129.0 (93.0–170.0)	0.082
Time to repeat blood glucose, min, median (IQR)	37 (22–59)	33.5 (19.25–51)	0.499
Achieved euglycemia in 6 h, <i>n</i> (%)	226 (91.9)	121 (93.8)	0.500
Time to euglycemia, min, median (IQR)	51.0 (27.5–104.0)	38.0 (26.0–79.0)	0.053
Total grams dextrose given in 6 h, g, median (IQR)	25.0 (12.5–25.0)	25.0 (25.0–35.0)	<0.001
Total doses dextrose given in ED in 6 h, median (IQR)	1.0 (1.0–1.0)	1.0 (1.0–2.0)	0.230
Dextrose infusion started in 6 h, <i>n</i> (%)	28 (11.4)	26 (20.2)	0.022
Patient disposition, <i>n</i> (%)			
Home	67 (27.2)	33 (25.6)	0.731
Floor	143 (58.1)	61 (47.3)	0.045
ICU	36 (14.6)	35 (27.1)	0.003
Length of stay, days, median (IQR)	3.0 (0.7–7.5)	2.8 (0.4–6.6)	0.555

ED = emergency department; g = gram; h = hour; ICU = intensive care unit; IQR = interquartile range.

Table 3. Safety Outcomes.

Adverse Event, <i>n</i> (%)	D10 (<i>n</i> = 246)	D50 (<i>n</i> = 129)	<i>p</i> Value
Extravasation	0	0	
Hyperglycemia in 6 h	70 (28.5)	41 (31.8)	0.502
Rebound hypoglycemia in 6 h	68 (27.2)	56 (43.4)	0.002

h = hour.

Table 4. Primary and Safety Outcomes in Severe Hypoglycemia.

	D10 (<i>n</i> = 51)	D50 (<i>n</i> = 50)	<i>p</i> Value
Baseline Characteristics			
Predextrose BG, mg/dL, median (IQR)	31 (24–38)	30 (21–36)	0.127
Initial IV dextrose dose g, median (IQR)	25 (12.5–25)	25 (25–25)	0.011
Total IV dextrose dose in 6 h g, median (IQR)	25 (15–35)	25 (25–50)	0.117
Efficacy			
Postdextrose BG mg/dL, median (IQR)	116 (92–158)	139 (106–175)	0.335
Achieved euglycemia in 6 h, <i>n</i> (%)	47 (92)	48 (96)	0.678
Time to euglycemia, min, median (IQR)	34.5 (20.25–62.75)	34.5 (21–67.5)	0.655
Safety			
Hyperglycemia in 6 h	13 (25.5)	23 (46)	0.038
Rebound hypoglycemia in 6 h	17 (33.3)	23 (46)	0.226

BG = blood glucose; g = gram; h = hour; IQR = interquartile range.

(31.8% vs. 28.5%, *p* = 0.502) in line with greater amount of dextrose administered initially in the D50 group.

Severe Hypoglycemia

Pertinent baseline, efficacy, and safety information for the subgroup of patients with severe hypoglycemia (BG <

40) are summarized in Table 4. Patients in the subgroup had similar median predextrose BG between the two groups (30 [IQR 20–36] vs. 31 [IQR 24–38], *p* = 0.127). Despite similar initial and total dextrose doses administered within both groups as well as time to repeat BG (30.5 [IQR 17.25–48.5] vs. 22 [IQR 16.5–38] min, *p* = 0.741), post-treatment BG was higher in the D50 group com-

pared to D10 (139 [IQR 106–175] vs. 116 [IQR 92–158], $p = 0.335$) although not significantly. Achievement of euglycemia (96 vs. 92%, $p = 0.678$) and time to euglycemia were similar between the two groups (34.5 [IQR 21–67.5] vs. 34.5 [IQR 20.25–62.75], $p = 0.655$). Patients in the D50 group had higher rates of hyperglycemia (BG > 180 mg/dL) (46 vs. 25.5%, $p = 0.038$) and rebound hypoglycemia (BG < 70 mg/dL) (46 vs. 33.3%, $p = 0.226$).

Discussion

The results of this study suggest there is no difference in efficacy between D10 and D50 for the management of hypoglycemia in the ED setting. We found no difference in the primary outcome of time to achieve euglycemia between the D10 and D50, however, there was a higher incidence of rebound hypoglycemia in the D50 group. Rebound hypoglycemia is of particular concern with the use of D50 due to the rapid increase in BG levels postadministration to supratherapeutic levels, which can stimulate endogenous insulin release and lower BG, leading to the need for prolonged monitoring, recurrent treatment, and longer ED and hospital stays.

To our knowledge, this is the first study comparing D50 with D10 in the ED setting in the United States. There have been only three studies that compared D10 with D50 for the treatment of hypoglycemia, with two of them taking place in the prehospital setting. A randomized controlled trial by Moore et al. (7) compared D10 and D50 for the treatment of out-of-hospital hypoglycemia in 51 unresponsive adult patients in the United Kingdom. Each patient was administered dextrose in 5-gram aliquots until their GCS returned to baseline or the maximum dose of 25 grams was administered. Verma et al. (9) conducted a similar randomized controlled study in an ED in North India that compared D10, D25, and D50, also given in 5-gram aliquots. The authors of both studies reported no significant differences in the time to return to baseline mentation, measured by GCS, although demonstrated lower total dextrose dose and post-treatment BG with D10 (7,9). While we were unable to evaluate GCS, our results are otherwise similar, demonstrating lower total grams of dextrose and subsequently a lower post-treatment BG level with D10 compared to D50. However, administration of dextrose in small aliquots, as was done in the studies by Moore et al. and Verma et al., is not standard of care and makes the results difficult to extrapolate to practice (7,9).

Additionally, neither study found a difference in hypoglycemic events between groups; however, Moore et al. evaluated incidence of hypoglycemia up to 24 h post-treatment, which may not represent the effect of an initial D10 or D50 dose as much as it represents subsequent

patient management. Our study sought to evaluate hypoglycemia and other outcomes in a shorter period of 6 h to better capture the impact of initial D10 or D50 treatment, and in doing so, demonstrated a higher rate of recurrent hypoglycemia episodes with D50. We believe our study adds to the results by Moore et al. and Verma et al. while comparing the efficacy and safety of D10 and D50 following more common administration practices (7,9).

A retrospective cohort study by Weant et al. (8) compared patients who were treated for hypoglycemia with IV D10 or D50 by EMS. They reported no difference in the primary outcome of IV dextrose readministration between the D10 and D50 groups (0.6% vs. 2.0%, $p = 0.565$). Similar to the study by Moore et al. there was no difference in initial BG level between groups however there was significantly higher postdextrose BG levels with D50 compared to D10 (151.9 vs. 124.6 mg/dL, $p < 0.001$) and a larger BG change per gram of dextrose (6.4 vs. 5.2 mg/dL, $p = 0.002$). There were no differences in hyperglycemic events, hospital admissions, length of stay, or in-hospital mortality. While previous conducted studies demonstrated elevated BG with D50, none have adequately assessed for the presence of rebound hypoglycemia within a short time frame after administration, which we believe is an important safety outcome that can lead to prolonged ED stays, need for prolonged monitoring and repeat treatment, and escalation of care.

Our results add to the existing data indicating limited difference in efficacy between D10 and D50 for the management of hypoglycemia in the ED while also expanding to look specifically at severe hypoglycemia (BG < 40 mg/dL). Previous studies by Moore et al. and Verma et al. evaluated unresponsive and altered patients, respectively, but neither looked specifically at pretreatment BG < 40 mg/dL which, along with altered mental status, can prompt nurses and providers to treat with high dextrose concentration (7,9). Our study adds to the results by Moore et al. and Verma et al., demonstrating that D10 produces equivalent clinical response to D50 regardless of GCS or pretreatment BG (7,9).

We also provide further evidence that D50 use leads to an increase in important safety outcomes. Like previous trials, we reported no extravasation events. D50 poses a risk of extravasation due to high osmolality, with the potential for high morbidity if it occurs, although there is low incidence that may not be captured within the small study population of published literature. We reported no difference in hyperglycemic events, also consistent with previous trials. However, our study showed an increased risk of rebound hypoglycemia within 6 h of the first dextrose dose in the D50 group. Previous trials noted no difference in further hypoglycemic events within 24 h; however, this time frame introduces confounding. The shorter period we evaluated in our study may more accu-

rately reflect the direct effect each dextrose formulation has on rebound hypoglycemia. While the disparate rates of rebound hypoglycemia may be confounded by differences within each group, factors expected to impact recurrent hypoglycemia such as CKD, home antidiabetic medications, and adjunct hypoglycemia treatments prehospital and within the ED were similar between groups. Further studies are needed to evaluate and corroborate the effect of D50 on rebound hypoglycemia.

Limitations

There are several limitations to our study that must be considered. First, our study was retrospective, and we were unable to evaluate for all potential confounders that could impact treatment and recurrence of hypoglycemia, including cause of hypoglycemia, concomitant administration of food or juice, or other comorbidities. While home antidiabetes medication data were also collected, there was no way to evaluate patient adherence to medications prehospital. Similarly, GCS was not reliably recorded on patients and prevented us from utilizing GCS to determine initial altered mental status differences between groups or time to resolution of GCS within each group as an outcome. Additionally, during the study period, our ED had no established protocol for hypoglycemia treatment, which led to inconsistencies in treatment and monitoring between patients, including dose of dextrose and time to repeat BG. Because of this, we may have missed patients who did experience hyperglycemia or rebound hypoglycemia, due to BG levels not being checked regularly within the 6-h study period. Treatment with D10 or D50, the dose administered, and escalation to a continuous dextrose infusion were at provider discretion. Some providers treat hypoglycemia more aggressively than others, giving larger doses initially or initiating continuous infusions earlier, which may have impacted our results. Re-evaluation of BG was not specified by nursing or hypoglycemia protocol but instead at nursing or provider discretion. Despite this, groups were similar in time to repeat BG and administration of adjunct treatments prehospital and in the ED, indicating consistency in the management of hypoglycemia. Based on these results, an ED-specific hypoglycemia protocol was created to help standardize treatment and reevaluation. More patients in the D50 group were treated with IV dextrose prior to arrival, had a lower initial BG level, and were more likely to be admitted to the ICU, indicating an overall sicker population which may have may have biased clinical management and impacted initial treatment, time to reevaluation, and escalation of care. Additionally, it is unclear if the higher rates of ICU admissions in the D50 group indicate a sicker population or an increase in the BG monitoring and hypoglycemia treatment require-

ments related to recurrent hypoglycemia that necessitated an increase in the level of care. While continuous dextrose does not necessitate a higher level of care, patients are admitted to the ICU if frequent BG checks and continuous dextrose titrations are required. These results are hypothesis-generating and need to be confirmed in a controlled study.

Conclusion

There was no difference between D10 and D50 in the primary efficacy outcome of time to achieve euglycemia. However, more patients in the D50 group required initiation of a dextrose continuous infusion and experienced rebound hypoglycemia. Larger controlled studies are warranted to validate these efficacy and safety outcomes and to determine the preferred agent for hypoglycemia in the ED setting.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

CRediT authorship contribution statement

Daniel Fischer: Writing – review & editing, Writing – original draft, Validation, Supervision, Methodology, Investigation, Formal analysis, Conceptualization. **Gillian Lutz:** Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Formal analysis, Data curation, Conceptualization.

References

1. Diabetes. National Diabetes Statistics Report, <https://diabetes.org/newsroom/american-diabetes-association-announces-support-for-insulin-act-at-senate-press-conference>; 2024 [accessed 4 May 2025].
2. American Diabetes Association Professional Practice Committee6. Glycemic goals and hypoglycemia: *standards of care in diabetes—2024*. Diabetes Care 2024;47(suppl_1):S111–25. doi:10.2337/dc24-S006.
3. Drug shortage detail: 50% dextrose injection. (2015). <https://www.ashp.org/drug-shortages/current-shortages/drug-shortage-detail.aspx?id=52>.
4. Hurtubise M, Stirling J, Greene J, et al. Dextrose 50% versus dextrose 10% or dextrose titration for the treatment of out-of-hospital hypoglycemia: a systematic review. Prehosp Disaster Med 2021;36(6):730–8. doi:10.1017/S1049023X21001047.
5. Kiefer MV, Hern GH, Alter HJ, Barger JB. Dextrose 10% in the treatment of out-of-hospital hypoglycemia. Prehosp Disaster Med 2014;29(2):190–4. doi:10.1017/S1049023X14000284.

6. Hern HG, Kiefer M, Louie D, Barger J, Alter HJ. D10 in the treatment of prehospital hypoglycemia: a 24 month observational cohort study. *Prehosp Emerg Care* 2017;21(1):63–7. doi:[10.1080/10903127.2016.1189637](https://doi.org/10.1080/10903127.2016.1189637).
7. Moore C, Woollard M. Dextrose 10% or 50% in the treatment of hypoglycaemia out of hospital? A randomised controlled trial. *Emerg Med J* 2005;22(7):512–15. doi:[10.1136/emj.2004.020693](https://doi.org/10.1136/emj.2004.020693).
8. Weant KA, Deloney L, Elsey G, Combs D, French D. A comparison of 10% dextrose and 50% dextrose for the treatment of hypoglycemia in the prehospital setting. *J Pharm Pract* 2021;34(4):606–11. doi:[10.1177/0897190019889444](https://doi.org/10.1177/0897190019889444).
9. Verma A, Jaiswal S, Reid C, et al. Efficacy of 10%,25% and 50% dextrose in the treatment of hypoglycemia in the emergency department – a randomized controlled study. *Am J Emerg Med* 2024;82:101–4. doi:[10.1016/j.ajem.2024.05.029](https://doi.org/10.1016/j.ajem.2024.05.029).
10. American Diabetes Association13. Diabetes care in the hospital. *Diabetes Care* 2016;39(suppl 1):S99–104. doi:[10.2337/dc16-S016](https://doi.org/10.2337/dc16-S016).

Article Summary

1. Why is this topic important?

Hypoglycemia is a common ED presentation with a high level of morbidity. Traditional treatment with D50 can cause hyperglycemia and rebound hypoglycemia, which can prolong ED stays and require escalation of care.

2. What does this study attempt to show?

This study attempts to compare the clinical efficacy between D50 and D10 in the treatment of hypoglycemia within the ED, including severe hypoglycemia. This study also attempts to further elucidate the safety concerns associated with utilizing D50 in the treatment of hypoglycemia.

3. What are the key findings?

In this study, D10 and D50 demonstrate equivalent recovery of BG in the treatment of hypoglycemia within the ED. Similarly, D10 and D50 are equally effective in treating severe hypoglycemia. D50 is associated with significantly more rebound hypoglycemia compared to D10.

4. How is patient care impacted?

Use of D10 for the treatment of hypoglycemia within the ED is equally effective to D50 while reducing the risk of post-treatment hyperglycemia or rebound hypoglycemia.