Overnight home use of artificial pancreas 'feasible and beneficial'

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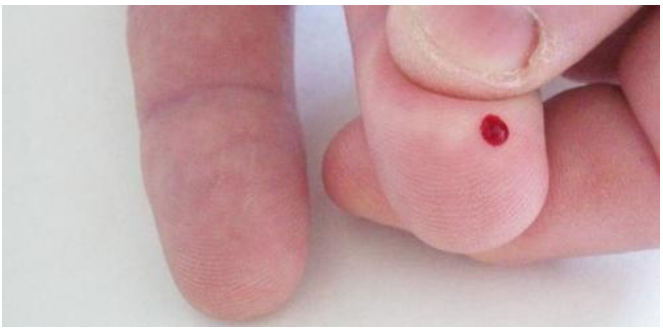

Credit: Alisha Vargas

(Medical Xpress)—Children with type 1 diabetes have been able to use pioneering artificial pancreas technology, developed at the University of Cambridge, for the first time overnight at home without the supervision of researchers.

The artificial pancreas promises to dramatically improve the quality of life for people with type 1 diabetes, which typically develops in childhood. All previous artificial pancreas trials, in hospitals and in home environments, have seen researchers strictly monitor patients. The latest trial, funded by JDRF, has shown for the first time that unsupervised use of the artificial pancreas overnight can be safe. The results of the trial are published today in the journal *Diabetes Care*.

Type 1 diabetes is an autoimmune condition in which the pancreas is unable to produce insulin, a hormone which regulates blood glucose levels. High levels of glucose can seriously damage the body's organs. People with type 1 diabetes currently rely on multiple insulin injections or pump infusions every day; a child diagnosed at the age of five faces up to 19,000 injections and 50,000 finger prick blood tests by the time they are 18.

Participants in the trial, all aged between 12 and 18, saw improved blood glucose control during the trial, experiencing fewer nights with hypoglycaemic episodes, generally known as 'hypos'. A hypo occurs when the blood glucose level of someone living with type 1 diabetes falls dangerously low. Without proper treatment, it may cause unconsciousness and even death.

A real-time information haul of more than 10,000 UK residents with type 1 diabetes, released to JDRF from the mySugr app, suggests that UK people living with the condition experience an average of ten hypos per week.

Actor Jeremy Irvine, star of the Stephen Spielberg film War Horse, has lived with type 1 diabetes since the age of six. He said: "When the chance came for me to take part in early artificial pancreas trials a few years ago, I jumped at the opportunity. I wanted to play my own very small part in moving the artificial pancreas closer to reality. I'm really excited to hear of this latest progress – the scientists behind it are my heroes."

Dr Roman Hovorka from the University of Cambridge, who is leading the UK effort to develop an effective artificial pancreas, said: "The study is an important stepping stone for the wider use of an artificial pancreas. We have shown that overnight home use is feasible and beneficial – allowing people to live their life more freely.

"The artificial pancreas is expected to transform the treatment of type 1 diabetes and we have proven that this promise holds. The success of this trial means that larger and longer studies are already in the pipeline."

Katharine Barnard, from the Human Development and Health Academic Unit at the University of Southampton, worked with Dr Hovorka on the trial to evaluate psychosocial impact. She said: "Hypoglycaemia – particularly at night – is a common fear among those living with type 1

diabetes and a major obstacle in achieving optimal blood glucose levels. The findings from this study are positive and are certainly worth investigating further.

"Reassurance, confidence and improved diabetes control are just some of the psychological and physical benefits that patients may witness as artificial pancreas technology continues to develop."

More information: Roman Hovorka, Daniela Elleri, Hood Thabit, Janet M. Allen, Lalantha Leelarathna, Ranna El-Khairi, Kavita Kumareswaran, Karen Caldwell, Peter Calhoun, Craig Kollman, Helen R. Murphy, Carlo L. Acerini, Malgorzata E. Wilinska, Marianna Nodale, and David B. Dunger. "Overnight Closed-Loop Insulin Delivery in Young People With Type 1 Diabetes: A Free-Living, Randomized Clinical Trial." *Diabetes Care* May 2014 37:5 1204-1211; DOI: 10.2337/dc13-2644 1935-5548