Title **Insulin pump therapy for type 1 diabetes**

Agency

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Reference

March 2012 (English); ISBN 978-1-897443-82-8 (print); ISBN 978-1-897443-83-5 (online):
http://www.ihe.ca/documents/Insulin%20Pump%20Therapy%20March%202012.pdf

Aim

- To assess the evidence on the safety and effectiveness of insulin pump therapy (IPT), compared with multiple daily injections (MDI), in patients with type 1 diabetes mellitus (T1DM).
- To estimate the economic impact of replacing MDI with IPT for eligible patients with T1DM in Alberta.

A social and system demographic analysis was also conducted.

Conclusions and results

Safety and effectiveness

The evidence indicated that IPT was as safe as MDI in terms of frequency of severe hypoglycemia episodes and diabetic ketoacidosis in adults, children, adolescents, and pregnant women. Both IPT and MDI significantly reduced glycosylated hemoglobin (A1C) compared with baseline levels. However, when compared with MDI, patients using IPT had slightly lower A1C levels. This finding applied across all age groups. Patient satisfaction with treatment was higher with IPT. The studies were generally of short duration (less than 2 years), so long-term outcomes remain undetermined.

The evidence for IPT in pregnancy comprised studies published over 10 years ago. The lack of recent randomized controlled trials made it impossible to examine the safety and efficacy of newer generation insulin pumps and insulin analogs in this subpopulation.

Economic outcomes

Only one of the five economic studies identified provided relevant cost-effectiveness evidence. The study compared IPT with MDI in a highly select group of adults with severe hypoglycemia. It found that the cost per additional quality-adjusted life-year gained was GB£11,461 for IPT users. The authors concluded that IPT was cost-effective when targeted at patients who had more than two severe hypoglycemic events per year and who required inpatient treatment for hypoglycemia at least once every 8 months.

Alberta administrative health data indicated that in 2007 the health service utilization costs related to hospital, outpatient, and physician resources were approximately CA$8,247, CA$715, and CA$149 per patient with T1DM, respectively. The estimated budget impact of switching eligible patients from MDI to IPT was CA$14.6 million over 3 years. The cost per IPT user per year was approximately CA$4,700 in the first year and CA$4,600 in subsequent years. When excluding consumables and considering only the costs associated with the insulin pump, the cost per patient per year was estimated to be CA$5,360 in the first year and CA$5,250 in subsequent years; a total budget impact of CA$16.63 million over 3 years. Adults accounted for 80% of the costs, followed by adolescents at 15%, pregnant women at 3%, and children at 2%.

Recommendations

There were no clinically significant differences between IPT and MDI in terms of the number of severe hypoglycemia episodes or the degree of A1C reduction in any age group, including pregnant women. Therefore, it is unclear whether IPT will reduce secondary complications in patients who switch from MDI to IPT. The cost-effectiveness of IPT relative to MDI is currently unknown.

The research evidence was insufficient to establish appropriate criteria for initiating IPT or to identify appropriate patient subgroups that would benefit clinically from IPT.

Methods

Please refer to the full report for details of the methods.

Further research/reviews required

Patients need to report hypoglycemia in real time, and the lack of standardized and prompt reporting of hypoglycemia presents a methodological limitation for future research. Furthermore, there are no recent studies on pregnant women with T1DM and few studies of MDI users with recurrent severe hypoglycemia or hypoglycemia unawareness, which are two of the primary indications for IPT. Future research should address these limitations.

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