REVIEW ARTICLE

The clinical utility of C-peptide measurement in diagnosis and management of diabetes

Khaleda Akter[1], Nasima Sultana[2], Nadia Zebin Khan[3],

ABSTRACT

Impaired beta-cell function is a recognized corner stone of diabetes pathophysiology. Estimates of insulin secretory capacity are useful to inform clinical practice, helping to classify types of diabetes, complication risk stratification and to guide treatment decisions. Measurement of insulin secretion using C-peptide can be helpful in clinical practice: differences in insulin secretion are fundamental to the different treatment requirements of Type 1 and Type 2 diabetes. This article reviews the use of C-peptide measurement in the clinical management of patients with diabetes, and its use to assist diabetes classification and choice of treatment.

INTRODUCTION

C-peptide is the part of proinsulin which is cleaved prior to co-secretion with insulin from pancreatic beta cells. Produced in equimolar amounts to endogenous insulin, it is not a product of therapeutically administered exogenous insulin and has been widely used as a measure of insulin secretion.[1] Patients with T1DM lack both insulin and C-peptide whereas patients with T2DM initially produce high amounts of insulin and C-peptide, and these levels vary as the disease progresses.[2,3]

C-peptide has almost five-times longer half-life than insulin and half of all insulin secreted by the pancreas is metabolized in the liver by first-pass metabolism, whereas c-peptide has negligible hepatic clearance. C-peptide is cleared in the peripheral circulation at a constant rate, whereas insulin is cleared variably making direct measurement less consistent.[4]

Assessment of endogenous insulin secretion by measuring plasma C peptide is widely accepted. As it is unaffected by exogenous insulin, so it accurately measures native insulin production and HbA1c does not give this information.[5] HbA1c only shows average blood glucose over 3 months whereas C-peptide reflects how much insulin the pancreas is producing.[6]

In the current article the clinical relevance of C-peptide is reviewed, with an emphasis on the renewal of interest in its measurement and how it can assist the clinician in the management of patients. This article is based on previously conducted studies and does not involve any new studies of human or animal subjects performed by any of the authors.

METHODOLOGY

References for this review were identified through searches of PubMed for articles published up to November 2025, by use of the following keywords alone or in combination: 'C-peptide', 'proinsulin', 'insulin', 'type 1 diabetes', 'autoimmune diabetes', 'type 2 diabetes', and 'complications'. Only articles published in English were included. Articles were also identified through searches in the authors' personal files. Articles resulting from these searches and relevant references cited in those articles were reviewed.

ETHICAL CONSIDERATIONS

This study did not require ethical approval, as it synthesized data from previously published research. No human participants were directly involved in the research process. We ensured that data extracted from primary studies was aggregated to maintain privacy.

Authors 1. Dr. Khaleda Akter, Asssistant Profesor, Dept. of Biochemistry, BIRDEM Academy 2. Prof.Dr. Nasima Sultana, Professor & HOD, Dept. of Biochemistry, BIRDEM Academy 3. Dr. Nadia Zebin Khan, Associate Professor, Dept. of Biochemistry, BIRDEM Academy Address of correspondence: Dr. Khaleda Akter, Asssistant Profesor, Dept. of Biochemistry, BIRDEM Academy, email: khaledapia@gmail.com, Phone:+8801710483835