



Dietary dilemmas in diabetes



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BACKGROUND

Two of the 'f' words summarising pre-disposition to type 2 diabetes are fixed (family history, age forty years), but the third (fat) can be changed. The diagnosis of diabetes can be the trigger to review lifestyle, 'eat less and walk more' and to lose fat tissue. Initially this is often enough to bring blood glucose into the target range, but later as the metabolic abnormality of type 2 diabetes progresses, oral hypoglycaemic agents will be needed. Nonetheless, lifestyle issues remain important in managing the medical components of the type 2 syndrome (blood glucose, blood pressure, blood fats and blood clotting).

OBJECTIVE

This article uses a case based approach to discuss how a dietician can help patients review and modify their lifestyle.

DISCUSSION

A coordinated approach by the general practitioner, dietician and diabetes educator will often help to discover the cause of abnormal blood glucose levels, and assist the patient in normalising them.

Case 1 – Mary

'I'm eating all the right things but my blood glucose is high all the time. What am I doing wrong?'

Mary is 57 years of age and was diagnosed with type 2 diabetes 2.5 years ago. After diagnosis she lost 6 kg, although she is still overweight at 70 kg; body mass index (BMI) 27 kg/m². Mary has maintained her weight since, and walks 30–40 minutes per day with her husband, John. Her HbA1c has gradually climbed over the past year and is now 8.5%. Her blood glucose profile before meals shows:

Blood glucose	Breakfast	Lunch	Dinner
(mmol/L)	7–9	6–8	5–7

You refer Mary for dietary review. The dietician reports that Mary's food habits are healthy and that no significant changes are needed.

Discussion

The progression of Mary's diabetes is expected. As she ages, her insulin resistance will increase and her capacity to make insulin will decrease.¹ Although she has maintained her healthy eating and activity habits and has not regained weight, her blood glucose has gradually climbed. She now needs hypoglycaemic medication. The high fasting glucose indicates this.

Lifestyle does not have much effect on the fasting blood glucose unless associated with loss of fatty tissue. When you wake up, the glucose in your blood has been made by your liver overnight and does not reflect what you ate for dinner or evening snack (contrary to what most patients think). Unusual amounts of exercise may increase insulin sensitivity and affect fasting blood glucose, but in Mary's case the situation is occurring every day. She is not

likely to be able to increase her activity enough to get blood glucose levels on target again.

Theoretically if Mary were able to lose more weight (by eating even less and walking even more) this would probably get things back in control again.² However, the changes required might not be practical or sustainable. You could explain this to Mary so she doesn't blame herself or try to make lifestyle changes that are unrealistic. She should be congratulated on the dietician's report and on her weight maintenance. Unless there is some contraindication (unlikely in Mary's case) metformin is the usual preferred starting oral hypoglycaemic, initially a low twice per day dose and gradually increasing (eg. to 850 or 1 g twice per day). Metformin has the advantage of being associated with weight loss rather than the weight gain associated with sulphonylureas that are the alternative starting medication.³

Case 2 – Tony

Tony, an Italian man aged 60 years was diagnosed with type 2 diabetes 2 years ago. He has been testing blood glucose levels first thing in the morning and 2 hours after the largest meal of the day. His weight is currently just above his healthy weight range (84 kg, 1.78 m; BMI 26.5 kg/m²). He presents to you with postprandial hyperglycaemia. You refer Tony to a dietician. His diet history indicates that his breakfast and lunch appear to be adequate but his evening meal is very large consisting of minestrone soup for entree, and a large pasta meal with three slices of continental bread.

Discussion

To interpret postprandial blood glucose levels you need to know Tony's preprandial levels. Assuming the preprandial levels were on target (eg. <6 mmol/L), the amount and type of carbohydrate eaten should be reviewed.

Glycaemic index (GI) is a tool to determine the rate of absorption of a carbohydrate food. A ranking from 0–100 indicates whether 50 g of food will raise blood glucose levels just a little, moderately, or dramatically (*Figure 1*). If a carbohydrate food has a GI of less than 55 it is considered to break down slowly, 55–70 is considered moderate, and above 70 is considered rapid (*Table 1*). (See www.glycaemicindex.com for a list of foods and their GI values). When we eat carbohydrate foods the blood glucose rises and falls. Two factors determine the extent of the swing: the GI and the amount of carbohydrate food eaten.

Glycaemic load = (GI x carbohydrate (g) per serving) ÷ 100

The glycaemic load is largest for those foods that provide the most carbohydrate, particularly those we eat in large amounts eg. rice, pasta. The glycaemic load provides an estimate of quality and quantity of carbohydrate in the diet (GI gives us just quality).

The GI logo (*Figure 2*) on food packaging indicates that the product has been tested, but does not necessarily mean the product is a suitable choice. Testing can be done in

Table 1. GI checklist		
	Low or moderate GI (include regularly)	High GI (limit)
Breakfast cereals	Porridge, oats, All Bran, Guardian	Rice Bubbles, Corn Flakes, Puffed Wheat
Bread	Wholegrain, multigrain	White, bagels, baguettes
Rice and pasta	White pasta/spaghetti, basmati or doongara rice	White rice
Vegetables and legumes	Sweet corn, sweet potato, beans (kidney, baked)	Potato, mashed potato

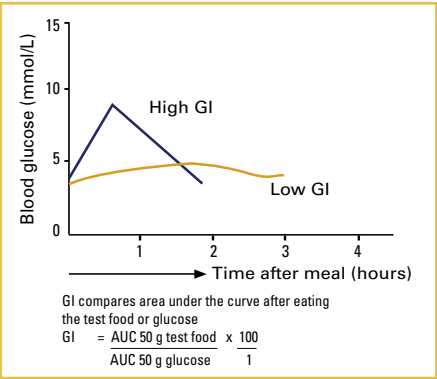


Figure 1. High and low glycaemic index

vivo (in small groups of healthy people) or in vitro and can only provide some guidance as to the appropriate choices for an individual with diabetes.⁴ For example:

- An apple has a GI of 40 and contains 15 g of carbohydrate per serve
The glycaemic load is (40x15)÷100=6
- A potato has a GI of 90 and 20 g of carbohydrate per serve
The glycaemic load is (90x20)÷100=18
- Watermelon has a GI of 72; a serving of 120 g has 6 g of available carbohydrate
The glycaemic load is (72x6)÷100=4

By simply looking at the GI value of watermelon you would think you should not eat it, but its glycaemic load is low, so it won't affect blood glucose much. Tony's evening meal has a high carbohydrate load. His minestrone soup would contain carbohydrate in the form of legumes and pasta along with the load of pasta in the main course and accompanying bread. Pasta and legumes have a low GI whereas white bread is refined and has a high GI. Encouraging Tony to reduce his pasta serve and avoiding

bread with his meal would assist in reducing his postprandial blood glucose levels. Increasing his vegetable intake and possibly increasing his meat serve would assist with satiety. Tony should also be encouraged to increase and/or maintain regular physical activity to lower blood glucose and promote weight loss.



Figure 2. The GI logo

Case 3 – Ruth

Ruth, 50 years of age, was diagnosed with type 2 diabetes 1 year ago and is currently on no diabetes medication. She works full time as a clerical officer and lives with her husband and two children. She is obese (92 kg, 1.62 m; BMI 35.1 kg/m²). She tests her blood glucose levels at home and her recent HbA1c is 7.2%. She asks for advice on losing weight. Many of her friends have had success with the high protein diets that are currently in vogue.

Discussion

Over the past few years there has been debate about the possible health advantages of following a diet higher in protein than the current Australian recommendations. A review of two recent prospective randomised controlled trials reported greater weight loss with a high protein compared to a more balanced diet at 6 months but equivalent weight loss at 12 months.⁵ The proposed benefits from higher protein diets include lower rates of obesity, cardiovascular disease, diabetes, and lower blood cholesterol levels. Much of

the evidence to date is circumstantial and further research is required before evidence based recommendations can be made. Some of the very high protein diets (>30% energy from protein) promoted by popular weight loss books severely limit carbohydrate intake which can result in rapid weight loss due to loss of fluid. These diets often result in a high intake of saturated fat, as many high protein foods are also high in saturated fat. The Dietitians Association of Australia (DAA) does not recommend very high protein diets as they can be potentially damaging to health if followed for a long period of time.⁶

The DAA recommends individuals focus on a diet based on the *Australian dietary guidelines*. This should include plenty of wholegrain breads and cereals, fruit and vegetables, and adequate amounts of low fat dairy products and lean meats or alternatives such as lean poultry, seafood, legumes, nuts and seeds (Figure 3). Including carbohydrate foods that have a low GI can assist in controlling blood glucose.

In Ruth's case the 'f' words for lifestyle may help. Less **food** and less **fat**, more **fibre** and more **fitness**. Dieting alone is unlikely to produce significant and sustainable weight

loss. In the short term, people may be able to lose weight but in most cases weight is regained within 12 months.⁴ Concentrating on food, fat and fibre is necessary but not sufficient. Increased activity (fitness) is also needed. For most people walking is the easiest. Setting an initially achievable goal and gradually increasing over weeks to months, means that no damage will be done and the person will be able to carry out the program. Some people find a pedometer helps to keep them on track. Start by recording the steps at the end of each day with the usual level of activity. Take the average and next week increase the steps by 10%, (eg. 1000 steps per day to 1100 the next week. Explain that the patient should keep an eye on the pedometer and arrange extra activities so that by the end of the day they achieve their target. They can make further increases each week or two.

The long term aim would be to be active for at least 30–40 minutes each day (approximately 10 000 steps per day). For obese people such as Ruth, the long term target may be higher (eg. 60 minutes per day) to achieve and maintain weight loss. The message is to 'walk each day and walk more each week or two'. Other people will find other activities more practical and/or enjoyable. If walking is involved (eg. golf) a pedometer may still be useful to keep track of the steps (a leisurely 4 hour round of golf may not actually involve a lot of steps!).

Discussion

Food diaries can be a useful tool to determine a person's food intake, but there are associated problems. Many people, as soon as they are asked to fill out a food diary, are more diligent with their diet and eat the right things during the time of documentation. Others document what they know you want to see and some document their main meals and forget about the food eaten in between. Excess weight does not appear overnight, so encouraging slow weight loss by engaging in regular activity is crucial, along with emphasising the importance of healthy eating.

If Judy is interested she could benefit from learning how to read labels and by choosing more foods low in fat and sugar, and high in fibre.⁴ Medical conditions and medications associated with weight gain and difficulty in losing or maintaining weight are listed in Table 2. Have a low threshold for testing for thyroid disease – most results will be normal but hypothyroidism may not be clinically obvious and becomes progressively more common with age (particularly in women).⁷ Prescribing replacement thyroxine and seeing significant weight loss and improved quality of life is very gratifying. Check for medications that increase appetite and substitute alternatives that have a neutral effect or are associated with weight loss such as a selective serotonin reuptake inhibitor (SSRI) to replace a tricyclic antidepressant. Interestingly, sibutramine (prescribed for weight loss) was first developed as an SSRI. There are reasons to minimise prednisolone use, and weight control is one of them. Although it may take some time to phase out the prednisolone such as by maximising and optimising aerosol corticosteroid, adrenergic and anticholinergic agents, it is worth trying.

Explain to the patient that the extra effort on their part is worthwhile. Otherwise the patient may prefer the easily achieved short term benefits of oral prednisolone to the more demanding intensive aerosol schedule.

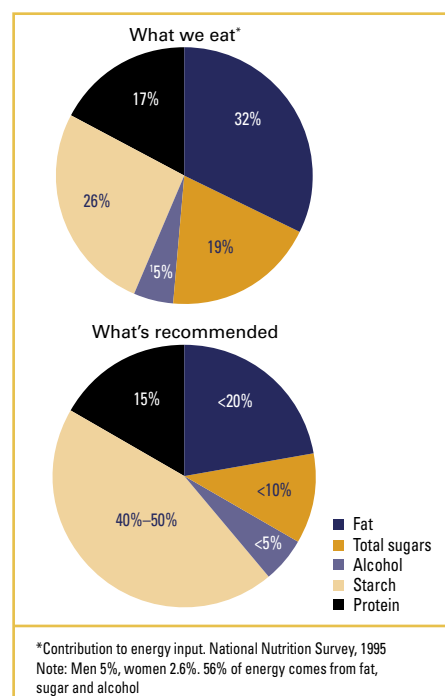


Figure 3. Recommended eating patterns
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Case 4 – Judy

Judy, 65 years of age, was diagnosed with type 2 diabetes 10 years ago. She is taking metformin and is testing her blood glucose levels 2–3 times a week at home. A recent HbA1c is 8.2%. Judy is 1.6 m in height and weighs 69 kg (BMI 35.2 kg/m²). She has struggled with her weight most of her life and has come to you for advice on weight loss. You ask her to make a review appointment with you in 2 weeks and bring along a food diary from those 2 weeks. She presents to you at review with a food diary indicating a well balanced, low fat diet.

Case 5 – Ron

"They seem to make things so difficult. I hear about cutting back cholesterol, fat, saturated fat and trans fat; increasing mono and polyunsaturated fat. I look on the shelf and see foods that are 99% fat free or 1% fat, 'lite' or 'diet'. Some have National Heart Foundation ticks and other logos. How can I choose the foods that will be good for me?"

Ron, a retired school teacher, is 67 years of age. He lives alone but has three very supportive children who live nearby. He has had type 2 diabetes for 8 years and a strong family history (mother and sister). He is overweight (1.79 m, 89 kg; BMI 27.8 kg/m²). Blood glucose has been reasonable with HbA1c ranging between 7.2 and 8% over the past few years, but Ron's weight has increased by 2 kg since he retired 2 years ago. He has also been treated for hypertension and has recently found his cholesterol is high (6.3 mmol/L).

Discussion

You advise Ron that his cholesterol level was well above ideal for someone with diabetes (target <4 mmol/L)⁸ but medication would not be subsidised by the Pharmaceutical Benefits Scheme. Ron was prepared to pay for the statin but decided to try changing his diet first. He was referred to a dietician for advice.

On the next visit Ron is pleased with himself. He feels confident about choosing

Table 2. Obesogenic conditions and medications

Condition
Endocrine
• hypothyroidism, Cushing syndrome
Musculoskeletal
• conditions limiting activity
Neurological
• hypothalamic damage increasing appetite
Medication
Contraceptive pill
Cyproheptadine
Marijuana
Pizotifen
Prednisolone
Sulphonylureas
Tricyclic antidepressants

Table 3. Fat content – vegetable oils versus butter

Food	Saturated	Monounsaturated	Polyunsaturated
Canola oil	7	63	30
Coconut oil	92	6	2
Olive oil	12	76	12
Palm oil	51	39	10
Peanut oil	19	46	35
Soybean oil	15	23	62
Sunflower oil	11	23	66
Butter	54	20	3

his food, walks each day, and has lost 1 kg and 1.5 cm off his waist.

Fat facts

Saturated fats are long chains with no fixed arrangement of the atoms around the carbon bonds. The double bonds in cis unsaturated fats fix the atoms into two arrangements – cis (as occurs mostly in nature) and trans (this form develops mainly when fats are processed. Small amounts of some trans fatty acids are found in meat and dairy products naturally). The cis form puts a kink in the fatty acid chain while the trans form has roughly the same form as a saturated fat.

The omega 'w' refers to the position of the double bonds counting from the methyl end of the fatty acids. w3 and w6 fatty acids are thought to reduce clotting and LDL cholesterol (but may increase triglyceride and decrease HDL). The rule about vegetable fats being unsaturated is generally true with some important exceptions (*Table 3*).

Trans fatty acids form when polyunsaturated fatty acids from vegetable or fish oils are partly hydrogenated to form margarines and shortenings for processed and fast foods. The trans form has been shown to be undesirable and the food industry in Australia is now trying to limit or exclude them from processed foods. The naturally occurring trans fatty acids in meat and dairy products do not have the same effect, and so are not of concern.⁹

When choosing foods, look at the nutrition label as it is compulsory to list total, saturated, and trans fat content. Lower fat is better for people trying to lose weight but they should also check the sugar content as manufacturers may increase sugar content to

make low fat foods more palatable.

Steaming, grilling, low fat baking, stir frying using nonstick pans and aerosol cooking fats will reduce the fat content of cooked foods. Plant sterols (eg. Meadow Lea Logicol margarine or Flora Proactiv margarine) may provide a useful and acceptable way of enhancing cholesterol lowering.² Total fat intake needs to be considered for people who are overweight.

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