

# Improved patient outcomes facilitated by C-peptide testing, enabling reclassification and therapeutic changes for patients with diabetes

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Early diagnosis and intervention for diabetes (type 1 and 2) is critical for improving outcomes and mitigating complications. Despite clear cut diagnostic criteria for type 2 diabetes (T2DM), current diagnosis of type 1 diabetes (T1DM), which is characterized by deficient insulin production, is based on imprecise clinical criteria, and clinical judgement at presentation. This can result in potential misclassification of diabetes type, with patients on insulin indefinitely. While the benefits of insulin are vast, unnecessary use can have long lasting, detrimental effect on patients. The combination of unfavourable potential impact of insulin on patients, coupled with recent advances in T2DM management, which can delay or replace insulin therapy, further highlight the need for early and accurate distinction of T1DM versus T2DM to guide optimal therapy.

C-peptide is a biomarker of insulin reserve and can be used as an indicator that a patient may not have T1DM, with the potential to stop or reduce insulin treatment. Thus, an integrated clinical care team at University Hospital of Wales sought to re-evaluate patients with previously diagnosed T1DM using C-peptide measurement to potentially reclassify them as T2DM or monogenic diabetes. This reclassification enables subsequent modification of treatment and potential for improved quality of life (QOL) through insulin cessation. A C-peptide concentration  $>200$  pmol/L is used to prompt further evaluation using a diagnostic algorithm. Improvement in glycaemic control (HbA1c), BMI, quality of life (QoL) and cost savings were evaluated.

Since implementation in April 2022, 324 patients have been evaluated for reclassification. Of which, 49 (15%) patients were identified with a C-peptide level of  $>200$  pmol/L. 38 (11.7%) of which were reclassified with T2DM, with another 11 patients (3.4%) awaiting reclassification and monogenic diabetes results. Among the reclassified individuals, 17 individuals (5.2% of the initially evaluated cohort) stopped their insulin completely, with addition of co-therapies. HbA1c improved by 10mmol/mol ( $p < 0.01$ ) & BMI reduced by  $6\text{kg/m}^2$  ( $p < 0.05$ ) in the off-insulin cohort. Additionally, self-reported QoL improved in 15 patients. Lastly, our cost evaluations indicate £1602/patient/year in savings, attributed to reduced treatment and glucose monitoring.

Thus, strategic incorporation of C-peptide testing into clinical practice to establish precise diagnosis of diabetes has enabled a patient-centered treatment approach, with safe and effective withdrawal of insulin, enhancing QOL for patients.



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