Role of Urine C-Peptide Creatinine ratio in the management of Diabetes.

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Introduction:
C-Peptide is produced in equal amounts to insulin and is the best measure of endogenous insulin secretion. With the rise in prevalence of Type 2 DM and increasing recognition of monogenic subtypes of diabetes (MODY) in younger patients, the measurement of insulin secretion is relevant in clinical practice. (2) C-Peptide level must be interpreted with caution in renal failure, approximately half of C-Peptide produced is removed by kidney.

Methodology:
This audit aims to review whether urine C-Peptide measurement helped in the management of adult and paediatric patients with diabetes. It was retrospective study. We found that 38 patients had UCPCR test, from 01/01/2012 to 31/12/2013 (2 years).We did not address the use of C-Peptide in the assessment of hypoglycaemia.

Results:
The analysis of data showed that it helped in management plan for 36 patients and confirmed diagnosis in 30 patients. All the 38 patients had renal function checked before this test. All normal except one with eGFR 58. We found that 5 patients had deranged LFTs pre UCPCR test. UCPCR was requested once only for all patients.19 patients had auto antibodies checked and one patient had genetic testing for MODY. 25 patients had UCPCR measured within 5 year of diagnosis and 13 patients, after 5 years of diagnosis.

Conclusions:
Utility is greatest in the long standing diabetes as there may be overlap of C-Peptide levels between 2 types at the time of Diagnosis. In type 1 Diabetes, insulin/c-peptide levels rapidly fall, therefore utility of this test increases from 3 to 5 years post diagnosis. (1)

This test is helpful to differentiate between MODY and Type 1 DM, as persistence of C-Peptide level is an important feature of MODY. (5).

The awareness that a patient has absolute insulin deficiency (low c-peptide level) is important to clinical management and determining prognosis. (4).

It may be helpful to diagnose adult patients presenting with DKA, who do not have classical Type 1 diabetes (ketosis prone Diabetes) and may not require long term insulin treatment.

C-Peptide may help to identify insulin treated patients with sufficient Beta cell function to replace insulin with other oral hypoglycaemic agents.(5). There may be an additional role to exclude severe insulin deficiency prior to addition of sulphonylureas and GLP-1 agonist to insulin.

Key Message:
If c-peptide level taken within the first few years of diagnosis, may be useful in confirming Type 1, however higher results should be interpreted with caution.

References:

1)Besser RE, Ludvigsson J, Jones AG, McDonald TJ, Shields BM, Knight BA et al. Urine C-peptide creatinine ratio is a noninvasive alternative to the mixed-meal tolerance test in children and adults with type 1 diabetes. Diabetes Care 2011; 34: 607–609.

2)Besser RE, Ludvigsson J, Jones AG, McDonald TJ, Shields BM, Knight BA et al. Urine C-peptide creatinine ratio is a noninvasive alternative to the mixed-meal tolerance test in children and adults with Type 1 diabetes. Diabetes Care

3)Ludvigsson J, Carlsson A, Forsander G, Ivarsson S, Kockum I, Lernmark A et al. C-peptide in the classification of diabetes in children and adolescents. Pediatr Diabetes 2012; 13: 45–50.

4)Sari R, Balci MK. Relationship between C peptide and chronic complications in type-2 diabetes mellitus. J Natl Med Assoc 2005; 97: 1113–1118.

5)The clinical utility of C-peptide measurement in the care of patients with diabetes-A. G. Jones[1,2] and A. T. Hattersley[1,2](Diabetes UK13)