Diabetes

Indications

Diabetes is a condition affecting approximately 3.9 million people in the U.K. This figure has doubled since 1996, and it is estimated the figure will be more than 5 million by 2025. [1] Of the two main types of diabetes, type 2 diabetes is more common. In the U.K. approximately 90% of cases are type 2.[1] Type 1 characterised by the body's immune system attacking the cells that produce insulin, type 2 by not enough insulin being produced or the body becoming resistant to it. [1] The lack of insulin leads to increased blood sugar levels.

Pre-Diabetes
It is thought that many more people may have above normal blood sugar levels, but not high enough to be diagnosed as diabetes. [2] This is sometimes referred to as pre-diabetes or metabolic syndrome [3], and can increase the risk of developing diabetes in the future. [1]

Diagnosis
The diagnosis of diabetes can be made from a range of tests; a urine test, a glucose tolerance test (GTT), and a glycosylated haemoglobin test (HbA1c) which measures average blood glucose over the past 2-3 months. [2] A HbA1c test can also help to indicate the risk level of developing type 2 diabetes.[2] A result of 6.5% (or 48mmol/mol) indicates type 2 diabetes, and 6-6.4% (or 42-47 mmol/mol) indicates high risk. [2] These tests can be arranged via a GP to individuals displaying diabetes symptoms, and the HbA1c test will often be offered as part of a health screening programme.

Post Diagnosis
Type 2 diabetes especially is now a prevalent and costly chronic illness, but all forms of diabetes need effective monitoring and management.[4] Regular management of blood glucose and blood lipid levels is required to prevent complications.[4] [5] These complications can include neuropathy, nephropathy, retinopathy and cardiovascular disease.

Recommended Tests

Blood Glucose (HbA1c (Glycosylated Haemoglobin)
In suspected cases of blood sugar control problems, or for on-going management of diagnosed diabetes/pre-diabetes, an HbA1c test is recommended. In 2011, the World Health Organisation recommended this test for people who are not known to have diabetes [2 NHS), and has been accepted as a diagnostic test for type 2 diabetes.[4]

Vitamin Profile (A, C, E and B1, B2 and B6).
Low intakes of vitamins and minerals are considered risk factors.[6] Vitamins C and E are good for treatment or prevention of diabetes.[7] Vitamin C reduces oxidative stress and inflammation, improving endothelial dysfunction in type 1 diabetes.[8]

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It has been shown that long term treatment with Metformin could increase the risk of vitamin B12 deficiency, [9] so the Vitamin Profile – Comprehensive Test, which includes B12 (and vitamin D), may be a better option for those taking this medication.

[Sample requirements: clotted blood tube (gold top) for fat soluble vitamins & C (and B12 if required), heparin (green top) for vitamins B1, B2 & B6]

Minerals Profile with RBC Magnesium

Higher magnesium intake may reduce diabetes risk.[10] Deficiency or efficiency of other minerals (Copper, Chromium, Manganese, Iron, and Zinc) may also play a role in the development of diabetes. [11]. The primary utilisation of chromium in human metabolism is for glucose tolerance.
[Sample requirement: Trace element free plasma (navy blue top tube), heparin [green top] and clotted blood tube (gold top)]

Antioxidant Activity - Total

Oxidative stress is increased in diabetes [12][8] It appears to be a deleterious factor leading to insulin resistance, dyslipidemia, impaired glucose tolerance and the development of type 2 diabetes.[12] Levels of antioxidants should be assessed.
[Sample requirement: clotted blood tube (gold top)]

Fatty Acid Profile

Inflammation is thought to play an important role in type 2 diabetes.[13] Consumption of certain omega-3 fatty acids can alleviate inflammation,[14][15] and is associated with improved biomarkers of type 2 diabetes.[3] Omega-3 has been shown to improve insulin sensitivity in clinical trials.[16] A full profile of the fatty acids is recommended.
[Sample requirement: EDTA (lavender top)]

Patient preparation

Patients should avoid mineral and vitamin supplements for 24-48 hours prior to having samples collected for above tests that cover these micronutrients.

Turn around time

Typically 5-7 working days for all of the above tests.

Advisory note:

This guide to a disease specific recommended panel of tests, lists those nutritional & biochemical pathology investigations that are justified in current medical literature and which may be appropriate for some individuals. These are guidelines only and individual requirements will vary depending on multiple factors (diet, use of nutritional supplements, food exclusions etc).

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