Current Practices of Hypoglycemia Management in the Emergency Department (ED)

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Background

- Diabetes incidence has tripled in the past two decades affecting ~ 21 million
- ED visit and hospitalizations due to hypoglycemia are greater than $1,300 and $17,000, respectively
- Number of ED visits for hypoglycemia was unchanged between 2006 and 2009
- Multiple factors may contribute to hypoglycemia including medications, comorbities, non-modifiable risk factors (e.g. age, gender)

Purpose

1. To describe hypoglycemia [blood glucose (BG) ≤ 50 mg/dL] management practices in the ED at Strong Memorial Hospital
2. Identify characteristics associated with:
   - *Refractory hypoglycemia* – need for additional treatment following initial management to achieve BG ≥ 80 mg/dL
   - *Recurrent hypoglycemia* – resolved hypoglycemia followed by subsequent hypoglycemia in the ED

Methods

Study Design
- Retrospective chart review of patients presenting to the ED with hypoglycemia

Setting
- Strong Memorial Hospital (850-bed teaching Hospital in Rochester, NY)
- 120-bed ED
- 105,000 visits annually at time of study

Selection of Patients
- January 2011 through July 2015
- Inclusion
  - Patients ≥ 18 years old with ICD9 code for hypoglycemia or documented initial BG ≤ 50 mg/dL
- Exclusion
  - Patients that developed hypoglycemia *after* ED presentation

Data collection
- Patient demographics
- Pre-hospital BG values and treatment administered
- Hypoglycemia management during the first six hours of ED stay
  - First four consecutive BG values
  - Time to recognition of hypoglycemia, treatment and reassessment
  - Maintenance therapy (dextrose containing IV fluids, food)

Statistical Analysis
- Descriptive statistics to describe patient characteristic and hypoglycemia treatment
- Wiloxon rank sum for continuous variables
- Chi-square for dichotomous variables

Results

Patient Characteristics (n = 244)

Mean age (years) ± SD	71 ± 12
Male, no. (%)	120 (48.9%)
Mean weight (kg) ± SD	83.3 ± 24.7
White, no. (%)	89 (55.3%)
Diabetes mellitus, no. (%)	178 (72.9%)
Chronic kidney disease, no. (%)	108 (44.3%)
Infection, no. (%)	84 (34.4%)

Pre-Hospital (n = 124, 58% of patients)

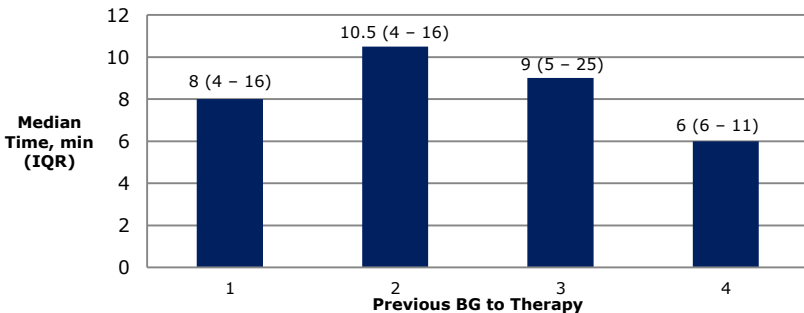|	
Initial pre-hospital BG, mean mg/dL ± SD	45.2 ± 41
Patients with BG ≤ 50 mg/dL treated with bolus dextrose/glucagon, no. (%)	89 (94%)
Patients with repeat BG after therapy, no. (%)	73 (82%)
ED arrival to 1st ED point of care BG, median minutes (IQR)	25 (10-40)

Emergency Department

Initial BG for all patients, mean mg/dL ± SD	58.7 ± 43
BG ≤ 50 mg/dL to treatment, median minutes (IQR)	11 (6-23.5)

- Treatment with bolus dextrose: n = 174 (71.3%), 108 (62.2%) had BG ≤ 50 mg/dL
- Dextrose dose, median (IQR): 25 g (12.5-75)
- Maintenance therapy:
  - Dextrose-IVF: 61 (25%)
  - Food: 101 (41.4%)
  - Fluids + Food: 157 (64.3%)
- Those with BG ≤50 mg/dL NOT given bolus dextrose received:
  - Dextrose-IVF: 3 (1.8%)
  - Food: 40 (23%)
  - Fluids + Food: 2 (1%)
  - **Nothing: 21 (12%)**

Time from BG (≤ 50 mg/dL) to Treatment

Median Time, min (IQR) vs Previous BG to Therapy

- 1: 8 (4 – 16)
- 2: 10.5 (4 – 16)
- 3: 9 (5 – 25)
- 4: 6 (6 – 11)

Time from Treatment to Repeat BG

Median Time, min (IQR) vs Therapy to Repeat BG

- 1: 20 (6.5 – 39)
- 2: 25 (10.5 – 54)
- 3: 28 (19 – 35)
- 4: 41 (24 – 42.5)

Refractory (n = 60, 24.4%)	Recurrent (n = 38, 15.5%)
Refractory vs. non-refractory 1st BG, mean ± SD: • 35.9 ± 9.8 vs. 64 ± 50.9 mg/dL **p = 0.0007** First bolus dextrose dose in refractory vs. non-refractory, mean ± SD • 26 ± 6.1 g vs. 26 ± 7.6 g p = 0.40	Maintenance therapy (dextrose containing IVF, food) • Recurrent patients: 83% • Non-recurrent: 57% **p = 0.003** **Refractory Or Recurrent n = 74 (30.3%)**

Conclusions

- There is ~ 30 minute delay in initial BG in the ED for patients via EMS
- The initial dose of bolus dextrose was most often 25 g (regardless of weight, BG, or refractory hypoglycemia)
- Refractory or recurrent hypoglycemia occurred in approximately one-third of patients and there was an association with infection and this occurrence
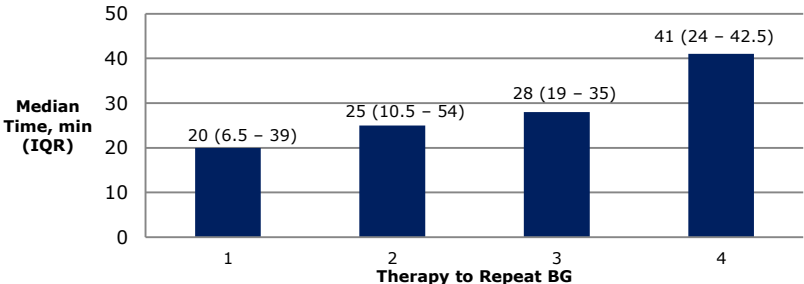
References

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