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Demographic Characteristics of Patients with Hyperglycemia in a Single Measurement

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Abstract

Objective: This following study was performed to determine the demographic features of patients with hyperglycemia in a single measurement admitted to emergency room (ER).

Methods: We conducted a retrospective cross-sectional study based on the hospital patients records who admitted to ER. Age, sex, laboratory parameters, blood glucose level, hospitalization results, hospitalization days and one year mortality informations were obtained from the patients' records.

Results: 46.4% (n = 1351) of patients were male and 53.6% (n = 1561) were female. The mean age of patients were 62.77 ± 18.030 (min:0–max:101) years. The most common age groups with hyperglycemia were 65–84 (45.47%) and 35–64 (39.7%) years. The mean blood glucose of patients was 352.22 ± 99.0 (min:250–max:1114). 73.2% (n = 2131) of patients were discharged from the ER, 18.4% (n = 91.6) of patients were hospitalized in hospital services and 8.4% (n = 245) of patients were hospitalized in intensive care unit 5.1% (n = 148) of patients died after within one year after the admission to ER. The relationship between hospitalization result and gender is statistically significant. The relationship between one year mortality and gender was not significant.

Keywords: Hyperglycemia; Blood glucose; Diabetes; Morbidity

Introduction

Hyperglycemia occurs as a result of stress response in patients with insulin resistance, insulin deficiency, impaired glucose metabolism and using glucocortioids. During acute stress, hyperglycemia is an adaptive response, by furnishing glucose-dependant organ substrate for energy and by protecting intravascular volume with raised serum osmolarity [1].

Diabetes mellitus is a metabolic disease is which there is disorder of energy homeostasis and this disease has adverse effects on health leading to morbidity and mortality. Nowadays, diabetes mellitus is a serious health problem for developed and developing countries [2,3]. In the world, about 150–170 million people suffer from this disease and according to World Health Organization reports: the prevalence of diabetes mellitus is expected to two-fold in 2025 [3].

The acute metabolic complications of DM are associated with volume insuffiency, insulin deficiency and asid-base disorders. The clinical features of diabetic emergencies are hyperglycemia, ketoacidosis, hyperosmolar state and clinical conditions associated with hyperglycemia [2].

Evaluation of patients in all age groups with presenting with hyperglycemia to the emergency department is also important in terms of epidemiological data. Therefore, this following study was performed to determine the demographic features of patients with hyperglycemia in a single measurement admitted to emergency room.

Material and Methods

Study Design

We conducted a retrospective cross-sectional study based on the hospital patients records admitted to emergency service in Kars Harakani State Hospital, Kars, Turkey. The study protocol was approved by Kafkas University Ethical Commitee and only registry data was used. We included all patients in Kars Harakani State Hospital Emergency Service and measured hyperglycemia (250 mg/dL) once during the dates January 2012 and December 2017. Age, sex, laboratory parameters, blood glucose level, hospitalization results, hospitalization days and one year mortality informations were obtained from the patients' records.

Statistical analysis

The continuous variables are expressed as mean ± sd, categorical data is expressed as n (%). The normal distribution is determined by histogram and Kolmogorov-Smirnov test. The categorical parameters are compared by Chi Square test. All tests are applied as two tailed and the statistical significance level was $p<0.05$. All statistical analyses were carried out SPSS 23.0 for Windows program.

Results

Approximately 1.077.5 patients admitted to ER between the dates. The incidence of patients with a blood glucose level of over 250 was 0.27% in a single measurement.46.4% (n = 1351) of patients were male and 53.6% (n = 1561) were female. The mean age of patients were 62.77 ± 18.030 (min:0–max:101) years. The most common age groups with hyperglycemia were 65-84 (45.47%) and 35–64 (39.7%) years.

Age Intervals	n	%
0-1 years	10	0.34
2-4 years	33	1.13
5-12 years	37	1.27
13-17 years	25	0.85
18-34 years	113	3.88
35-64 years	1157	39.7
65-84 years	1324	45.47
85 years<	213	7.31
	2912	100

Table 1: The distribution of patients by age.

The mean blood glucose of patients was 352.22 ± 99.0 (min:250–max:1114). 73.2% (n = 2131) of patients were discharged from the ER, 18.4% (n = 91.6) of patients were hospitalized in hospital services and 8.4% (n = 245) of patients were hospitalized in intensive care unit.Data of a patient could not be reached from recordings.

The mean hospitalization day of patients was 1.33 ± 3.62 (min:0–max:29). 5.1% (n=148) of patients died within one year after the admission to ER.

The relationship between hospitalization result and gender is statistically significant ($p < 0.005$).

	Mean ± SD	(Min – Max)	n
Hemoglobine	14.02 ± 2.26	(9-23.7)	2827
Neutrophil	6.83 ± 4.17	(0-39.6)	2319
Lymphocyte	2.37 ± 2.22	(0-49.49)	2319
NLR	4.64 ± 10.98	(0-470)	2319
WBC	10.54 ± 7.56	(0-281.9)	2831
Platelet	243.7 ± 91.52	(5-963)	2827
RDW	15.49 ± 2.49	(0-33)	2469
MPV	8.66 ± 1.08	(0-13.6)	2826
Blood pH	7.34 ± 0.129	(6.75-7.68)	437
Blood lactate	3.23 ± 3.30	(0.5-26)	438
Blood bicarbonate	22.23 ± 5.017	(5-56.4)	433

NLR: neutrophil-to-lymphocyte ratio, WBC: white blood cell, RDW: red cell distribution width, MPV: mean platelet volume.

Table 2: The results of complete blood count and blood gas analysis.

	Mean ± SD	(Min – Max)	n
Hemoglobine	14.02 ± 2.26	(9-23.7)	2827
Neutrophil	6.83 ± 4.17	(0-39.6)	2319
Lymphocyte	2.37 ± 2.22	(0-49.49)	2319
NLR	4.64 ± 10.98	(0-470)	2319
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Table 3: The results of biochemical and urine analysis.

	Discharge	Service	Intensive Care Unit	Total	p
	n	n	n	n	0.002
Male	949	269	133	1351	
Female	1182	266	112	1560	
Total	2131	535	245	2911	

Table 4: The relationship between hospitalization result and gender. *Pearson Chi Square

	One year mortality			
	No	Yes		
	n	n	Total	*p* - 0.215
Male	1275	76	1351	
Female	1489	72	1561	
Total	2764	148	2912	

Table 5: There relationship between one year mortality and gender was not significant. *Pearson Chi Square.

Discussion

Hyperglycemia is a common clinical finding in emergency departments and also one of the main reason for consultation of other pathologies. About 30–40% of admissions to emergency departments are patients with diabetic [4]. In this study, the incidence of hyperglycemia (blood glucose level 250 md/dL<) was 0.27% and 53.6% of patients were female. The mean age of patients were 62.77 ± 18.030 and most common age groups were 65-84 (45.47%) and 35-64 (39.7%) years. The incidence may be low in our study since we do not take hyperglycemia with blood sugar below 250.All age groups were evaluated together. Hyperglycemia was more frequent in elderly patients and for this reason the mean age of the patients was greater. In United States, 11 million people aged 65 years or older (26% of adults aged 65 years or older) suffer from DM. Adults aged 65 years and older are prone to develop DM higher than younger adults [5]. In Lai's report, the prevalence of hyperglycemia was high in elderly patients [6]. DM and its complications show gender differences due to countries, lifestyle, culture, environment and socioeconomic status [7]. In Yan et al.'s study, the number of patients presenting with hyperglycemia was higher in males and the mean age of the patients was lower (56.4% male, mean age 48.8) [8]. Age and gender may vary according to the population in which the study conducted.

In this study, 73.2% of patients were discharged from the ER, 18.4% of patients were hospitalized in hospital services and 8.4% of patients were hospitalized in intensive care unit. One year mortality was after the admission to ER was 5.1% for hyperglycemic patients. Hospitalization and gender were associated factors. The discharge from the ER was greater in female gender. Mortality and gender were not related. The discharging from ER was high. It may be because many patients did not present with complications such as hyperosmolar coma or diabetic ketoasidosis. Moderate hyperlycemia is frequently encountered in ER.Patients without complications such as diabetic ketoacidosis may be discharged from the emergency department [9]. Studies have showed a prevalence of hyperglycemia and diabetes ranging 38-40% for hospitalized hyperglycemic patients [10]. Leite et al.'s report, hyperglycemia was correlated with, among other parameters, morbidity/mortality, length of hospitalization and number of re-hospitalizations.

For this study, the biggest limitation is the inability to access patients' records, especially those containing laboratory results.

Conclusion

In conclusion, this study was planned in the emergency department showing demographic features of one-time hyperglycemia. There is a need for more comprehensive and prospective studies including detailed hospital records.

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Conflict of interest

None to declare.

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