• FULL-LENGTH ARTICLES •

Glycemic Control and the Outcomes of Hispanic Patients with Diabetes Admitted to the General Ward of a Community Hospital in Puerto Rico

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Objective: Uncontrolled glucose, present in 40% of diabetic patients admitted to United States hospitals, has been associated with prolonged length of stay and poorer general outcomes in critically ill and surgical patients. However, past studies of general ward patients have shown there to be no consistent benefits of strict glucose control, and the Hispanic population has been underrepresented in such studies. This work evaluated the association between glycemic control and the outcomes of hospitalized Hispanics with diabetes and to describe physicians' interventions in the treatment of diabetes.

Methods: This is a retrospective chart review of all patients with diabetes admitted over a period of six months in the general ward of a community hospital in Puerto Rico. We evaluated glucose levels during the first 72 hours, length of stay, and reported complications during admission. Outcomes were evaluated with crude odds ratios and multivariate logistic regression.

Results: Uncontrolled blood glucose was observed in 59.1% of the 875 patients whose records were revised; of that 59.1%, treatment modification was not prescribed for 43.2%. Patients with poorly controlled glucose were more likely to develop acute coronary syndrome (corrected OR: 11.46; 95% CI = 1.48 - 88.50) as a complication and less likely to develop hypoglycemia (corrected OR: 0.57; 95% = CI 0.37 - 0.88).

Conclusion: Our results suggest that hospitalized but non-critically ill Hispanic patients with diabetes are prone to poor outcomes secondary to uncontrolled glucose levels; in addition, those results support the creation of standardized protocols for the management of diabetes in this population. [*P R Health Sci J 2011;30:43-50*]

Key words: Glycemic control, Outcomes, Hispanics

Diabetes mellitus is one of the most prevalent chronic diseases among Hispanics. Second only to the Pima Indians (1), Puerto Ricans living in Puerto Rico (as opposed to those living in the continental USA or in other countries) have one of the highest self-reported prevalences of diabetes (12.5%) (2). Reaching almost epidemic proportions, diabetes is the fourth most common comorbid condition in hospitalized patients, complicating the course of many hospitalizations (3). Studies done with cardiovascular and surgical patients in intensive care units (ICU) have suggested that poor glycemic control is associated with prolonged length of stay (LOS), poorer general outcomes, and a higher incidence of wound infections, reinfarction, and death (3-9). The literature suggests that strict glucose control benefits critically ill patients by decreasing complication rates and improving outcomes (3-9). New studies have evaluated whether these benefits

extend to patients on the general ward (10-16). Although early findings suggest that tighter blood glucose control improves the outcomes of this group of patients, consensus about the benefits of strict blood glucose control in the general ward has not been achieved. In addition, recent studies suggesting an association between very strict glucose control and a higher risk of death have fueled this controversy (17, 18).

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On the other hand, many studies suggest suboptimal management of diabetes mellitus during hospitalizations. Sustained hyperglycemia is seen in more than 20% of patients, and 42%-65% of them never receive treatment modification (19-21). Finally, short-acting insulin sliding scales (ISS) as a single therapeutic approach continue to be widely used despite being discouraged by medical authorities (22, 23).

Although Hispanics have one of the highest prevalences of diabetes, most of these studies were done in Europe or in the continental USA with minimal representation of the Hispanic population. Therefore, we designed a descriptive chart review study that evaluated the association of glycemic control and the outcomes of Hispanic patients with diabetes admitted to the general ward at a community hospital in Puerto Rico. As a secondary aim, medical staff interventions were also evaluated to assess diabetes management in these patients.

Methods

This is a retrospective chart review of all of the admission records of adult patients with diabetes mellitus as a comorbid condition who were discharged from the general ward of a community hospital in the metropolitan area of San Juan, Puerto Rico. All admissions between January 1, 2005, and June 30, 2005, were evaluated. The participant hospital has 250 beds distributed for the services of internal medicine, family medicine, surgery, obstetrics, gynecology, orthopedics, pediatrics, and psychiatry. Cases of patients with incomplete admission data, readmissions, those severely ill upon admission (ICU admissions, mechanical ventilation within the first 24 hours), and those in which glucose levels might be influenced by factors other than diabetes treatment (diabetic ketoacidosis, hyperosmolar status, hemodialysis, gastric bypass surgery, nothing-by-mouth status) were excluded (Figure 1). Our study population was thus reduced to 875 admission records. Data were retrieved from paper charts by five residents and medical students following a standard data collection instructions form. Retrieved information included demographic data, comorbidities, smoking status, diabetes treatment (inpatient and outpatient), admission diagnosis, LOS, blood glucose levels, and complications reported during hospitalization. Primary outcomes were LOS, death during hospitalization, readmission within seven days after discharge, and complications during hospitalization. Secondary outcomes were medical staff interventions for the modification of inpatient diabetes treatment. The protocol was approved by the Internal Review Board of the University of Puerto Rico – Medical Sciences Campus.
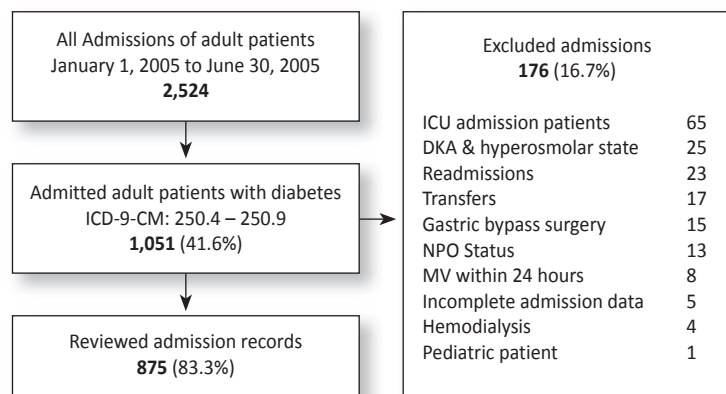
Figure 1. Population and sampling. ICU: Intensive care unit; DKA: Diabetes ketoacidosis; NPO: Nothing per oral route (*nil per os*); MV: Mechanical ventilation

Definitions

Being a retrospective chart review study, ethnicity was determined by self-reported ethnicity data as documented during nursing staff admission interviews; this information is solicited from all patients admitted in this institution. A patient with diabetes was defined as any patient identified as diabetic (ICD-9 codes 250.01 - 250.09) in the discharge summary. For this study we reviewed the blood glucose levels reported in the record upon arrival and, if available, at 24 (±4) hours, 48 (±4) hours, and 72 (±4) hours after admission. Blood glucose levels were obtained either from blood laboratory reports or fingertip blood analysis (documented on chart). Some studies suggest that fingertip glucose determination might be affected by hemoglobin levels, (24) and differences between serum and fingertip glucose determination have been reported (25). However, during the last decade, advances in technology for glucose meters have resulted in a marked improvement of these devices, with correlation coefficients between 0.97 to 0.98 (26-28). Glucometers used for fingertip blood glucose analysis in this institution are periodically calibrated by clinical laboratory staff in order to assure correlation with core laboratory tests, and the nursing personnel are trained in their correct use and calibration. Each glucose value was individually classified as uncontrolled vs. controlled glucose using ADA guidelines, which state that any random blood glucose level above 180mg/dL can be defined as uncontrolled (29). By convenience of available data, glucose status during the first 72 hours of admission was determined for each individual by defining uncontrolled glucose status as having 50.0% or more of the recorded glucose values above 180mg/dL.

Being a chart review of the admissions to a general ward, the data necessary to calculate a severity index were not available in most cases. Instead, we used a modified Charlson Comorbidity Index in which the following comorbidities were evaluated: congestive heart failure (CHF), previous myocardial infarction, peripheral artery disease, dementia, chronic obstructive

pulmonary disease, connective tissue disease, peptic ulcer disease, liver disease, old cerebrovascular disease, renal disease, and malignancy with or without metastasis (30). We considered as a complication any evidence of clinical deterioration of the admission diagnosis or comorbidities described in the medical record. Other complications included any of the following conditions occurring after admission: nosocomial urinary tract infection or pneumonia, surgical-wound infection, sepsis, cellulitis, acute coronary syndrome (ACS), new arrhythmias, decompensated CHF, new cerebrovascular accident or transient ischemic attack, worsening of renal function, hypoglycemia, death, and readmission within seven days after discharge.

Diabetic treatment within the hospital was categorized as diet alone, oral treatment (hypoglycemics), basal insulin, and insulin sliding scale alone. Basal insulin corresponded to the use of a basal insulin regimen (Neutral Protamine Hagedorn [NPH] or any long-acting insulin) with or without oral hypoglycemic drugs or short-acting insulin. ISS was defined as diabetes treatment consisting only of the administration of short-acting insulin (regular or rapid-acting insulin) based on an established scale of blood glucose intervals, each with a predetermined amount of insulin assigned. Finally, treatment modification was defined as any new order of diabetes treatment or modifications to previous treatment occurring after the first 24 hours of admission. Treatment modification included changes in diet, addition/modification of basal insulin or ISS, and/or modification of oral hypoglycemics.

Statistical Analysis

The population under study was characterized using descriptive analysis. Controlled and poorly controlled glucose groups were compared using the Student's t-test, the Mann–Whitney U test, the Chi-square test, and Fisher's exact test. Associations between glucose control and outcomes were done by calculating crude odds ratios. Those associations found to be statistically significant were then evaluated on a multivariate logistic regression model into which clinically and statistically significant covariates were integrated (age, sex, smoking status, steroid use, and comorbidity index). For the secondary aim, simple descriptive analysis was done to assess diabetes treatment modalities and modification during hospitalization. Analysis was performed using statistical software (Epi Info Version 3.5.1 and SPSS 16.0) with the significant coefficient being set at 0.050. No power analysis was performed because the entire population of interest was evaluated. We found a high rate of missing glucose values (up to 28.0%). To address this situation, the

analysis was repeated for significant results to verify whether these associations persisted after assuming both that all missing glucose values were controlled and that all missing values were uncontrolled.

Results

Demographics and Clinical Characteristics

Of the 875 charts reviewed, 517 (59.1%) were of patients who had uncontrolled blood glucose during the first 72 hours of admission. Almost all the population was self-reported as Hispanic (99.9%), and both groups (uncontrolled and controlled glucose groups) had similar demographic characteristics except for average age, with the group of patients with uncontrolled blood glucose being younger (65 years vs. 69 years, p<0.001); see Table 1. Clinical characteristics differed in mean comorbidity index, new onset diabetes status, outpatient diabetes treatment, and use of steroids (Table 1). The most common comorbidities in both groups were hypertension, coronary artery disease, obstructive pulmonary disease, and CHF, with similar prevalences for both groups (Table 2). The prevalence of three comorbidities was significantly higher in the controlled glucose group: dementia, being bedridden, and previous cerebrovascular accident (Table 2). Pneumonia and ACS—acute myocardial infarction (AMI)—were the most common admitting diagnoses, with similar rates in both groups; however, admissions because of skin and soft tissue infections were significantly higher among uncontrolled patients (Table 3). There was no difference concerning the admission service between the two groups (Table 3).

Outcomes: Length of Stay and Complications

Although average LOS varied with diagnosis, no statistically significant difference was found when comparing uncontrolled and controlled glucose groups. Evaluation for prolonged

Table 1. Demographic and clinical characteristics

	General (n=875)	Uncontrolled Glucose (n=517)	Controlled Glucose (n=358)	P
Age, mean (SD) years	66.6 (14.2)	64.9 (14.6)	69.1 (13.3)	<0.001
Female, n (%)	518 (59.2)	309 (59.8)	209 (58.4)	0.681
Government medical insurance, n (%)	651 (74.4)	384 (74.3)	267 (74.6)	0.920
Active smoker, n (%)	152 (17.4)	82 (15.9)	70 (19.6)	0.156
New onset diabetes, n (%)	30 (3.4)	24 (4.6)	6 (1.7)	0.008
DM outpatient treatment, n (%)				
Diet/oral hypoglycemics alone	517 (59.1)	275 (53.2)	242 (67.6)	<0.001
Insulin w or w/o oral hypoglycemics	337 (38.5)	235 (45.5)	102 (28.5)	<0.001
Unknown	21 (2.4)	7 (1.4)	14 (3.9)	<0.001
Glucocorticosteroids in hospital, n (%)	127 (14.5)	90 (17.4)	37 (10.3)	0.003
Comorbidity index, score (SD)	4.8 (2.2)	4.5 (2.2)	5.1 (2.1)	<0.001

SD: Standard deviation

Table 2. Comorbidity index and selected comorbidities

	General (n=875)	Uncontrolled Glucose (n=517)	Controlled Glucose (n=358)	P
Comorbidity index, score (SD)	4.8 (2.2)	4.5 (2.2)	5.1 (2.1)	< 0.001
Comorbidities, n (%)				
Hypertension	710 (81.1)	410 (79.3)	300 (83.8)	0.095
Coronary artery disease	285 (32.6)	170 (32.9)	115 (32.1)	0.408
COPD/BA	170 (19.4)	107 (20.7)	63 (17.6)	0.255
Congestive heart failure	162 (18.5)	92 (17.8)	70 (19.6)	0.510
Previous cerebrovascular accident	125 (14.3)	55 (10.6)	70 (19.6)	0.001
Chronic kidney disease	96 (11.0)	48 (9.3)	48 (13.4)	0.055
Dyslipidemia	90 (10.3)	60 (11.6)	30 (8.4)	0.123
Dementia	46 (5.3)	20 (3.9)	26 (7.3)	0.027
Bedridden	44 (5.0)	18 (3.5)	26 (7.3)	0.012
Malignancy without metastasis	38 (4.3)	23 (4.8)	15 (3.8)	0.853
Chronic liver disease	20 (2.3)	12 (2.3)	8 (2.2)	0.933
Malignancy with metastasis	18 (2.1)	8 (2.2)	10 (1.9)	0.378

SD: Standard deviation; COPD/BA - Chronic obstructive pulmonary Disease/Bronchial asthma

Table 3. Admission Data

	General (n=875)	Uncontrolled Glucose (n=517)	Controlled Glucose (n=358)	P
Admission Service, n (%)				
Internal Medicine	782 (89.4)	467 (90.3)	315 (88.0)	0.104
Family Medicine	58 (6.6)	28 (5.4)	30 (8.4)	0.104
Orthopedics	10 (1.1)	4 (0.8)	6 (1.7)	0.104
Others	25 (2.9)	18 (3.5)	7 (2.0)	0.104
Admission diagnosis, n (%)				
Pneumonia	189 (21.6)	114 (22.1)	75 (20.9)	0.040
ACS/MI	158 (18.1)	92 (17.8)	66 (18.4)	0.040
S & STI	113 (12.9)	80 (15.5)	33 (9.2)	0.040
CVA/TIA	86 (9.8)	54 (10.4)	32 (8.9)	0.040
CHF	78 (8.9)	41 (7.9)	37 (10.3)	0.040
Fracture	27 (3.1)	11 (2.1)	16 (4.5)	0.040
Other diagnoses	224 (25.6)	125 (24.2)	99 (27.7)	0.040

ACS/MI: Acute coronary syndrome/Myocardial infarction; S & STI - Skin and soft tissue infection; CVA/TIA - Cerebrovascular accident/Transient ischemic attack; CHF: Congestive heart failure

LOS (≥6 days) as a function of blood glucose control yielded non-significant differences (Table 4). The most common complications during hospitalization for both groups were a worsening of admission diagnosis, hypoglycemia, electrolyte disturbances, a worsening of comorbidities, and death (Table 4). Although the average number of complications did not differ between uncontrolled (0.75 ± 1.38) and controlled groups (0.73 ± 1.30) (p = 0.818), analysis by individual complications showed significant differences in the occurrence of new ACS-AMI and hypoglycemia during hospitalization (Table 4).

The OR for new ACS-AMI among uncontrolled patients remained significant after multivariate logistic regression

(corrected OR: 11.46; 95% CI = 1.48 - 88.50), see Table 5. Although underpowered for some diagnoses, further analyses correcting for admission diagnosis did not affect the strength and statistical significance of this association. In the case of hypoglycemia, multivariate logistic regression showed a persistent association of fewer hypoglycemic episodes among uncontrolled patients (corrected OR: 0.57; 95% CI = 0.37 - 0.88). Further analysis showed hypoglycemia to be associated with death (corrected OR: 2.7; 95% CI = 1.21 - 6.16) after correcting for comorbidity index, glucose control, age, sex, and smoking history. All these associations persisted after the analysis was repeated (twice), assuming both that all missing glucose values were controlled and that all missing values were uncontrolled.

Hospitalized Diabetes Treatment - Treatment Modification

Almost six of every ten patients in this study (59.1%) had uncontrolled blood glucose during the first 72 hours of admission, and only 57.8% of them underwent treatment modification in response to their poor glucose control. The most common treatment modifications were adding or adjusting basal insulin (52.5%), adding or adjusting oral hypoglycemic medications (22.8%), and ISS modification (13.6%). ISS as the only pharmacological treatment for diabetes was the most common initial modality of treatment and the most commonly associated to uncontrolled glucose, independently of pre-hospital treatment (Figure 2). A consistent tendency for poorer glucose control was found among those patients treated with insulin in the ambulatory setting, regardless of the inpatient management (Figure 2).

Discussion

The main finding of this study was that the high rate of uncontrolled blood glucose among our patients with diabetes seems to be associated with an increased probability of developing ACS-AMI as a complication and with a decreased probability of developing hypoglycemia during hospitalization. We also found an increased probability of death among patients who present hypoglycemia during hospitalization and suboptimal hospital management of diabetes in a significant number of cases.

Uncontrolled blood glucose during the first 72 hours of admission was present in 59% of our hospitalized patients. This number surpasses those reported in the United States, which

Table 4. Measured Outcomes

	General (n=875) n (%)	Uncontrolled Glucose (n=517) n (%)	Controlled Glucose (n=358) n (%)	Crude OR (95% CI)
ACS/MI	16 (1.8)	15 (2.4)	1 (0.4)	10.7 (1.4-81.1)
Hypoglycemia	98 (11.2)	45 (7.2)	53 (21.1)	0.5 (0.3-0.8)
Readmission	21 (2.4)	15 (2.4)	6 (2.4)	1.8 (0.7-4.6)
Electrolytes disturbances	86 (9.8)	47 (7.5)	39 (15.5)	0.8 (0.5-1.3)
Worsening admission dx.	106 (12.1)	68 (10.9)	38 (15.1)	1.3 (0.8-1.9)
Death	74 (8.5)	45 (7.2)	29 (11.6)	1.1 (0.7-1.8)
Worsening comorbidity	71 (8.1)	44 (7.1)	27 (10.8)	1.1 (0.7-1.9)
Prolonged LOS	529 (60.5)	310 (49.7)	219 (87.3)	1.0 (0.7-1.3)

OR: Odds ratio; CI: Confidence interval; ACS/MI: Acute coronary syndrome/Myocardial infarction; dx: diagnosis; LOS: Length of stay

numbers range from 38% to 42% (21, 23). In a work by Cook et al in which over 2,900 admissions of non-critically ill patients in a teaching hospital were evaluated, poor glucose control was found in 42% of cases. That cohort is slightly older than ours (69 vs. 67 years in our study) and differs in sex distribution (43% women vs. 59% in our study), admission service (34% surgical services vs. <5% in our study), and ethnicity (90% Caucasians vs. 99% Hispanic in ours). Although these factors and others, such as the use of steroids, (31) may contribute to the higher prevalence of uncontrolled glucose in our study, ethnicity should receive special attention. Since this is the first study on this issue in which most of the population is self-reported as being Hispanic, further work is necessary to evaluate whether glucose control is intrinsically more difficult to achieve in Hispanics or whether this difference is solely secondary to other factors such as disparities in health services and access to them.

Despite the high prevalence of poor glucose control in our sample, we found no impact of uncontrolled glucose on the LOS or on the development of poorer outcomes (other than new ACS-AMI during hospitalization and death associated with hypoglycemia). It is possible that the association between poor glycemic control and the poor outcomes previously described among critically ill and surgical patient (32) might not be as strong in non-critically ill, general ward Hispanic

patients. Patients in general ward admissions are usually less fragile than are ICU patients, in whom poor glucose control has been traditionally linked to poorer outcomes. Moreover, ICU admissions tend to be longer, allowing time for the deleterious effects of uncontrolled blood glucose to occur, as well as other non-glucose–associated complications. Another issue to be considered is the possibility that Hispanics with diabetes have higher resistance to the detrimental effects of hyperglycemia in this acute setting because of their higher baseline glucose levels (33-34). Whichever the case, larger studies using a prospective design are required in order to make a better assessment of the effects of glucose control on the outcomes of Hispanic patients with diabetes who have been admitted to a general ward.

The two most striking findings of this study are the increased probability of patients with uncontrolled glucose to develop ACS-AMI as a complication and the association of hypoglycemic episodes with an increased probability (2.7 fold) of dying during hospitalization. For years, the detrimental effects of hyperglycemia on the rate of cardiac complications have been supported by many ICU studies (5, 7, 19) and at least one general ward study (11). Various theories have been proposed to explain this association between hyperglycemia and cardiac complications, although some of them rely on the possible protective cardiovascular effects of insulin. One of these theories proposes that insulin might modulate the body's stress response by reducing the transcription of pro-inflammatory genes, chemokines, adhesion molecules, and nuclear factor-κβ (NF-κβ) (3, 11). Another theory claims that insulin has the capacity of increasing the synthesis of nitric oxide via the stimulation of nitric oxide synthase, resulting in an acute vasodilative effect (3). However, the most accepted theory is that patients with diabetes, particularly those with poor control, present increased levels of free fatty acids and extreme sensitivity to catecholamine stimulation (4, 7, 15). Experimental and clinical observations have suggested that free fatty acids and their intermediates potentiate ischemic injury through direct toxicity, increased oxygen demands, and direct inhibition of glucose oxidation (4, 7). Still persists the possibility that hyperglycemia may not be a causal risk factor for cardiovascular complications but merely a marker for other unmeasured confounders (11).

The increased incidence of ACS-AMI in our study supports the extrapolation of previous results from studies evaluating ICU and critically ill patients. However, important drawbacks must be considered. First, ACS cases and confirmed AMI cases were evaluated together as a single

Table 5. Multivariate logistic model for significant outcomes[1]

	ACS-MI		Hypoglycemia	
	OR	95% CI	OR	95% CI
Uncontrolled glucose	11.46	(1.48-88.50)	0.57	(0.37-0.88)
Age	0.97	(0.93-1.01)	0.99	(0.97-1.01)
Sex (male/female)	0.42	(0.13-1.34)	0.92	(0.59-1.43)
Comorbidity index	1.31	(1.02-1.69)	1.21	(1.07-1.36)
Smoking status (unk/no)	0.76	(0.10-6.06)	1.69	(0.89-3.22)
Smoking status (yes/no)	1.27	(0.34-4.72)	0.44	(0.21-0.92)

ACS/MI: Acute coronary syndrome/Myocardial infarction; OR: Odds ratio; CI: confidence interval; Unk: Unknown

outcome and we found only 16 admissions presenting this complication. Second, since this is a retrospective chart review design, our results largely rely on medical staff's documentation, which is sometimes incomplete, inaccurate, or both. Despite these limitations, strength of association and correlation with published literature in this field makes this finding an important element to consider. Therefore, prospective studies with a larger number of participants, in which ACS and AMI cases are reported separately, are necessary to have an accurate picture of this association.

Hypoglycemia has been one of the most debated issues concerning glucose control in the hospitalized patient. After

secondary to tight glucose control. Further evaluation of this association must be pursued considering important covariates such as severity indexes, admission diagnosis, and diabetes treatment approach.

We found a suboptimal hospital management of diabetes with 42.2% of the uncontrolled glucose patients receiving no diabetes treatment modification within the first 72 hours vs. the 34% reported in the United States (20). Contrary to recommended guidelines, ISS alone as the initial pharmacologic modality of treatment continues to be used in a considerable proportion of admissions (39.2%). Finally, almost one fourth of the patients did not have recorded values for glucose monitoring during the periods of time being reviewed. All these findings point toward suboptimal diabetes management and monitoring among Hispanic patients admitted to this particular community hospital. This situation might be secondary to gaps in the reporting process, a lack of standardized nursing protocols for glucose monitoring in the general ward, and the absence of evidence-based protocols aimed at guiding medical staff in the management of patients with diabetes admitted to this institution. Although this suboptimal treatment is not unique to our population, (20, 21) it is evidence of the need for educational programs for health care providers and for the development of standard protocols for the management of diabetes in the general ward setting. Results of this study suggest that special attention should be given to patients who present hypoglycemic episodes
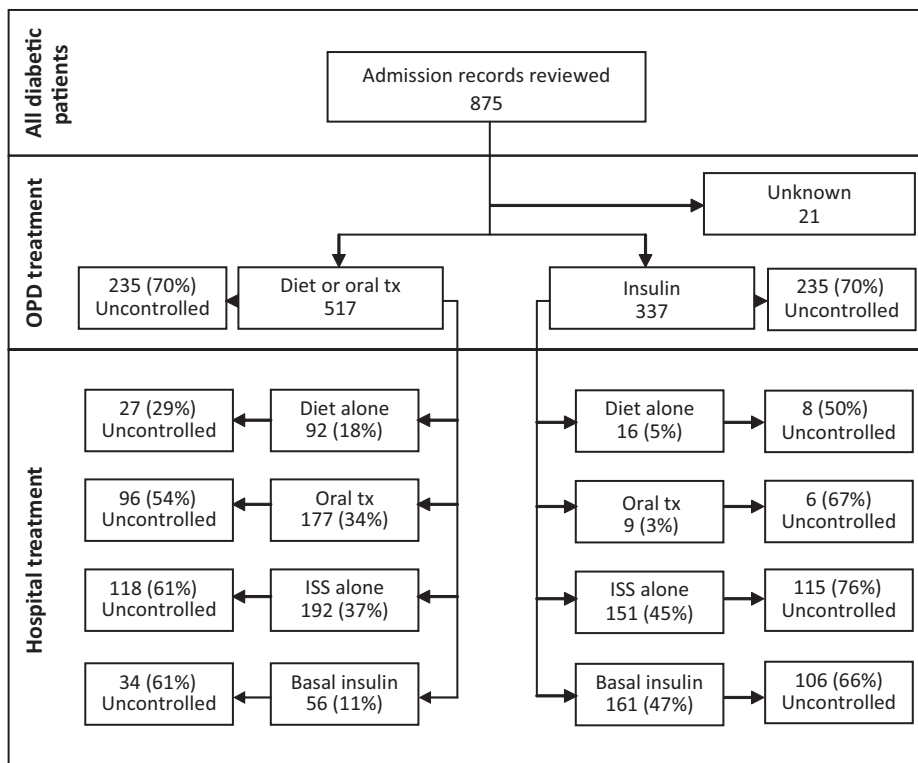

Figure 2. Ambulatory and hospital treatment of patients with diabetes

stopping enrollment of two clinical trials because of higher mortality among patients receiving intensive insulin therapy, (17, 35) the issue of whether rigorous insulin therapy is likely to lead to death has become a central one. In our study, patients with uncontrolled blood glucose were 45% less likely to develop hypoglycemia than patients with controlled blood glucose, which is consistent with published literature. However, we found a 2.7-fold increased level of mortality among patients who presented hypoglycemia, regardless of the level of glucose control on admission. This finding contributes to the debate of whether or not hypoglycemia is a marker of illness severity rather than a risk factor for mortality,

and to those who have been identified as having cardiovascular risk factors (regardless of their admission diagnosis).

Being a retrospective study, the present work has important limitations that include the following: a small power for stratification by admission diagnosis, objective measures of pre-hospitalization glycemic control (HgbA1c) are unavailable, the data under review are based on medical records documentation, and the lack of generalization to populations other than Hispanics admitted to community hospitals in Puerto Rico. Finally, the event rate for some measured outcomes was too small to enable the detection of statistically significant associations between poor glucose control and these outcomes.

In conclusion, this study shows that poor glycemic control and suboptimal diabetes management is common in the management of hospitalized Hispanic patients with diabetes. This poor glycemic control is highly correlated with an increased probability of developing ACS as a complication, with death (among those presenting hypoglycemia) being a possibility as well. Being the first study of this class done in Puerto Rico, where the served population is mainly of Hispanic ethnicity, and one of the very few done with general ward patients, the results of this study must be seriously evaluated. Results from the present work are relevant for the design of future prospective studies to address this issue among Hispanic patients, especially in those who develop either ACS-AMI or hypoglycemia. In order to reduce the potential for complications (such as those found in this study), these two populations must be closely followed once they are admitted to a general ward. Finally, since the association of uncontrolled glucose with poorer outcomes has been reported to be higher among non-diabetic patients, future studies including both diabetic and non-diabetic patients are also highly recommended.

Resumen

Objetivo: El 40% de los pacientes diabéticos hospitalizados en los Estados Unidos presentan descontrol glucémico, que ha sido asociado a estadías prolongadas y pobres resultados en pacientes críticos y quirúrgicos. Sin embargo, los beneficios del control glucémico en pacientes no críticos son controversiales y la representación hispana en la mayoría de estos estudios es limitada. Este trabajo evaluó los efectos del control glucémico en los de pacientes hispanos con diabetes que son hospitalizados y describe las intervenciones médicas intrahospitalarias para el manejo de la diabetes. Métodos: Este estudio retrospectivo revisó todos los expedientes de pacientes con diabetes admitidos a un hospital de comunidad en Puerto Rico durante 6 meses. Se evaluaron los niveles de glucosa en las primeras 72 horas, el tiempo de estadía y las complicaciones reportadas durante la admisión. Los resultados fueron analizados mediante producto cruzado y regresión logística multivariada. Resultados: El 59.1% de los pacientes admitidos presentaron descontrol glucémico y 43.2% de éstos no recibieron modificación de su tratamiento en respuesta al descontrol. La probabilidad de eventos coronarianos agudos fue mayor entre los pacientes descontrolados (OR corregido 11.46, 95% CI 1.48 - 88.50), mientras que la probabilidad de hipoglucemia fue menor (OR corregido 0.57; 95% CI 0.37 - 0.88). Conclusión: Estos hallazgos sugieren que los pacientes hispanos con diabetes son susceptibles a peores resultados asociados al descontrol glucémico durante hospitalizaciones no críticas y apoyan la necesidad de establecer protocolos estandarizados para el manejo hospitalario de la diabetes en esta población.

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