

Pickup J C, Keen H, Parsons J A & Alberti K G M M. Continuous subcutaneous insulin infusion: an approach to achieving normoglycaemia.

Brit. Med. J. 1:204-7, 1978.

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London; Chemical Pathology and Human Metabolism Unit, General Hosp., Southampton, England]

We examined the feasibility of achieving near-normoglycaemia in type 1 diabetic patients by giving a continuous subcutaneous infusion of insulin using a variable-rate, portable syringe pump. In most of the 12 diabetics, good control was demonstrated over the 24 hours of the study. [The *SCI*® indicates that this paper has been cited in over 235 publications.]

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In the summer of 1973 I held a Biochemical Society Travelling Fellowship at the Endocrine Unit, Massachusetts General Hospital, and met there a fellow Englishman, John Parsons, who was a regular visitor and collaborator with the Boston unit. Like myself, Parsons had read medicine at Oxford and had developed an interest in hormone pharmacology while researching in the University Department of Pharmacology. Three years later, when I was seeking a research post in this field, Parsons put me in touch with Harry Keen at Guy's Hospital in London, who was interested in trying to improve metabolic control in diabetic patients.

I joined Keen's unit in late 1976 and was allotted the task of developing for human use a portable, battery-powered syringe pump that had been designed, built, and used at the National Institute for Medical Research at Mill

Hill by Parsons and others for controlled infusion of parathyroid hormone in animals. Keen proposed that insulin might be given via the pump at a slow basal rate with augmented mealtime supplements, as Gerard Slama and colleagues¹ had done a couple of years before with intravenous (IV) insulin infusion. But to prevent the risk of thrombosis and infection associated with IV administration, we would implant the delivery cannula in the subcutaneous tissue.

This was our first full-length paper on continuous subcutaneous insulin infusion (CSII), and we reported the results in 12 diabetics studied for 24 hours on injection therapy and 24 hours on CSII, where control was mostly markedly improved.

The purpose of the study, and other early papers, is frequently misunderstood. It was not meant to develop a new way of routinely treating diabetic patients but, rather, to find a way of achieving long periods of strict metabolic control in insulin-dependent diabetics to compare with "ordinary" levels of control and so test the relationship between control and microvascular disease.

The paper may be widely cited for several reasons. It was the first description of the technique of CSII, which, in spite of its experimentally oriented origins, has become a routine treatment modality for some thousands of diabetics, particularly in North America. Large-scale clinical trials have indeed used CSII to examine the links between diabetic control and microangiopathy.^{2,4} On a pharmacological note, I think the work demonstrated the power of mimicking physiological hormone secretion patterns by controlled drug delivery. There is no doubt, too, that the success of CSII set new standards of diabetic control and encouraged others to try harder with ordinary insulin injections in alternative "intensified" insulin regimens.

Sadly, Parsons died in a road traffic accident in 1981.

1. Slama G, Hautcouverture M, Assan R & Tchobroutsky G. One to five days of continuous intravenous insulin infusion on seven diabetic patients. *Diabetes* 23:732-8, 1974. (Cited 115 times.)
2. Kroc Collaborative Study Group. Blood glucose control and the evolution of diabetic retinopathy and albuminuria: a preliminary multicenter trial. *N. Engl. J. Med.* 311:365-72, 1984.
3. Lauritzen T, Frost-Larsen K, Larsen H-W, Deckert T & the Steno Study Group. Effect of 1 year of near-normal blood glucose levels on retinopathy in insulin-dependent diabetics. *Lancet* 1:200-4, 1983. (Cited 130 times.)
4. DCCT Research Group. Diabetes Control and Complications Trial (DCCT): results of feasibility study. *Diabetes Care* 10:1-19, 1987.