Intraperitoneal Insulin Pump: A Viable Treatment Option

Glycemic control improved with a surgically implanted pump for intraperitoneal insulin infusion and proved to be superior to that of subcutaneous insulin administration. As presented at EASD by Susan Logtenberg, MD, Diabetes Centre, Isala Clinics, Zwolle, The Netherlands, patients also showed an improved quality of life and increased patient satisfaction with this pump, despite having to undergo an initial surgical procedure.

In type 1 diabetes, the treatment ideal is strict glycemic control. This requires not only vigilance on the part of the health care provider but also a consistent, constant effort on the part of the patient. Despite these combined efforts, glycemic targets often are not met. For such patients, an alternative could be the use of an implantable insulin pump.

A study by Dr. Logtenberg and colleagues compared the effects of continuous intraperitoneal insulin infusion (CIPII) with an implantable pump (MIP 2007C, Medtronic) versus subcutaneous insulin (SC) infusion, either with multiple daily injections or continuous subcutaneous insulin infusion, in a population of 24 poorly controlled type 1 diabetes patients (HbA1c >7.5% or ≥5 hypoglycemic events/week) in a 16-month, open-label, randomized, crossover investigation. Study endpoints were incidence of hypoglycemia (<4.0 mmol/L), HbA1c, and time spent in euglycemia, as measured by a continuous glucose monitoring system.

All study participants had been diagnosed as having type 1 diabetes with a mean duration of more than 20 years, a baseline average HbA1c of 8.6%, and an average of 4 hypoglycemic events per week. Most patients were being maintained with continuous subcutaneous insulin infusion at study inception.

Results showed a superior HbA1c level at 6 months for the CIPII cohort as compared with SC (7.5% vs 8.4%; p=0.02). There was a trend toward fewer hypoglycemic events, with a 13% and 16% decrease in grade 1 and 2 events (glucose <3.5 mmol/L; p=0.07), respectively, with CIPII as compared with SC. The treatment effect of CIPII was strikingly improved as compared with SC in terms of time spent in euglycemia (p=0.002) and hyperglycemia (p=0.03).

In a separate poster presentation (#1107), the same patient cohort was assessed for health-related quality of life (HRQOL) and treatment satisfaction. HRQOL was assessed using the SF-36 and WHO-5 instruments (range 0-100), and satisfaction was gauged with the diabetes treatment satisfaction questionnaire (DTSQ; range 0-36). Assessments were made at baseline and at the end of treatment-crossover intervals.

Results showed that scores for CIPII were significantly higher in 6 of the 8 subscales. The Mental and the Physical component summary scores of the SF-36 also were higher with IP (p=0.005 and p=0.02, respectively). Mean difference in DTSQ score at the end of treatment was 9.3, favoring CIPII (p=0.0004). WHO-5 score also was significantly improved as compared with SC.

Taken together, these 2 datasets show that CIPII, as compared with SC, improves HbA1c levels, increases time in euglycemia, decreases time in hyperglycemia, and is reported by diabetes patients as improving their lives. Yet, as pointed out by Dr. Logtenberg, this approach, available worldwide for over 20 years, primarily is used in only France, Sweden, and The Netherlands.

Highlights from the
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