

Insulin Pumps Might Have Slight Advantage Over Shots in Type 1 Diabetes

January 18 2010, By Kurt Ullman

(PhysOrg.com) -- A new evidence review suggests that using a pump to deliver insulin continuously — instead of taking three or more daily injections — might result in better control of blood sugar for people with type 1 diabetes.

“The findings of this review tell us that both continuous subcutaneous insulin infusion and multiple injections correct blood glucose levels. However, [continuous infusion] may be better for reducing harmful fluctuations in blood glucose,” said lead author Marie Misso, Ph.D.

Type 1 diabetes — which used to be known as juvenile diabetes — results when the pancreas is not able to secrete enough insulin, causing the levels of glucose (or sugar) in the blood to rise.

Chronically high blood glucose can lead to heart attacks, circulation problems and blindness. Low levels can lead to unconsciousness and even death. [Type 1 diabetes](#) is one of the most common [chronic diseases](#) of childhood.

Most people with the condition control their glucose by injecting themselves with insulin three or more times per day. Others choose to use a pump, which gives continual, smaller doses of insulin without the discomfort of injections.

“There are numerous studies that evaluate these treatments, but most are of poor quality,” said Misso, a research fellow at the Monash Institute of

Health Services Research in Clayton, Australia. “So there has been uncertainty about which treatment is best for maintaining consistent levels of blood glucose and reducing harmful fluctuations.”

In the new review, Misso and colleagues analyzed the results of 23 studies that assigned 976 adults and children to one of the two interventions randomly. Researchers looked at measures such as levels of [hemoglobin A1c](#) (or HbA1c), a widely used marker for assessing long-term glucose control. They also looked at the incidence of both high and low blood glucose.

The review appears in the latest issue of The Cochrane Library, a publication of the Cochrane Collaboration, an international organization that evaluates medical research. Systematic reviews draw evidence-based conclusions about medical practice after considering both the content and quality of existing medical trials on a topic.

While participants using the insulin pump had significantly lower HbA1c levels than those using multiple daily injections, no differences existed between the two for non-severe low blood glucose levels. However, there appeared to be a reduction in severe incidents of low blood glucose among those using the pump.

“Good evidence is now available to support the use of continuous subcutaneous insulin infusion in the appropriate patient. It is essential to consider adverse events, late complications of diabetes, mortality and cost when deciding whether [a pump] is appropriate for the patient,” Misso said.

For people who likely have to deal with their condition for the rest of their lives, convenience is another consideration that comes into play.

The advantages of using the insulin pump include being able to avoid

possibly painful injections several times a day. In addition, pumps administer the medication without the user having to find a private place to give the injection.

The downside to pump use includes having to wear it like a pager or cell phone throughout the day, concerns about protecting the tubing that goes into the body -- although wireless pumps have recently come on the market -- and worries about breaking the pump during rough play or exposure to water.

Ramin Alemzadeh, M.D., director of the Diabetes Program at the Children's Hospital of Wisconsin in Milwaukee, cautioned that although the researchers reported pumps might improve glucose control overall, pediatric patients should not expect major changes in the longer-term control of [blood glucose](#).

“In our experience, we don't see a significant overall [blood glucose](#) improvement beyond six months or one year of treatment in most children and adolescents. Initially, the patient's HbA1c levels improve, but after a while levels begin to rise and are not significantly different from where they started,” Alemzadeh said. “A patient's diabetes management starts with them and their family. How well they do is independent of which method of insulin administration they use.”

The review discloses that one of the co-authors has received compensation for lectures and advisory board participation from companies who make insulin or [insulin](#) pumps. His department has also received funding for research and educational activities from these companies.

More information: Misso ML, et al. Continuous subcutaneous insulin infusion (CSII) versus multiple insulin injections for type 1 diabetes mellitus. Cochrane Database of Systematic Reviews 2010, Issue 1.

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