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EXPERIENCE WITH CONTROL-IQ TECHNOLOGY: THE IMPERIAL COLLEGE LONDON PILOT STUDY

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INTRODUCTION
The t:slim X2 insulin pump with Control-IQ (CIQ) technology is one of the hybrid closed-loop systems available in the United Kingdom. We aimed to explore the benefits of CIQ technology in people with type 1 diabetes (PwT1D) in real-world practice.

METHODOLOGY
A retrospective review of persons with type 1 diabetes mellitus age ≥18 years old using the t:slim X2 insulin pump with CIQ technology who attended the diabetes service at Imperial College London NHS trust was performed. Clinical characteristics were obtained from the electronic health records (Cerner Corporation). Continuous glucose monitoring (CGM) data were collected from web-based platforms including Libre View and Dexcom Clarity. Ambulatory glucose profiles of 28 days before and after CIQ technology use were compared.

RESULTS
Data from 214 persons with type 1 diabetes mellitus were assessed for eligibility. Since 2020, 72 patients have used the t:slim X2 insulin pump with CIQ technology. The median (IQR) age at CIQ initiation was 36.4 (19.1,47.9) years, and the median (IQR) diabetes duration was 18.8 (9.4,31.6) years. Among the 72 patients, 41 patients had paired CGM data before and after CIQ technology use with 15 months of follow-up. Before using CIQ technology, 38 of 41 (92.7%) patients used insulin pump therapy, and 14 of 41 (36.8%) patients used a predictive low-glucose suspend insulin pump. The mean HbA1c before CIQ initiation was 7.4 ± 1.2%. After CIQ technology use, mean ± SD %time within 70-180 mg/dL increased from 60.2 ± 16.5% to 68.2 ± 15%, $p = 0.001$. There was a significant decrease in % time >180 mg/dL [median (IQR) 35.1 (21.7,46.1) vs. 26.5 (15.2,41.8), $p = 0.003$] and % time >250 mg/dL [6.3 (3.6,19.4) vs. 4.9 (1.9,14.8), $p = 0.025$]. There was no significant change in % time <70 mg/dL [median (IQR) 1.9 (0.8,3.6) vs. 1.4 (0.6,2.8), $p = 0.058$], % time. <54 mg/dL [0.2 (0.04,0.56) vs. 0.2 (0.08,0.71, $p = 0.834$], and % coefficient of variation (36.8 ± 6.7 vs. 35.3 ± 5.3, $p = 0.072$).

CONCLUSION
In real-world practice, CIQ technology led to further improvement in the percentage of time in the target range with no increase in hypoglycemic events.

KEYWORDS
hybrid closed-loop system, automated insulin delivery, t:slim X2 insulin pump, control-IQ