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An Introduction to Type 2 Diabetes

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Type 2 diabetes should not be viewed as a less severe version of type 1 as it is a highly malignant condition with 50% of affected individuals dying within 10 years of the diagnosis. This chapter however is specifically short as the treatment of type 2 diabetes is extensively covered in other chapters in this book, specifically chapters 2, 3 and 8, which cover obesity management, counselling and exercise.

A major contributing factor to the development of Type 2 diabetes is body weight and the incidence of type 2 diabetes begins to rise at a BMI of 23 kg/m^2. Type 2 diabetes is increasing worldwide in parallel with the increase in the numbers of people who are overweight or obese. Those populations with the greatest genetic predisposition for Type 2 diabetes are the populations most vulnerable to the environmental and behavioural changes that cause obesity and physical inactivity.

The UK Prospective Diabetic Study (UKPDS) demonstrated that Type 2 diabetes is a progressive disease characterised by a progressive loss of b-cell function. With time there is an inevitable loss of glycaemic control. Different treatment modalities are required at different times in the natural history of type 2 diabetes with insulin treatment frequently required after ten years. The UKPDS demonstrated that with good glycaemic control the microvascular complications of Type 2 diabetes could be reduced (1).

DIETARY GOALS

Reflecting the aims in chapter 1 dietary recommendations for type 2 can be simply broken down as follows

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- A regular meal pattern
- Starchy carbohydrate in each meal/snack, especially low glycaemic index carbohydrate
- A reduction in total fat intakes, replacing saturated fat with monounsaturated rich fats and oils
- Five portions of fruit and vegetables each day
- A reduction in sugar intake and replacing with sweeteners
- Two-three portions of oily fish each week
- A reduction in salt intake, a 'no added salt diet'
- Moderate alcohol consumption, a maximum of 1–2 drinks per day (unless medically contraindicated)
- A reduction in daily energy intake by 500 kcal, where appropriate

DIETARY TREATMENT SHOULD HAVE STANDARDS OF PRACTICE

On diagnosis with diabetes or when seen for an initial consultation any background information that influences diabetic/dietetic management should be collected. This will include:

- Reason for referral
- Diagnosis
- Past medical history and any co-existing morbidity
- Medication
- Home monitoring data from urine or blood testing
- Relevant social/cultural circumstances
- Special needs

Anthropometric measurements recorded:

- Height (m)
- Weight (kg)
- BMI (kg/m^2)
- Waist circumference (cm)

Also any clinical parameters pertinent to the treatment of diabetes which might include:

- Blood pressure
- Fasting/random blood glucose (mmol/l)
- HbA1c (%)
- Total, HDL and LDL cholesterol levels (mmol/l)
- Triglycerides (mmol/l)

and where appropriate indicators of renal function (and liver function).

A diet history/24-hour recall is used as the basis for giving dietary advice. This should take the form of open questions about his/her diet over a typical 24-hour period. The time-frame to discuss should commence when the patient wakes up and finish 24 hours later. Due to differences in employment circumstances this time-frame may not be morning to night. Times of eating and drinking should be noted and portion sizes estimated. The checklist on the back of the dietetic record card can be used to determine more detailed information.

A three-day food diary is useful when further dietary information is required.

DIETARY MANAGEMENT

On the basis of the patient's dietary assessment, a dietary treatment plan needs to be agreed on to improve or maintain the patient's nutritional status, glycaemic control and cardiovascular risk factors, such as hyperlipidaemia and hypertension. This treatment plan must take into account the patient's medical, social and cultural requirements and dietary advice tailored to the individual's specific needs. A number of dietary targets may be agreed depending on the patient's understanding and their ability to make informed changes. It is important that the patient is aware that for maximum benefit life long compliance is usually required and therefore all changes should be realistically maintainable over the long term.

If the patient is overweight or obese a target weight should be agreed. The target weight should represent a maximum weight loss of 10%. This target will not necessarily be an ideal weight for the patient's height, but will bring about an improvement in BMI and a reduction in risk factors.

Follow up appointments need to be arranged, to continue dietary education, as and when the dietitian feels it is necessary, but under the St Vincent Declaration it is stated that 'every person with diabetes should be able to see a dietitian at diagnosis and annually for a dietary review' [2].

OBESITY (see chapter 8)

Obesity is a risk factor for the development of Type 2 diabetes. Weight gain (particularly centrally distributed) is associated with metabolic processes that increase the risk of cardiovascular disease. These metabolic disturbances include an atherogenic lipid profile, hyperinsulinaemia, hypertension and thrombogenesis.

Diabetes UK estimate 75–90% of people with diabetes have Type 2 diabetes, of these 80% are overweight or obese. The risks of hypertension,

dyslipidaemia, atherogenesis and premature death from cardiovascular disease are all increased with increasing obesity in Type 2 DM. This is illustrated by the ten-fold increased risk of premature death when Type 2 DM is associated with a BMI above 36 kg/m^2. By contrast, intentional weight loss of between 8–13 kg can reduce mortality by 33% in obese diabetic subjects.

For overweight Type 2 diabetic patients, the most important dietary objective is to achieve and maintain a desirable weight and BMI. However, the weight loss required to achieve this is often not realistic, even in the long term and weight loss of 5% can result in some clinical improvement. Whereas 10% weight loss can produce major benefits improving glycaemic control by reducing insulin resistance; improving lipid profile and reducing hypertension [3].

Weight loss can only be accomplished by reduction of total energy intake below the level of energy expenditure. It is important that the weight loss targets and diet are realistic. Each individual's requirements will vary and are hard to determine accurately. It is usual to determine normal intake from a diet history. From this, modification of the diet is suggested to reduce energy intake usually involving a reduction of energy dense foods, those high in fat and sugar. If this is unsuccessful a more prescriptive diet can be given based on a calculation of energy expenditure using Lean and James formula which is reduced by 500 kcal to give a more precise dietary target [4].

DIET AND ORAL HYPOGLYCAEMIC DRUGS

Anti-diabetic drugs should be taken as prescribed at the appropriate time interval in relation to food intakes. In order to prevent hypoglycaemia, in patients taking insulin secretagogues, and to maintain good glycaemic control in all subjects, an even distribution of food intakes, including some carbohydrate is essential. Foods with a low glycaemic index should be encouraged. Patients treated by diet alone can be more flexible about their food intakes, but the basic/good dietary principles still apply.

As Type 2 diabetes is a progressive disease, worsening glycaemic control should not be seen as necessarily being due to non-compliance with drug therapy or diet. Large prospective type 2 diabetic studies have clearly demonstrated that to maintain good glycaemic control most diabetic patients progress from diet alone, to monotherapy and then to combination therapy with oral agents before finally requiring insulin. Polypharmacy is difficult to avoid in the majority of Type 2 diabetic patients, as hypertensive medication, antithrombolytic therapy and lipid lowering drugs are also frequently required [1] [5] [7].

INSULIN THERAPY

As a consequence of the relentless deterioration in beta cell function in Type 2 diabetic patients with little, if any, improvement in insulin resistance with time exogenous insulin therapy is required to achieve adequate glycaemic control. During the UKPDS approximately 30% of obese and 22% of non-obese Type 2 DM patients required insulin within six years of diagnosis [1]. The introduction of insulin in Type 2 DM patients is however associated with weight gain which itself is likely to be detrimental to the underlying metabolic syndrome, glycaemic control and cardiac risk.

Although the UKPDS study showed the benefit of insulin therapy on glycaemic control, there is little data on whether the introduction of insulin therapy favourably influences insulin resistance syndrome, lipid profiles or blood pressure. There is a need for planned obesity management and weight maintenance as outlined in chapter 1 for any patients starting insulin.

SALT RESTRICTION

There is evidence that salt reduction will lower blood pressure in the general population and Type 2 diabetics. The importance of achieving good blood pressure control was again demonstrated in the UKPDS [6]. Advice should therefore be given to reduce the amount of salt added in cooking and at the table and to reduce intakes of salty foods especially for hypertensive diabetic patients.

All other aspects on management are reflected in the recommendation section of this book

SUMMARY

Management of type 2 diabetes remains a nutritional challenge with the main focus on management of obesity and coronary risk factors.

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