

Subspecialist Care Improves Diabetes Outcomes

The ultimate goal of the care of diabetic individuals is to reduce complications and prolong high quality of life. In view of the soaring increase in prevalence of this devastating illness, we as a society are obliged to “pull out all the stops” to identify disease early, prevent its progression, and provide the best care for those in need of treatment. It has become axiomatic that the best way to provide care for patients is the team setting, with substantial emphasis on the role and responsibility of the patient himself. The role of the specialist in caring for people with diabetes is a particularly timely issue in view of the rapidly escalating disease prevalence and the shrinking pool of endocrinologists. The solution may be to train more specialists, distribute their services differently, or use new approaches to assist already overworked primary physicians or other health care providers.

The article by Zgibor et al. (1) in this month's issue of *Diabetes Care* supports the contention that specialist physicians and clinics contribute to better outcomes for patients with type 1 diabetes. The study demonstrated that in a large population of 429 childhood-onset type 1 diabetic patients who were followed prospectively over a period of 10 years, a longer duration of time spent in specialist care resulted in a reduction in the development of overt nephropathy, neuropathy, and coronary artery disease. Although the study is limited in that some of the information was obtained by patient questionnaire, the information was validated by medical record review, providing reassurance of the accuracy of responses. After correcting for a number of variables that could influence outcome, including patient demographic characteristics, duration of disease, and comorbidities, significant differences in outcomes persisted.

The current work is vital because it reports the result of clinically important long-term disease outcomes. It follows the study Zgibor et al. reported in a 2000 *Diabetes Care* article (2), which showed

better process outcomes in patients followed by specialists as compared with generalists. This study, which is clinic-based, reveals results similar to an important report published by Hellman et al. (3) in a private practice endocrinology setting in which longitudinal data were available over a 14-year follow-up. The doctors intensively followed 209 people and reported that they developed significantly less end-stage renal disease, had fewer cardiac events, and had lower overall mortality rates compared with 571 patients who had been followed by standard community care. Additionally, as Zgibor et al. point out in their discussion, in Europe, many studies have reported that care in specialized diabetes centers has been associated with lower rates of proliferative retinopathy, other long-term clinical complications, and mortality. Even allowing for the factor of patient self-selection to remain in the care of specialist practices and clinics, the clinically important collective results of these important studies should prompt us to expand the availability of diabetes specialist care to more Americans.

Previous studies in the U.S. have demonstrated that the involvement of endocrinologists and diabetes team management have a significant impact on such short-term, clinically significant outcomes as cost for diabetic ketoacidosis (4–7), length of hospital stay, (8) emergency room visits and hospitalizations (9,10), hypoglycemia (10), and foot infections (11).

The involvement of the clinical endocrinologist has repeatedly been shown to result in better adherence to clinical guidelines for the management of diabetes and improvement in process measures: self-monitoring, diabetes education, and eye and foot exams and measurement of HbA_{1c}, blood pressure, microalbumin, and lipid levels, all of which are strongly associated with improvement in clinical outcomes in long-term randomized controlled clinical trials. Observational studies have, in fact,

indicated that endocrinologists in private practice and in institutional settings are able to provide process outcomes significantly different than those of generalists (12,13) and are comparable to those achieved in the Diabetes Control and Complications Trial (14). Among populations with serious challenges to caring for their diabetes, the inclusion of specialty physicians and care teams has resulted in improved HbA_{1c} (15). Additionally, more frequent exposure to specialist care results in lowering of HbA_{1c} (16) in pediatric type 1 diabetic individuals, a particularly challenging group of patients.

In the Medical Outcomes study report by Greenfield et al. (11) in 1996, endocrinologists fared better than family physicians in the Mean Summary Clinical Outcomes Index, which includes HbA_{1c}, foot ulcers, foot infections, albumin excretion, systolic and diastolic blood pressure, visual acuity, vibration sense, and serum creatinine. Furthermore, although the endocrinologists' population had more foot ulcers at the onset of the study, there was a significant reduction in ulcer prevalence and in infections in their patients as compared with those in family practices. In the most recent publication by Greenfield et al. (17), derived from the American Diabetes Association Provider Recognition Program, which is a select group of physicians interested in caring for diabetes, there were statistically significant differences in process and outcome measurements between specialists and generalists before “adjusting for physician clustering.” The conclusion reached by the authors, which is that there were not statistically different outcomes between specialists and generalists, has been questioned (18). Some of the statistical methods in this work have been challenged for their applicability and generalizability. Furthermore, within the study population, sites were misclassified as generalist or specialist and there was a significant degree of co-management by generalists and specialists, which underestimated the

degree of contribution of subspecialists to generalist care.

Process measures indicate whether specific components of care are being delivered, such as whether an eye exam or foot exam is performed or whether laboratory parameters such as HbA_{1c} and lipids are measured. These parameters may also become clinical measures themselves, when their level in an individual or within a population is measured. The correlation between these multiple variables and long-term clinical outcomes has been firmly established by randomized controlled clinical trials, which are widely recognized in the diabetes community. But process measures and short-term indicators, though well-correlated with clinical outcomes, cannot always detect the magnitude of differences between types of health care providers—particularly in cross-sectional, rather than longitudinal studies. Factors such as comorbidities, type of diabetes, patient demographics, and disease burden at the time of study are among many variables that make risk-stratification and evaluation of outcomes difficult. Issues such as patient compliance further complicate the picture.

Endocrinologists often see the most difficult patients only at the end of a long life of diabetes with clinically overt complications. They are often referred the patients who are not only difficult to manage medically, but also those who have failed to comply with the suggestions of other physicians. Our goal should be the provision of subspecialty input *early* in the disease, when intensive education and management have the best chance of changing behavior and planning therapy for the future. Various protocols using prompts and ongoing subspecialty participation in general care clinics may be promising.

The current study affirms that better short-term clinical and process outcomes indeed translate in the same large population, followed prospectively over a long period, into reduction in long-term diabetic complications and improved quality of life.

The benefits of subspecialty care include better information, dedication, commitment, focus, and attention to the complexities of life for people with diabetes. Particularly in the case of type 1 diabetes and difficult, complicated type 2 diabetes, continuous, regular feedback

with the endocrinologist and diabetes team is the only way to achieve good control on a day-to-day basis and to avoid extremes of hyper- and hypoglycemia. Ongoing teaching and patient–diabetes team interaction allows the patient to continually reassess his/her treatment and make appropriate short-term adjustments. Even in less labile type 2 diabetes, the provision of specialty input at the onset of disease and periodically throughout life would seem a much more appropriate way to set standards for care, provide rational therapeutic suggestions, continue to monitor guideline adherence and short term outcomes, avoid early complications, or at least provide early detection of problems and timely intervention. For example, in the study by Hellman et al. (3), early attention to cardiovascular risk and intimate involvement in patient care during times of acute illness and hospitalization also positively influenced clinical outcomes. Attention to this model of service would provide long-term benefits in a number of practice settings.

Ideally, all patients would be best served by systems that include the regular services of physicians with greater knowledge of disease, a more focused practice, better support systems involving other diabetes providers including certified diabetes educators and nutritionists, greater motivation to protect patients with diabetes, and often, better practice structure and recall systems to ensure patient visits and compliance.

The current study raises, but does not answer, the question of the setting and practice type and its effect on outcome. Clearly we are all aware that there are many deficiencies in the practice of medicine in the U.S., which, if corrected, would contribute to more effective care for patients with diabetes. Systematic recall, better medical informatics, and better access and reimbursement for care could each contribute to overall improvements in care of diabetes and other chronic illnesses.

Our challenge as subspecialty disease experts and endocrinologists (who serve as both principal care physicians for patients with diabetes as well as team leaders in diabetes care centers), is to devise systems of care that are flexible enough to assist patients in many settings, intensive enough to be effective, and practical and cost effective enough to contribute to reduction of the disease burden from diabe-

tes. Subspecialist care clearly improves long-term, clinically important outcomes in patients with diabetes, as demonstrated by the article by Zgibor et al. and earlier literature. Our challenge as a society is to provide more endocrinologists and other members of the diabetes team who are intensively educated specialists devoted to the care of patients with diabetes. It is impossible to imagine that, without better quality health care for people with diabetes, we will be able to stem the tide of the inexorably increasing morbidity and mortality from this disease.

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