

Artificial pancreas may improve overnight control of diabetes in adults

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Two small randomised trials published in the British Medical Journal today suggest that closed loop insulin delivery (also known as an artificial pancreas) may improve overnight blood glucose control and reduce the risk of nocturnal hypoglycaemia (a sudden drop in blood glucose levels during the night) in adults with type 1 diabetes.

The number of people with type 1 diabetes is increasing at a rate of 3% per year, particularly in white northern European populations. Lifelong insulin therapy is needed to control blood glucose levels, but the risk of hypoglycaemia remains a major challenge, especially during the night.

Recent advances have led to the development of a closed loop insulin delivery system that automatically computes insulin dose according to glucose levels detected by a sensor. Previous studies have shown that this system is effective in children and adolescents, but its effectiveness in adults is unknown.

So a team of researchers, led by Roman Hovorka from the University of Cambridge, carried out two studies to compare the safety and efficacy of overnight closed loop insulin delivery with conventional insulin pump therapy in adults with type 1 diabetes.

The group consisted of 24 adults (10 men and 14 women) aged 18-65, who had used insulin pump therapy for at least three months.

In the first study, 12 participants were twice monitored overnight after

consuming a medium sized meal (60 g carbohydrate) at 7pm: they were randomly assigned to use either closed loop delivery of insulin or conventional insulin pump therapy and then, on a night one to three weeks later, they used the other delivery method. In the second study, the other 12 participants were twice monitored overnight (using one or other of the two insulin delivery methods) after consuming a larger meal (100 g [carbohydrate](#)) at 8.30pm, accompanied by alcohol.

The time spent with [blood glucose levels](#) in the target range increased by up to 28% during overnight closed loop insulin delivery. Closed loop delivery also lowered glucose variability overnight and significantly reduced the time spent hyperglycaemic.

These findings provide further evidence that overnight closed loop delivery can operate safely, effectively, and consistently across different age groups, insulin sensitivities, and lifestyle conditions, conclude the authors.

They add that the closed loop system "may in future allow more flexible lifestyles in conjunction with improved glycaemic control for people with type 1 diabetes."

In an accompanying editorial, Professor Boris Kovatchev from the University of Virginia says that, while closed loop control shows promise in a research setting, further development and system miniaturisation is needed in practice to greatly improve the health and lives of people with [type 1 diabetes](#).

Provided by British Medical Journal

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