Hypoglycemia in Emergency Department

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ABSTRACT

Objective: To study the epidemiology, etiologies and prognostic factors of hypoglycemia.

Methods: A retrospective chart review of hypoglycemic cases from December, 2009 to February, 2012 was conducted to gather the following patient data: age, gender, vital signs at triage, white blood cell count, serum glucose, C−reactive protein, glutamic oxaloacetic transaminase, creatinine, sodium, potassium, past history of liver cirrhosis, uremia, concomitant infection, concomitant cancer/malignancy, length of stay, lack of recent meal, status of acute renal failure and concomitant stroke. A total of 186 cases were enrolled in our study. We analyzed the data using commercial statistics software (SPSS for Windows, version 11.0, SPSS Inc., Chicago, IL). We used the Student´s t−test and χ^2 test for the statistical analyses, and significance was set at a P value less than 0.05.

Results: Hypoglycemia is related to several co−morbidities. In total, 10.2% of the patients had liver cirrhosis and 7.0% had uremia. More than half (55.4%) were bacterial infection during hospitalization. Acute renal failure accounted for 26.3% of the hypoglycemic episodes. In addition to the etiology of infection, the lack of a recent meal accounted for 44.6% hypoglycemic episodes. A total of 2.2% of the cases resulted from an acute cerebrovascular accident. Approximately 8.6% were concomitant with malignancy.

Conclusions: When hypoglycemic patients present in the emergency department, physicians should pay attention to the presence of infection, malignancy, liver diseases (liver cirrhosis and biliary tract infection), and acute renal failure.

1. Introduction

Hypoglycemia is an endocrine emergency that can alter the patient′s mental status, resulting in lethargy, confusion and organ dysfunction. Common causes are a lack of adequate intake of food, chronic alcohol abuse, interactions among medications, increased physical exertion and overdose of medications (insulin/oral hypoglycemic agent). It presents with a variety of symptoms, ranging from impaired cognitive function to convulsions, coma and death. In the past, there have been many articles describing the etiologies of hypoglycemia, including old age, lack of a recent meal,

infection, chronic renal insufficiency, liver diseases, and recurrent hypoglycemic episodes[1−3]. However, physicians have seldom mentioned or studied the prognostic factors of hypoglycemia. We studied hypoglycemia through a retrospective review of records from December, 2009 to February, 2012 at a tertiary teaching medical center in Northern Taiwan. The epidemiology, etiologies and prognostic factors for hypoglycemia are discussed in our report.

2. Materials and methods

A retrospective chart review of hypoglycemic cases (serum glucose less than 60 mg/dL) from December, 2009 to February, 2012 was conducted to gather data on patient age,

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gender, heart rate, systolic blood pressure, diastolic blood pressure at triage, white blood cell count (WBC), serum glucose, C–reactive protein (CRP), glutamic oxaloacetic transaminase (GOT), creatinine, sodium, potassium, past history of liver cirrhosis, uremia, concomitant infection [urinary tract infection (UTI) or pneumonia or biliary tract infection], concomitant cancer/malignancy, length of stay, lack of a recent meal, status of acute renal failure (ARF), and concomitant stroke. A total of 186 cases were enrolled in to our study, and we divided the patients into survival and mortality groups to compare the differences affecting the prognosis of hypoglycemia. The survival group was defined as the patients who survived until discharge. Concomitant stroke indicates newly–onset stroke with hypoglycemic episode in this emergency department (ED) visit. All charts reviewed with a paper–based manner. Data missed of 49 patients' CRP values and 4 patients' GOT levels were found. Only one case of 79 year–old female is out–of–hospital cardiac arrest case. All values were recorded on patients' arrivals of ED.

Patients with serum glucose levels less than 60 mg/dL were defined as hypoglycemic. Elderly age was defined as an age above 65 years old. Leukocytosis was defined as a WBC count above 10000/μL. Elevated CRP was defined as a level above 0.8 mg/dL. Elevated GOT was defined as a level above 41 U/L. Elevated creatinine was defined as a level above 1.3 mg/dL. ARF was defined as a doubling of level of creatinine within one month. Neonatal and pediatric patients (age less than 18 year–old) were excluded. We analyzed the data using commercial statistical software (SPSS for Windows, version 11.0, SPSS Inc., Chicago, IL). We used the Student's t–test and χ^2 test for statistical analyses, and significance was set at a P value less than 0.05.

3. Results

A total of 186 cases of hypoglycemia aged from 26 to 98 years old with an average age of 70.5±15.3 were encolled. Among these patients, 70.4% were elderly (131/186). Approximately 45.2% (84/186) had leukocytosis, which indicated that a possible inflammatory process was involved in the hypoglycemia. High CRP levels were noted in 82.8% (154/186) of the cases. About 62.4% (116/186) had impaired

Table 1

Basic information of patients with hypoglycemic cases conducted from December, 2009 to February, 2012 in Northern Taiwan.

	All	Survival	Mortality	P value
Age	70.5±15.3	70.5±15.1	70.3±17.2	0.1980
M: F	96:90	82:83	14:07	0.000*
BT ℏ	36.4±1.2	36.4±1.1	36.3±1.4	0.087
HR /min	86.5±18.1	85.3±15.9	95.7±29.5	0.001*
SBP mmHg	139.3±30.0	141.7±27.3	120.0±41.2	0.286
DBP mmHg	73.3±18.1	74.6±16.9	63.7±23.8	0.079
WBC (/μL)	11 223.0±7 198.0	10 969.0±6 438.0	13 219.0±11 608.0	0.008*
Glucose(mg/dL)	34.9±12.4	35.1±12.0	33.1±15.6	0.026*
CRP (mg/dL)	5.1±6.5	4.7±5.4	9.1±13.1	0.008*
GOT (U/L)	110.0±340.0	82.2±312	324.0±461.0	0.001*
Creatinine (mg/dL)	2.8±2.6	2.8±2.6	2.9±2.9	0.837
Na (meq/L)	134.5±11.1	134.8±11.1	131.8±11.2	0.274
K (meq/L)	4.1±1.0	4.0±1.0	4.7±1.2	0.185
LOS (days)	15.2±18.9	14.6±16.0	20.2±34.3	0.022*
Liver cirrhosis	19/186 (10.2%)	12/165 (7.3%)	7/21 (33.3%)	0.000*
Uremia	13/186 (7.0%)	11/165 (6.7%)	2/21 (9.5%)	0.348
With Infection	103/186 (55.4%)	89/165 (54.0%)	14/21 (66.7%)	0.001*
UTI	62/186 (33.3%)	54/165 (32.7%)	8/21 (38.1%)	0.394
Pneumonia	43/186 (23.1%)	36/165 (21.8%)	7/21 (33.3%)	0.051
BTI	5/186 (2.7%)	3/165 (1.8%)	2/21 (9.5%)	0.000*
Lack Ingestion	83/186 (44.6%)	71/165 (43.0%)	12/21 (57.0%)	0.976
ARF	49/186 (26.3%)	39/165 (23.6%)	10/21 (47.6%)	0.006*
With cancer	16/186 (8.6%)	11/165 (6.7%)	5/21 (23.8%)	0.000*
With CVA	4/186 (2.2%)	3/165 (1.8%)	1/21 (4.8%)	0.088

BT: Body temperature; HR: Heart rate; SBP: Systolic blood pressure; DBP: Diastolic blood pressure; WBC: White blood cell count; CRP: C–reactive protein; GOT: Glutamic oxaloacetic transaminase; LOS: Length of stay; UTI: Urinary tract infection; BTI: Biliary tract infection; ARF: Acute renal failure; CVA: Cerebrovascular disease; *: P<0.05, significant difference.