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Implications of New Geriatric Diabetes Care Guidelines for the Assessment of Quality of Care in Older Patients

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Abstract

Background—Current approaches to assessing quality of diabetes care do not account for the heterogeneity of older patients.

Objective—We sought to compare conclusions regarding adequacy of glucose and blood pressure control using current quality assessment approaches and a stratified approach based on geriatric care guidelines.

Design—This was a cross-sectional evaluation of diabetes care.

Subjects—We studied patients older than 65, living with diabetes ($n = 554$) attending clinics of an academic medical center.

Measurements—We measured the proportion of patients with and without markers of poor health (life expectancy ≤ 5 years, age ≥ 85 , 4–6 activities of daily living dependencies, or Charlson Comorbidity Index Score ≥ 5) achieving treatment goals.

Results—Under general population goals (glycosylated hemoglobin [$\text{HbA}_{1\text{C}}$] $\leq 6.5\%$ or $< 7\%$; systolic blood pressure [SBP] < 130 mm Hg), a small proportion of our subjects met glucose (24–36%) or SBP control (30%) targets. Under new guidelines, less-intense targets ($\text{HbA}_{1\text{C}} \leq 8\%$, SBP < 140 mm Hg) would be applied to patients with diminished health, with general population goals reserved for healthier patients. With this stratified approach, the proportion of sicker patients achieving their specified glucose (61–83%) and SBP goals (37–64%) generally was high, depending on the criteria for poor health, whereas the proportion of healthier patients achieving their goals remained low.

Conclusions—A stratified approach to assessing the quality of diabetes care leads to distinct care conclusions for older patients with and without markers of diminished health. An approach to quality assessment and quality improvement that acknowledges patient heterogeneity could help ensure the clinical relevance of such efforts for older patients.

Keywords

diabetes mellitus; geriatrics; quality of care; practice guidelines

Although patients older than the age of 65 represent a significant proportion of patients with type 2 diabetes, how intensely to treat older patients remains uncertain.¹ Important clinical differences exist among such patients that may determine whether the medications needed to

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achieve treatment goals developed for the general population are beneficial or harmful.² In recent years, the American Diabetes Association (ADA)³ and the California Healthcare Foundation/American Geriatrics Society (CHF/AGS) Panel on Improving Care for Elders with Diabetes⁴ have acknowledged these differences and recommended that treatment goals of diabetes care be individualized for older patients based on factors such as life expectancy, functional status, and comorbidities.

The evolution of care guidelines for older patients has implications for how the quality of diabetes care should be measured. Current performance measures (eg, Diabetes Quality Improvement Project [DQIP] measures⁵) for diabetes were designed with the knowledge that glucose and blood pressure control is influenced not only by the care provided but by numerous underlying patient differences, such as disease severity.⁶ Despite these best intentions, current performance measures and the majority of the diabetes quality of care literature^{7–9} do not directly acknowledge the heterogeneity of older patients, in part because geriatric care guidelines only recently have emerged. The concerns with continuing current quality assessment practices are that the quality of care for older diabetes patients may be ignored or misrepresented and that frail patients may receive overly aggressive treatments.

The new guidelines suggest that quality assessment in older patients with diabetes should include a stratification step whereby patients with and without important clinical markers of poor health would be assessed separately. We examine how conclusions regarding the adequacy of glucose and blood pressure control, 2 components of overall diabetes care, differ for a cohort of older patients depending on the specific approach to quality assessment.

METHODS

We used data for a cohort of older patients with diabetes that were attending clinics of the University of Chicago. The patients were required to be at least 65 years of age and have an existing diagnosis of type 2 diabetes. Candidate subjects were contacted via telephone. We called 1049 patients, made contact with 696, and completed 557 interviews. After excluding ineligible subjects, we had 554 patients for analysis.

In face-to-face interviews,¹⁰ patients were asked about their treatment preferences and health status (eg, functional status).¹¹ The physicians of subjects were given a self-administered survey to determine their assessment of the patient's health status. Medical records were reviewed for information regarding comorbid illnesses,¹² recent vital signs, laboratory values, and medications. We performed a 10% rereview of medical records to assess inter-rater reliability and the kappa scores were 0.92 for glycosylated hemoglobin (HbA_{1C}) and 0.75 for systolic blood pressure (SBP) levels.

Measures of Control

We focused on the evaluation of the control of blood glucose and blood pressure where distinctions exist between goals for frail and nonfrail older patients in new practice guidelines. We first evaluated measures of control using general population goals from clinical practice guidelines. For glucose control, we evaluated care based on a target HbA_{1C} ≤ 6.5% as established by the American Association of Clinical Endocrinologists¹³ and a HbA_{1C} < 7% as recommended by the ADA for the general diabetes population.³ For blood pressure control, we used a goal of 130/80 mm Hg.^{3,14} We then assessed measures of control using DQIP performance measures.⁵ For glucose control, the performance measure is the proportion of patients with poor control (HbA_{1C} ≥ 9.5%) and for blood pressure, the performance measure is a blood pressure <140/90 mm Hg.

We then used a stratified approach to goal-setting as advocated in new guidelines.^{3,4} For glucose control, patients with life expectancy of greater than 5 years were held to intensive glucose control targets ($\text{HbA}_{1\text{C}} < 7\%$),¹⁵ whereas patients with life expectancy 5 years or less were held to moderate glucose control targets (eg, $\text{HbA}_{1\text{C}} \leq 8\%$).⁴ In addition, these guidelines recommend that an intensive SBP target of 130 mm Hg be reserved for healthier, functional patients whereas a target SBP of 140 mm Hg be used in the general population of older diabetes patients.

Criteria for Stratification

We operationalized various concepts described in practice guidelines to stratify the population.^{3,4,16} We first used physician-estimated life expectancy and categorized it into >10 years, 6–10 years, and ≤ 5 years. We also stratified patients by age (65–74, 75–84, and ≥ 85 years of age) which also is associated with life expectancy. For functional impairment, we categorized activity of daily living scores (ADLs) as dependence in 0, 1–3, and 4–6 activities.^{17,18} For a measure of comorbidity, we used a modified Charlson Comorbidity Index that excluded points assigned to diabetes.^{12,19} The index was categorized as 0, 1–2, 3–4, and ≥ 5 . Patients who had a physician-estimated life expectancy ≤ 5 years, age ≥ 85 years, dependence in 4–6 ADLs, and a modified Charlson Comorbidity Index Score ≥ 5 had their measures of control assessed with less stringent care goals.

Statistical Analysis

Analyses were conducted using SAS for Windows, Version 8.0 (Release 8.1, SAS Institute Inc., Cary, NC). We provide descriptive statistics such as proportions, means, and standard deviations to describe the population and the measures of control by different quality assessment approaches. We describe the proportions of patients with any degree of overlap of the various criteria for clinical frailty.

RESULTS

Patient Characteristics

The mean age of patients was 74 with 60% of patients in the group between 65 and 74 years (Table 1). The majority of patients were women (62%), black (79%), and functionally independent (77%). The mean modified Charlson Comorbidity Index Score was 2.3.

Measures of Control Using General Population Goals and Performance Measures

A relatively small proportion of patients had measures of control that met general population goals recommended in practice guidelines (Table 2). Only 36% of patients had a $\text{HbA}_{1\text{C}} < 7\%$ and 24% had a $\text{HbA}_{1\text{C}} \leq 6.5\%$. Similarly, 23% had a systolic blood pressure < 130 mm Hg while 60% had a diastolic blood pressure < 80 mm Hg.

According to diabetes performance measures, only 12% of patients were considered to have poor glucose control (Table 2). For blood pressure control, 40% of patients had systolic blood pressure < 140 mm Hg whereas 88% of patients had diastolic blood pressure < 90 mm Hg. These results compare favorably with prior assessments of managed care plan populations.⁵

Measures of Control Under Stratified Approach

Applying new diabetes treatment guidelines for older patients led to different conclusions about measures of control for patients with and without markers of limited life expectancy, comorbid illnesses, or functional impairment. A small proportion of healthy older patients met their goals for measures of control (28–38% with $\text{HbA}_{1\text{C}} < 7\%$ and 14–25% with SBP < 130 mm Hg) whereas a larger proportion of patients with markers of poor health met their target goals for

glucose and blood pressure (Table 3). For example, one-third (32%) of patients had a physician-estimated life expectancy ≤ 5 years. Only 35% of this subgroup met the general population goal for glucose control. However, under stratified guideline goals ($\text{HbA}_{1\text{C}} \leq 8\%$), 70% would be considered to have adequate control. This increase in the proportion of subjects considered to have adequate glucose control held true for each of the clinical markers: age ≥ 85 years (goal achieved shifts from 38 $\rightarrow$ 83%); 4–6 ADL impairments (36 $\rightarrow$ 64%); and modified Charlson score ≥ 5 (33 $\rightarrow$ 61%). We had similar, but less dramatic, increases in the proportion of patients with poor health meeting systolic blood pressure goals (Table 3).

Stratification Criteria

Forty-four percent of patients had at least one important clinical marker indicating the need for modified treatment goals for diabetes although the degree of overlap of multiple criteria was low. Only 14% of patients met at least 2 of the criteria, 1.8% met at least 3 criteria, and only 1 patient met all 4 criteria.

DISCUSSION

Our study illustrates how conclusions regarding the adequacy of glucose and blood pressure control for a population of older diabetes patients differ depending on whether one uses current quality assessment approaches or a stratified approach. Current approaches to assessing measures of control share the common approach of applying uniform standards to a population. Applying general population goals to all older patients can lead to conclusions regarding the care of frail patients that may encourage overly intensive treatments. At the same time, while current performance measures are designed to avoid inappropriate quality of care conclusions, current measures assess processes and measures of control somewhat removed from clinical decisions that affect health outcomes, motivating some investigators to develop updated performance measures.^{20,21}

New geriatric practice guidelines, not only provide a formalized approach to caring for diabetes in older patients, but also suggest a new approach to assessing measures of control that acknowledges differences among patients. Under this stratified approach, the control of glucose and blood pressure levels for healthier patients in our sample would be considered clearly suboptimal. On the other hand, the majority of frail older patients met less stringent glucose control targets and a higher proportion met blood pressure targets. The implications of these findings are that efforts to improve diabetes care in healthier older patients would be similar to those intended for younger subjects, while efforts to improve care in sicker older patients would aim for moderate control of glucose and blood pressure and focus on other quality of life issues.

Many important questions still remain for how we should ideally stratify older patients with diabetes.²² We assessed several criteria identified in guidelines and found little correlation, which is not surprising given the disparate nature of these characteristics. Efforts to develop comprehensive measures of frailty^{23,24} may eventually lead to useful tools for clinical practice. At present, we recommend that providers first consider remaining life expectancy, based on age and comorbidities, in conjunction with functional status as first steps in stratifying patients.^{22,25,26} In addition, patient goals and treatment preferences should clearly be incorporated into treatment decisions.^{22,25,27} For the purposes of quality of care assessment, identifying frail patients is a much greater challenge since characteristics such as functional status are difficult to obtain. One possible approach might be to identify patients with limited life expectancy, based on age and comorbidity scores, or sentinel conditions (ie, dementia)²⁶ and assess care with less intensive goals.

These findings should be considered in light of this study's limitations. We focused on only 2 measures of control and did not assess how stratification might affect the evaluation of other components of geriatric diabetes care. In addition, the generalizability of our results may be limited because our subjects were largely blacks attending clinics of a single academic center. However, our findings are based on the means and distributions of measures of control and the blood glucose and blood pressure levels of our population are quite similar to those from national data (NHANES).²⁸ The advantage of our data is the availability of stratification criteria mentioned in guidelines. Lastly, we recognize that physician-estimated life expectancy may be inaccurate but we purposely compared it with other criteria since it is likely to be used in real practice.

Clinical practice guidelines frequently have acknowledged the importance of individualizing care but new diabetes guidelines provide a formal framework for how this should occur. Measures that promote tight control for all older patients could actually cause some patients harm by either promoting intensification in patients who are not likely to benefit from such treatments or by promoting perverse incentives such as dropping patients with poor control from practices. Efforts to measure and improve quality of care for populations should not be at odds with efforts to measure and improve quality of care for individuals. Incorporating recent insights from geriatrics into quality measurement efforts could ensure their clinical relevance and fairness in an era when older patients are becoming more prevalent. Continuing the current practice of ignoring differences in older patients when evaluating care quality could lead to a surprising unintended consequence: the provision of lower quality of care for our frail elderly patients.

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TABLE 1
Demographic and Clinical Characteristics (n = 554)

Age (mean [SD])	74 (6)
Female, % (n = 553)	62
Race/ethnicity, % (n = 553)	
Black	78.8
White	15.7
Hispanic	2.7
Asian	0.4
Other	2.3
Duration of diabetes, years (mean [SD]) (n = 551)	13.4 (10)
Complications, %	
Any microvascular complication	39
Coronary artery disease	35
Stroke	18
No. ADLs requiring assistance (mean [SD])	0.4 (0.9)
0 ADLs requiring assistance, %	77
1–3	21
4–6	2.0
Modified Charlson Comorbidity Index Score (mean [SD]) *	2.3 (2.1)
Medicines (mean [SD])	6 (3)
Glucose-lowering medicines (mean [SD])	1.4 (0.8)
Glucose-control regimens, %	
No medicines	12
Oral medications only	51
Insulin injection ± oral medications	37
Blood pressure lowering medicines (mean [SD])	2 (1.2)

* This is the Charlson Comorbidity Index Score¹² calculated without points for diabetes or diabetes with complications.

Quality of Diabetes Care Using General Population Goals From Clinical Practice Guidelines and Performance Measures

	Mean (SD)	Clinical Practice Guidelines		Performance Measures	
		Measure	Proportion	Measure	Proportion
Glucose control (n = 542)	7.7 (1.6)	Hemoglobin A1C $\leq 6.5\%$ [*]	24	Hemoglobin A1C $\geq 9.5\%$ [‡]	12
SBP (n = 535)	143 (22)	Hemoglobin A1C $< 7\%$ [†]	36	SBP < 140 mm [†]	40
Diastolic blood pressure (DBP; n = 535)	75 (12)	SBP < 130 mm Hg ^{†§}	23	DBP < 90 mm Hg [‡]	88
		DBP < 80 mm Hg ^{†§}	60		

^{*} American Association of Clinical Endocrinologists.¹³

[†] American Diabetes Association.³

[‡] DQIP for glucose control is a hemoglobin A1C ≥ 9.5 , a measure of poor control.⁵

[§] The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.¹⁴

TABLE 3
Quality of Risk Factor Control Using Newer Individualized Geriatric Treatment Goals and Possible Stratification Criteria (n = 556)

Category	Patients, n	HbA _{1C} , Mean	HbA _{1C} <7%, %	HbA _{1C} ≤8, %	SBP, Mean mm Hg	SBP <130mm Hg, %	SBP <140mm Hg, %
Physician-estimated life expectancy, years							
>10	99	7.4	34	76	144	20	39
6–10	204	7.7	38	70	144	22	38
≤5	141	7.8	35	70	141	30	46
Age, years							
65–74	332	7.7	35	68	142	24	42
75–84	197	7.6	37	73	146	21	37
≥85	25	7.4	38	83	144	33	37
No. ADLs requiring assistance							
0	426	7.6	38	72	143	22	40
1–3	117	7.7	28	66	145	25	38
4–6	11	8.1	36	64	131	45	64
Modified Charlson Comorbidity Index Score *							
0	94	7.5	36	81	145	14	37
1–2	252	7.7	35	67	145	23	40
3–4	137	7.6	38	74	145	25	38
≥5	71	7.8	33	61	137	32	51

* This is the Charlson Comorbidity Index Score¹² calculated without points for diabetes or diabetes with complications.