

Safety and effectiveness of Do-It-Yourself Artificial Pancreas System (DIYAPS) compared with continuous subcutaneous insulin infusions (CSII) in combination with Free Style Libre (FSL) in people with Type 1 diabetes

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Abstract

The use of do-it-yourself artificial pancreas systems (DIYAPS) amongst people with type 1 diabetes is increasing. At present, it is unclear DIYAPS compares to other technologies such as FreeStyle Libre (FSL) and continuous subcutaneous insulin infusion (CSII).

The aim of this analysis is to compare safety, effectiveness and quality of life outcomes of DIYAPS use with the addition of FSL to CSII.

Method

Data from two large UK hospitals were extracted from the Association of British Clinical Diabetologists (ABCD) DIYAPS and FSL audits. Outcomes included HbA1c, glucose TBR (time-below-range), TIR (time-in-range), Diabetes Distress Scores (DDS) and Gold hypoglycaemia Score. Any adverse events were noted. Changes at follow-up were assessed using paired t-tests and ANOVA in Stata; TIR/TBR at follow-up assessed using unpaired T-Tests; Chi-square tests assessed the change in frequency of health utilisation (e.g. hospital admissions).

Results

DIYAPS (n=35) and FSL+CSII (n=149) users, with median follow-up duration of 1.4 (IQR 0.8-2.1) and 1.3 (IQR 0.7-1.8) years respectively, were included. HbA1c with DIYAPS use changed by -10mmol/mol [0.9%] ($p<0.001$, 95% CI 5, 14 [0.5, 1.3%]) significantly lower ($p<0.001$) than in the FSL+CSII group -3 mmol/mol [0.25%] ($p<0.001$, 95% CI 1, 4 [0.1, 0.4%]). TIR was higher and TBR was lower in the DIYAPS group. Adverse events were rare in both groups and no significant differences were observed in the frequency of healthcare utilisation.

Conclusion

DIYAPS use was associated with a lower HbA1c levels, higher TIR and lower TBR compared to FSL+CSII. There was no significant increase in adverse events, although this should be interpreted cautiously given the low numbers of users. Full results from the ABCD DIYAPS audit are awaited.