Intensive Management of Type 2 Diabetes Increases Therapy Costs but Reduces Complications

Gray A, Raikou M, McGuire A, Fenn P, Stevens R, Cull C, et al. Cost effectiveness of an intensive blood glucose policy in patients with type 2 diabetes: economic analysis alongside randomised controlled trial. BMJ 2000;320:1373–8.

Objective. To determine if intensive blood glucose control in patients with type 2 diabetes is cost-effective.

Design. Cost-effectiveness analysis using data from the UK Prospective Diabetes Study (UKPDS).

Setting and participants. 3867 patients (mean age, 53 years) with newly diagnosed type 2 diabetes from 23 United Kingdom hospital clinic-based study centers were allocated to either conventional glucose control (primarily through diet, *n* = 1138) or intensive control with sulfonylurea (*n* = 1573) or insulin (*n* = 1156). The goal in the intensive therapy groups was a fasting glucose concentration less then 6 µmol/L. The goal in conventional therapy group was to maintain patients free from diabetes complications and with a fasting glucose concentration below 15 µmol/L. The patients were followed for an average of 10 years.

Main outcome measures. Cost of treatment and cost of complications per patient, and incremental cost per event-free year gained in the intervention group over the duration of the study.

Main results. Intensive glucose control increased trial treatment costs by $1054 per patient but reduced the cost of complications by $1452 compared with conventional management. If standard practice visit patterns were assumed rather than trial conditions, the incremental cost of intensive management was $725 per patient. The within-trial event-free time gained in the intensive group was 0.60 years, and the lifetime gain was 1.14 years. Using standard practice volumes rather than protocol-driven volumes, the cost per event-free year gained with both costs and effects discounted at 6% was $1768 (within-trial gain). With the costs discounted at 6% per year and the effects undiscounted, the cost per event-free year gained was $853 (lifetime gains).

Conclusion

Intensive treatment in patients with type 2 diabetes increases the cost of therapy substantially but also increases the time that patients are free of complications and reduces the cost of complications.

Commentary

Cost-effectiveness analyses have shown that intensive therapy in type 1 diabetes patients is efficacious and cost-effective [1]. The UKPDS showed that intensive therapy in type 2 diabetes reduced the risk of microvascular complications by 37% and was nearly statistically significant ($P = 0.052$) for macrovascular complications [2]. The question is, how big are the gains in event-free time? In the Diabetes Control and Complications Trial (DCCT), the gain in event-free time in the intensive therapy group was 5.1 years. Although the gains in the current study were more modest—between 6 months and 1 year—they still compare favorably with gains from interventions in other conditions. For example, the gains in treating patients with angiotensin-converting enzyme inhibitors for congestive heart failure and with a β blocker after myocardial infarction range from 2 months to 1.2 years [3].

The authors used primary data rather than modeling, which increases the validity of the study's results. Also, although it will be difficult to extrapolate these results because the reimbursement system, cost of drugs, and hospital stay in England differ from those in the United States, this currently is the most comprehensive cost-effectiveness analysis of intensive management of type 2 diabetes available. Finally, the risks of hypoglycemia were incorporated in the analysis but not modeled individually. The risk for hypoglycemia could affect the results and make intensive therapy less cost-effective due to increased emergency room visits and hospital admissions.

Applications for Clinical Practice

This study provides sufficient evidence to justify using intensive therapy for patients with type 2 diabetes. Intensive therapy is efficacious and cost-effective, and its added costs are offset by the long-term gains. Also, although intensive therapy requires additional monitoring, a previous study showed that more monitoring does not affect patients' quality of life [4].

Some restrictions must be observed when applying the findings from this study. These findings pertain only to patients without microvascular complications and to patients being treated with insulin and sulfonylureas. It remains unclear whether intensive treatment would be cost-effective in patients with established microvascular complications. The new thiazolidinediones rosiglitazone and pioglitazone were not available at the time the study was conducted. These drugs are much more expensive, with a 1-month supply of rosiglitazone costing about $150 on average versus about $20 for insulin.

References

1. Lifetime benefits and costs of intensive therapy as practiced in the diabetes control and complications trial. The Diabetes Control and Complications Trial Research Group [published erratum appears in JAMA 1997;278:25]. JAMA 1996;276: 1409–15.
2. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). UK Prospective Diabetes Study (UKPDS) Group [published erratum appears in Lancet 1999;354:602]. Lancet 1998;352:837–53.
3. Naimark D, Naglie G, Detsky AS. The meaning of life expectancy: what is a clinically significant gain? J Gen Intern Med 1994;9:702–7.
4. Quality of life in type 2 diabetic patients is affected by complications but not by intensive policies to improve blood glucose or blood pressure control (UKPDS 37). UK Prospective Diabetes Study Group. Diabetes Care 1999;22:1125–36.