Largest study to date finds insulin pumps result in better blood sugar control than multiple daily injections

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Insulin pumps are significantly more effective at controlling blood glucose (sugar) in people with type 2 diabetes who have failed to respond to the usual standard of care, multiple daily insulin injections, according to the largest international study to examine the safety and effectiveness of the pumps to treat type 2 diabetes, published in *The Lancet*.

Type 2 diabetes is usually controlled by diet and medication, but most people with advanced disease also end up needing insulin therapy to achieve control of their blood sugar. However, roughly a third of these patients struggle to achieve the right level of blood sugar control with insulin injections many times a day. The growing obesity epidemic is adding to the problem by leading to greater insulin resistance.

Insulin pumps are portable devices attached to the body which deliver constant amounts of rapid or short acting insulin via a catheter placed under the skin. Previous randomised trials comparing the efficacy of insulin pump therapy and multiple injections in people with type 2 diabetes have not provided consistent evidence, and the benefits of pump therapy continue to be debated.

The OpT2mise trial enrolled 495 adults (aged 30-75 years) with poorly controlled type 2 diabetes to a 2 month run-in period, where their insulin multiple daily injection treatment was optimised. After the run-in phase,

the 331 participants whose HbA1c (glycated haemoglobin; an indicator of blood sugar control over the past 2 or 3 months) remained above the target range (≥ 8.0% and ≤12%) were randomly assigned to pump therapy or to continue with multiple injections.

Pumps outperformed multiple daily injections on several measures. The researchers found that people who used the pumps achieved a significantly greater reduction in average blood sugar levels than those who used multiple daily injections at 6 months (HbA1C difference of -0.7%). Twice as many patients also reached the target range of 8% or less in the pump-therapy group compared with the injection group (55% vs 28%). Patients using the pump also spent on average almost 3 hours less every day in hyperglycaemia (when blood sugar becomes too high).

What is more, the time spent in hypoglycaemia—when blood sugar becomes extremely low—remained similarly low with pump and multiple daily injections. At the end of the study, the daily dose of insulin was 20% lower with pump therapy than with multiple injections and no weight difference was observed in patients from both groups.

According to lead author Professor Yves Reznik from the University of Caen Côte de Nacre Regional Hospital Center, Caen, France, "Pumps enhance effective insulin absorption and increase insulin sensitivity thanks to the continuous daily subcutaneous insulin delivery. Our findings open up a valuable new treatment option for those individuals failing on current injection regimens and may also provide improved convenience, reducing the burden of dose tracking and scheduling, and decreasing insulin injection omissions."

Writing in a linked Comment, Dr Pratik Choudhary from King's College London, UK, says, " OpT2mise provides a compelling case for the clinical effectiveness of insulin pump treatment in type 2 diabetes, suggesting that it can help improve glycaemic control in this difficult to

treat group of patients who are unable to achieve glucose control despite increasing doses of insulin. However, cost effectiveness of pumps in different health-care systems will need to be evaluated."

More information: *The Lancet*, www.thelancet.com/journals/lan … (14)61037-0/abstract

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