



Closed-loop driven by control-to-range algorithm outperforms threshold-low-glucose-suspend insulin delivery on glucose control albeit not on nocturnal hypoglycaemia in prepubertal patients with type 1 diabetes in a supervised hotel setting

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Auteur	Renard, Eric [1], Tubiana-Rufi, Nadia [2], Bonnemaïson-Gilbert, Elisabeth [3], Coutant, Régis [4], Dalla-Vale, Fabienne [5], Farret, Anne [6], Poidvin, Amélie [7], Bouhours-Nouet, Natacha [8], Abettan, Charlotte [9], Storey-London, Caroline [10], Donzeau, Aurelie [11], Place, Jerome [12], Breton, Marc D [13]
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Résumé en anglais	This randomized control trial investigated glucose control with closed-loop (CL) versus threshold-low-glucose-suspend (TLGS) insulin pump delivery in pre-pubertal children with type 1 diabetes in supervised hotel conditions. The patients [n = 24, age range: 7-12, HbA1c: 7.5 ± 0.5% (58 ± 5 mmol/mol)] and their parents were admitted twice at a 3-week interval. CL control to range or TLGS set at 3.9 mmol/L were assessed for 48 hour in randomized order. Admissions included three meals and one snack, and physical exercise. Meal boluses followed individual insulin/carb ratios. While overnight (22:00-08:00) per cent continuous glucose monitoring (CGM) time below 3.9 mmol/L (primary outcome) was similar, time in ranges 3.9 to 10.0 and 3.9 to 7.8 mmol/L and mean CGM were all significantly improved with CL (P < 0.001). These results were confirmed over the whole 48 hour. Disconnections between devices and limited accuracy of glucose sensors in the hypoglycaemic range appeared as limiting factors for optimal control. CL mode was well accepted while fear of hypoglycaemia was unchanged. CL did not minimize nocturnal hypoglycaemia exposure but improved time in target range compared to TLGS. Although safe and well-accepted, CL systems would benefit from more integrated devices.
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Liens

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