The change in glycaemic control immediately after COVID-19 vaccination in people with type 1 diabetes

Since the first weeks of the COVID-19 vaccination programme in the UK and elsewhere, there have been reports from patients with insulin-treated diabetes of changes in blood glucose profile in the days after the vaccination. In a study published in December 2021 in the journal *Diabetic Medicine* (Heald et al, 2021), we have validated this observation, which has also been noted by many clinicians over the last 12 months.

Facilitated by flash glucose monitoring technology (Pickup et al, 2011), the team examined the interstitial glucose profile of 97 consecutive adults with type 1 diabetes in the periods immediately before and after their first COVID-19 vaccination. The primary outcome measures were the percentage of interstitial glucose readings within the target range of 3.9–10 mmol/L (time in range; TIR) in the 7 days prior to the vaccination and 7 days after the vaccination.

Overall, 58% of participants showed a reduction in TIR the week after COVID-19 vaccination. Importantly, one in three individuals had a >10% reduction in TIR, and one in ten showed a decrease of >20%. The mean change in TIR in the week following vaccination was most pronounced for people taking metformin or dapagliflozin in addition to a basal–bolus insulin regimen (change in TIR, –7.6%) and for those below the median HbA$_{1c}$ of 56 mmol/mol (7.6%) pre-vaccination (change in TIR, –5.7%).

One possible mechanism for the temporary change in blood glucose profile described here is stimulation of the immune system, resulting in a transient stress response, to a milder degree than would typically occur with a COVID-19 infection. Such physiological stress has the potential to increase counter-regulatory hormone levels for some days and has been noted previously (Mifsud et al, 2018).

The authors suggest that further investigation in a larger, multi-site patient series would be helpful in elucidating this phenomenon further. Individual patient knowledge and engagement remain cornerstones of diabetes management. The results here raise the question of whether people with type 1 diabetes should be given specific advice in advance of any further COVID-19 vaccinations, including the current booster programme, regarding potential temporary effects on their blood glucose control. ■

Heald AH, Stedman M, Horne L et al (2021) The change in glycaemic control immediately after COVID-19 vaccination in people with type 1 diabetes. *Diabet Med* 22 Dec: e14774 [Epub ahead of print]
Mifsud S, Schembri EL, Gruppetta M (2018) Stress-induced hyperglycaemia. *Br J Hosp Med (Lond)* **79**: 634–9
Pickup JC, Freeman SC, Sutton AJ (2011) Glycaemic control in type 1 diabetes during real time continuous glucose monitoring compared with self monitoring of blood glucose: meta-analysis of randomised controlled trials using individual patient data. *BMJ* **343**: d3805

Click here to read the study in full

Adrian Heald
Salford Royal NHS Foundation Trust and University of Manchester

Linda Horne
Vernova Healthcare, Macclesfield

Simon G Anderson
School of Medicine and Manchester Academic Health Sciences Centre, University of Manchester

J Martin Gibson
Salford Royal NHS Foundation Trust and University of Manchester