

Is the Quality of Diabetes Care Better in a Diabetes Clinic or in a General Medicine Clinic?

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OBJECTIVE — To compare the quality of ambulatory diabetes care delivered by physicians in the diabetes clinic versus the general medicine clinic of a university-affiliated Veterans Administration medical center.

RESEARCH DESIGN AND METHODS — This is a retrospective study that involved the review of medical records against predetermined process-of-care criteria. A total of 112 patients with diabetes were randomly selected, of whom 56 were cared for in the general medicine clinic and 56 in the diabetes clinic. The following main outcome measures were examined: 1) the compliance with individual criteria; and 2) the proportion of patient visits in each clinic receiving minimally acceptable quality, defined as a blood pressure measurement, a record of type of hypoglycemic medication, a glycated hemoglobin measurement within the past year, a urinalysis within the past year, an ophthalmologist or optometrist eye examination within the past year or scheduled in the next six months, a record of change in therapeutic management, and a scheduled return visit.

RESULTS — The diabetes clinic performed significantly better than the general medicine clinic on the following criteria: a record of a patient's self-monitoring of blood glucose levels; a foot examination; a comprehensive eye examination; a glycated hemoglobin measurement; and a referral for diabetic education. The proportion of patient visits meeting the minimally acceptable levels of quality was better in the diabetes clinic than the general medicine clinic (73 vs. 52%, $P = 0.02$).

CONCLUSIONS — Patients cared for by physicians in the diabetes clinic receive better quality of diabetes care than do patients cared for by physicians in the general medical clinic. If patient care is to be shifted from specialists to generalists, additional attention needs to be paid to ensure that generalists have the knowledge and system resources necessary to deliver an acceptable quality of diabetes care.

Managed care is becoming established as a major form of health care delivery in the U.S. (1). A principal component of managed care is the role of the generalist physician as the "gatekeeper," or someone who restricts direct access to specialists. One recent study of managed care organizations in California found that only 6% of plans allow patients to self-refer to internal medicine subspecialists and that

60% required the "gatekeeper" to obtain formal pre-authorization (2). A consequence of these changes is that patients previously managed by specialists will now be managed by generalists.

The Department of Veterans Affairs (VA) is also trying to reorganize its service delivery to one emphasizing outpatient primary care. It is a formal policy that many patients formerly cared for in these clinics

by specialists will now be managed by generalists in a general medicine clinic. When our VA first announced its intention to discharge continuing care patients from the diabetes mellitus clinic (DMC) to the general medical clinic (GMC), we felt it important to assess the current quality of diabetes care in the two clinics, since diabetes is one of the most common illnesses in the veteran population and there exist data to support the view that the medical management of diabetes can help prevent morbidity (3–16).

RESEARCH DESIGN AND METHODS

Study design

This study was a retrospective review of medical records against predetermined process-of-care criteria, undertaken at the West Los Angeles VA Medical Center, which is affiliated with the University of California at Los Angeles School of Medicine and provides both primary and referral care for over 35,000 patients annually. The GMC is staffed by faculty internists, medical fellows, medical residents, and nurse practitioners. The DMC is staffed by faculty diabetologists, endocrine fellows, and medical residents. In addition, there is a diabetic nurse educator, a podiatrist, and an optometrist on the DMC staff.

Defining quality of care

Criteria were taken from the American Diabetes Association guidelines for standards of diabetes care (17–20) and modified for local use by diabetologists and general internists at the West Los Angeles VA Medical Center. The quality of care at any given routine diabetes visit was considered "good" if documentation of all clinically appropriate process-of-care variables, where applicable, were found in the chart or on the hospital computer database (Table 1).

A smaller set of "minimally acceptable" criteria was created by the clinical authorities at the West Los Angeles VA Medical Center. These seven criteria were documentation on any given routine diabetes visit of 1) a blood pressure measurement, 2) the type of glycemic medication, 3) an HbA_{1c} value within the previous year, 4) a

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VA, Veterans Affairs; DMC, diabetes mellitus clinic; GMC, general medical clinic.

Table 1—Criteria for ambulatory diabetes care

- A. Visit frequency
- Patients with a significant change of hypoglycemic regimen should have a follow-up within 4 weeks (for insulin-treated patients) or within 8 weeks (for oral-agent-treated patients)
- B. Medical history
- Assessment of the patient's self-monitoring of blood glucose results at every visit
 - Assessment of possible cardiovascular symptoms at every visit
- C. Physical exam
- Blood pressure measurement at every visit
 - Foot examination at every visit
 - Comprehensive eye examination performed by an ophthalmologist or optometrist yearly (unless a patient was already blind)
- D. Laboratory testing
- HbA_{1c} measurement performed every 3 months
 - Routine urinalysis performed yearly
 - For patients with proteinuria, further work-up with a 24-hour urine protein determination
- E. Management
- Angiotensin-converting enzyme inhibitor for patients with proteinuria
 - Referral for diabetic education and/or for nutritional counseling as necessary to optimize glycemic control (for all patients with HbA_{1c} levels >10%)

Criteria have been modified from those of the American Diabetes Association (17–20) for local use at the West Los Angeles VA Medical Center.

urinalysis within the previous year, 5) a comprehensive eye exam performed by an ophthalmologist or optometrist in the previous year or scheduled within six months of the visit, 6) the change, if any, in therapeutic management, and 7) a scheduled return appointment.

These “minimally acceptable” criteria were chosen for two reasons. Four of these criteria have been most strongly linked to good patient health outcomes in clinical trials: blood pressure control and monitoring decreases the long-term complications of cardiovascular disease (21); the early detection of diabetic retinopathy can prevent the progression to blindness (4–7); glycemic monitoring and control decreases long-term microvascular complications in type I diabetic patients (3,8,9); and the early management of diabetic nephropathy with an angiotensin-converting enzyme inhibitor slows the progression of the deterioration of renal function (13–16). Secondly, these four processes, if they were actually delivered or performed, were most likely to be documented in either the medical record or computerized database (i.e., these criteria are least subject to recording bias). The remaining three criteria are important for the continuity of care, given that patients may not always see the same provider at each visit.

Selection of patient records

The records reviewed were for patients who received care in 1993 and 1994. Patients

were randomly selected using the indicated computerized medication profiles and a clinic enrollment list. Those who managed their diabetes with diet therapy alone were excluded. A total of 112 records were selected and reviewed, half of which came from each clinic. No patients in the sample were being seen concurrently by both clinics.

Data collection and analysis

A medical record abstraction system using

branched chain logic was used to collect the data. Branching chain logic consists of conditional “if . . . then” type statements. Variables about the patient's history, physical examination, and clinical management were abstracted from the most recent routine diabetes visit in the medical chart. Laboratory data, medications, and referral visits for other specialty care were collected directly from our hospital computerized database. The percentage compliance for individual process-of-care criteria was calculated. Each patient visit was reviewed against both the “good” and the “minimally acceptable” definition of quality of care. Statistical comparisons were made with *t* tests using STATA 3.1.

RESULTS

Characteristics of diabetic patients

The mean age of patients was 61 years in the DMC and 65 years in the GMC. All were male. Patients had diabetes for 12–13 years on average, with between half and two-thirds on insulin therapy. The mean glycosylated hemoglobin levels (9.7%) were about two percentage points above the upper limit of normal (7.1%), and over a third of patients already had proteinuria. No clinically important differences were found between patients seen at either clinic.

Table 2 lists the process-of-care criteria, the number of records that these criteria were applicable to, and the percentage compliance with each criterion for both clinics.

Table 2—Compliance with individual process-of-care criteria

Criteria	GMC (n = 56)		DMC (n = 56)	
	n	Compliance	n	Compliance
1. Cardiac symptoms inquiry	56	46*	56	29*
2. Self-monitored blood glucose record	56	52*	56	77*
3. Blood pressure	56	98	56	96
4. Foot examination	56	48*	56	86*
5. Comprehensive eye exam	56	71*	56	89*
6. Urinalysis within 1 year	56	91	56	84
7. Patients with proteinuria and a 24-h urine collection	16	50	22	50
8. Patients with proteinuria and on ACE inhibitors	16	38	22	23
9. HbA _{1c} measurement within 1 year	56	84*	56	100*
10. HbA _{1c} level >10%				
Referral to education	20	50*	23	82*
Referral to nutritionist	20	60	23	69

Data are n or %; n refers to the number of applicable records for each criteria. Eye examinations were performed within 1 year or scheduled up to 6 months after clinic visit. ACE, angiotensin-converting enzyme. *P ≤ 0.05.

There were several statistically significant differences in the percentage compliance with selected process-of-care criteria between the clinics. The DMC performed significantly better than the GMC on the following criteria: the self-monitoring of blood glucose levels, a foot examination, regular comprehensive eye examinations, and a referral for diabetic education when glycemic control was poor (defined as an HbA_{1c} value >10%). The GMC more often recorded having asked about cardiac symptoms.

None of the records from either clinic passed with "good" quality-of-care criteria. When tested against "minimally acceptable" quality criteria, 52% of the GMC and 73% of DMC charts passed ($P = 0.02$).

Table 3 shows the records from each clinic that failed the "minimally acceptable" criteria and the reasons why records failed. The most common cause for failure for both clinics was the lack of a comprehensive eye exam performed within the defined time frame. Other than eye examinations, there was no quality criterion that failed in more than three records in the DMC. Across individual records, with one exception, all of the failing records in the DMC failed because of a single criterion. However, in the GMC, 12 records failed more than one criterion (six records failed two criteria, five records failed three criteria, and one record failed five criteria).

CONCLUSIONS — In this study, we have assessed the quality of ambulatory diabetes care by using detailed explicit clinical criteria and by collecting data directly from medical chart review and a computerized database. We found that the DMC performed significantly better on several important individual quality measures and did better than the GMC on our aggregate measure of the quality of diabetic care. The specialist care in our VA outperformed the generalist care even though our generalist care was significantly better on many criteria than the published rates from other settings. The GMC rate of regular comprehensive eye examination was 71%, which is substantially higher than the 46% reported from U.S. Medicare claims data analysis (22) and 50% reported from a chart audit in Australia (23). Similarly, the GMC rate of monitoring glycated hemoglobin within the previous year was 84%, much higher than the 16% observed in the Medicare analysis (22). More recently, a study of outpatient diabetic care in a man-

aged care setting found that 56% of patients had no glycated hemoglobin testing in the past year, 52% had no test for urinary protein, and 92% had no documented foot examination (24), values far below those seen in our GMC.

It is interesting to compare our results with those recently published from the Medical Outcomes Study (25). In this report, patients with type II diabetes cared for by generalists or endocrinologists were followed longitudinally and several different outcomes (but not processes) were measured. Among 170 patients followed for 2 years, those seeing endocrinologists had better outcomes with respect to foot ulcers. Our data suggest why this may have occurred: patients cared for in our DMC were almost twice as likely to have had a foot examination recorded as were patients seen in the GMC. For the rest of the reported outcomes, no differences were seen between patients cared for by specialists or generalists. However, the follow up time in the Medical Outcomes Study was relatively short (2–4 years, compared with the >6-year follow-up in the Diabetes Control and Complications Trial (3). Clinical trial evidence indicates that improvements in patient outcomes will occur in time if attention is paid to the control of blood pressure and hyperglycemia and to the early detection and treatment of diabetic retinopathy and nephropathy. Differences between specialists and generalists in the knowledge of optimal diabetes management may be one explanation for our results. We believe that the organization or system of care delivery may also play a role. The higher rate of referral for diabetic teaching in the DMC and the higher rate of documentation of foot and regular eye examinations are likely related to the availability within that clinic of a nurse educator, a podiatrist, and an optometrist. For such arrangements to be financially feasible, a sufficiently large number of diabetic patients must be seen regularly. If diabetes care is not to be regionalized, then it may be that many individual practitioners or small group practices will have insufficient numbers of patients to justify the extra personnel.

There are several limitations to this study that deserve discussion. First, some of our process-of-care criteria are recorder-dependent. However, most of our critical quality criteria (those used in our aggregate measure of minimally acceptable quality) can be independently assessed through more than one source and are, therefore,

Table 3—Reasons for less than minimal quality

Criteria	Deficient charts	
	GMC	DMC
Blood pressure measurement	1	2
Glycemic medication recorded	6	1
HbA _{1c} measurement	9	0
Urinalysis	6	3
Eye examination	16	6
Change in therapy	9	2
Return visit scheduled	0	2

Data are n.

less prone to recording bias. It is also possible that some care provided outside of our medical center may not be identified by our abstraction system. Third, our study was at only one institution and requires replication in other settings. Interestingly, a preliminary report from another VA has reported similar results identifying deficiencies in accepted process measures among 95 diabetic patients being treated by primary care physicians (26). Lastly, we are comparing disease-specific care between a clinic and provider dedicated to the disease and a clinic and provider type that treats many problems.

Our study indicates that the quality of diabetes care is better in our VA DMC than in our GMC, even though the diabetes care delivered in the GMC is much better than the comparative data on primary care providers in other systems (22,24). Therefore, it is conceivable that the gap between specialist and generalist diabetes care in other settings may be even greater than we observed in this study. As the "gatekeeper" approach to managed care accelerates the shift in patient care from specialists to generalists, it will be important to ensure that generalists have both the knowledge and the system resources necessary to deliver care of comparable quality.

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