LONG-TERM REAL-WORLD OUTCOMES OF HYBRID CLOSED-LOOP THERAPY IN ADULTS WITH TYPE 1 DIABETES IN THE UK

A.L. Liarakos[1,2], T.S.J. Crabtree[1,2], T.P. Griffin[3], Y.W. Yap[4], P. Narendran[5,6], M. Karamat[7], G. Gallen[8], S. Hussain[9,10], J. Elliott[11,12], L. Leelarathna[13], A. Lumb[14,15], R.E.J. Ryder[16], P. Choudhary[3,17], E.G. Wilmot[1,2]

1. University Hospitals of Derby and Burton NHS FT, Derby, UK; 2. University of Nottingham, Nottingham, UK; 3. University of Leicester, Leicester, UK; 4. Aintree University Hospital, Liverpool, UK; 5. Queen Elizabeth Hospital, Birmingham, UK; 6. University of Birmingham, Birmingham, UK; 7. Heartlands Hospital, Birmingham, UK; 8. King's College Hospital NHS FT, London, UK; 9. Guy's and St. Thomas' NHS FT, London, UK; 10. King's College London, London, UK; 11. Royal Hallamshire Hospital, Sheffield, UK; 12. University of Sheffield, Sheffield, UK; 13. Manchester Royal Infirmary, Manchester, UK; 14. Oxford Center for Diabetes Endocrinology and Metabolism, Oxford, UK; 15. National Institute for Health and Care Research, Oxford Biomedical Research Center, Oxford, UK; 16. City Hospital, Birmingham, UK; 17. Leicester Diabetes Center, Leicester, UK.

Background and aims:

The National Health Service (NHS) England adult hybrid-closed loop (HCL) pilot provided access to HCL for people attending adult diabetes services with a diagnosis of type 1 diabetes (T1D), managed with an insulin pump and intermittently scanned continuous glucose monitoring, with an HbA1c ≥ 8.5% (69 mmol/mol). We aimed to assess longitudinal changes in glycaemic and patient-reported outcomes in this population.

Materials and methods:

Anonymised clinical data were submitted to a secure web-based tool within the NHS network in a platform designed by the Association of British Clinical Diabetologists. HbA1c, sensor glucometrics, diabetes distress scale (DDS) score and Gold score (hypoglycemia awareness) changes between baseline and follow-up were assessed. Analysis was performed using SpSS 28.0.

Results:

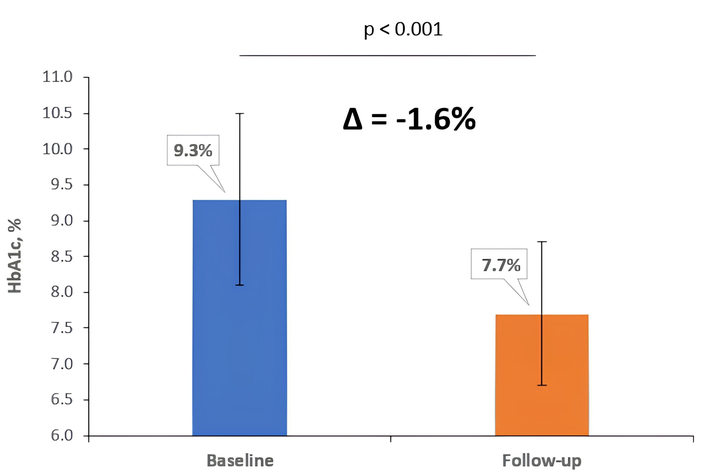
- Over a median follow-up of 20.4 months (IQR 15.6-22.8), 150 adults from 12 centers with paired baseline and follow-up HbA1c data available were included.
- Baseline characteristics: 64.7% female; 90.7% White; median age 38 years (IQR 29–51), diabetes duration 20 years (IQR 13–27), baseline HbA1c 9.3 ± 1.2% (78.5 ± 13.2 mmol/mol)
- Glycaemic outcomes (Table 1):
- HbA1c reduced by 1.6% (-17.1 mmol/mol) (P <0.001) (Figure 1) and time in range (TIR) (3.9–10.0 mmol/L) increased by 24.4% at follow-up (P <0.001) (Figure 2).
- 17.3% (26/150) achieved HbA1c <7.0% (53 mmol/mol) at follow-up. At baseline, 2.7% of our cohort met the internationally recommended target of >70% TIR, increasing to 36.3% (41/113) at follow-up (P <0.001).
- Patient-reported outcomes (Table 1):
- DDS score reduced by 1.4 points (P <0.001).
- Gold score decreased by 0.6 points (P <0.001).
- Gold ≥4 was reported in 23.7% of participants at baseline vs. 7.9% at follow-up (P = 0.004).

Table 1. Baseline and follow-up HbA1c, continuous glucose monitoring metrics and patient-reported outcomes

	N	Baseline	Follow-up	Change (95% CI)	p
HbA1c, mmol/mol	150	78.5 ± 13.2	61.4 ± 10.7	-17.1 (-15.4, -18.9)	<0.001
HbA1c, %	150	9.3 ± 1.2	7.7 ± 1.0	-1.6 (-1.4, -1.7)	<0.001
Time above range, level 2 (>13.9 mmol/L), % †	109	34.2 ± 19.3	13.6 ± 9.6	-20.6 (-17.0, -24.3)	<0.001
Time above range, level 1 (10.1–13.9 mmol/L), % †	107	25.5 ± 11.5	22.8 ± 8.7	-2.7 (0.06, -5.4)	0.06
Time in range (3.9–10.0 mmol/L), % †	113	37.7 ± 15.9	62.1 ± 13.5	24.4 (21.5, 27.3)	<0.001
Time below range, level 1 (3.0–3.8 mmol/L), % †	111	2.0 ± 2.6	1.1 ± 1.6	-0.9 (-0.4, -1.4)	0.001
Time below range, level 2 (<3.0 mmol/L), % †	114	0.5 ± 1.4	0.2 ± 0.5	-0.3 (-0.1, -0.6)	0.005
Coefficient of variation, % †	87	38.1 ± 8.6	34.4 ± 7.8	-3.7 (-1.4, -6.0)	0.002
Gold score	76	2.4 ± 1.7	1.8 ± 1.3	-0.6 (-0.3, -0.9)	0.001
Diabetes distress scale score	55	3.2 ± 1.4	1.8 ± 0.9	-1.4 (-1.0, -1.7)	<0.001

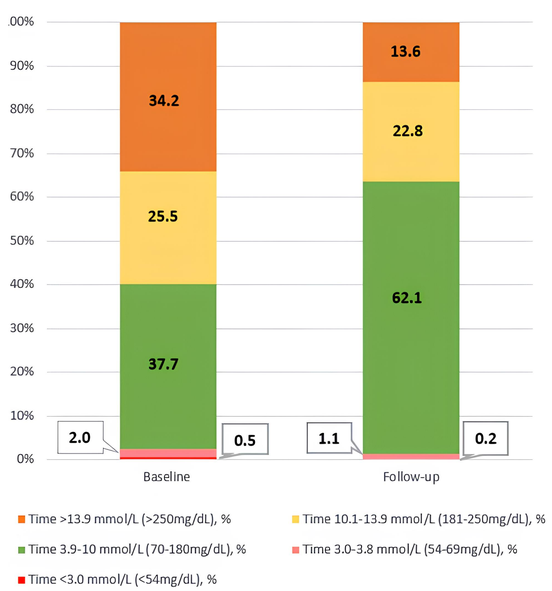
Data are mean ± SD. †Data derived from intermittently scanned continuous glucose monitoring (CGM) at baseline and real-time CGM at follow-up.

Figure 1. HbA1c (%) at baseline and follow-up



The error bars indicate standard deviation.

Figure 2. Sensor metrics at baseline and follow-up



Conclusion:

HCL therapy is associated with long-term improvements in HbA1c, TIR, hypoglycaemia and diabetes-related distress in adults with T1D in the real world.

Association of British Clinical Diabetologists

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