

Gaining a New Outlook

Diet and Coronary Artery Disease

Obesity has reached epidemic proportions in North America, increasing the incidence of coronary artery disease. Understanding the effects of diet modifications plays a huge role in preventing this growing problem.

By Jean G. Dumesnil, MD, FRCPC, FACC

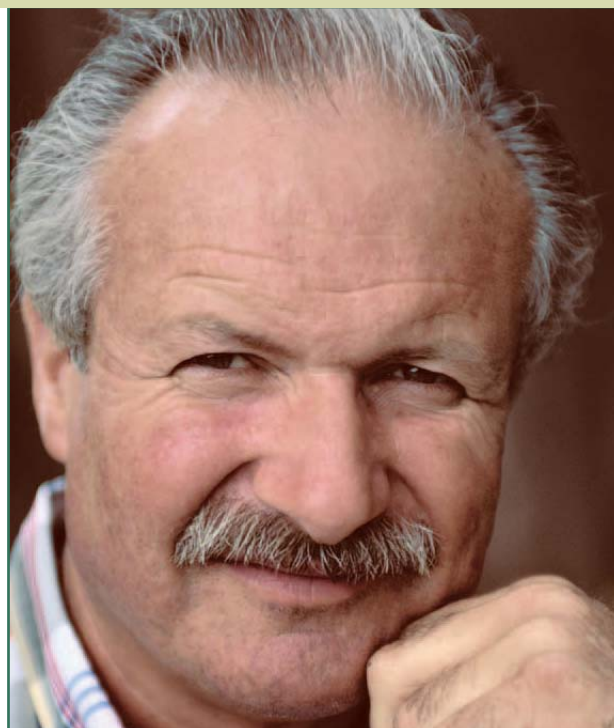
Case

A 58-year-old patient used to be overweight and suffered from hypercholesterolemia and labile hypertension.

- Height: 1.68 m
- Weight: 87.8 kg
- Body mass index: 31
- Waist circumference: 102 cm

Table 1 shows the evolution of his lipid profiles since 1994, at which time he was 49 years old.

See the case discussion on page 42.



In this article:

1. What is the prevalence of obesity?
2. What do the nutritional guidelines recommend?
3. What is a glycemic index and how can it be applied practically?

How prevalent is obesity?

The American Heart Association (AHA) now recognises obesity as a major risk factor for coronary artery disease (CAD). The AHA also recognises the difference in CAD risk for those who are overweight [*i.e.*, body mass index (BMI) 25 to 29] versus those who are obese (*i.e.*, BMI > 29). Indeed, the relative risk for obese people of developing CAD is 2.6 to 1 in women and 3.4 to 1 in men, whereas the same values are 1.6 to 1 and 1.8 to 1, respectively, in those who are overweight.

Unfortunately, the prevalence of obesity is increasing at such an alarming rate, it is presently considered as having reached epidemic proportions. Indeed, the



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prevalence of obesity in the U.S. increased by 67% between 1990 and 1999. In 2002, more than 60% of the American population was either obese (26%) or overweight (35%). Similar statistics were observed in Canada (Figure 1).

Because obese individuals are at a much higher risk of developing Type 2 diabetes, an exponential rise in this disease was also observed during the same period and it is forecasted that if the same rate of progression is maintained, the num-

Table 1

Evolution of patient's lipid profiles since 1994

Characteristic	Treatment/Start date			
	None April '94	Simvastatin, 10 mg/ May '95	Simvastatin, 10 mg + Montignac Diet March '96	Simvastatin, 10 mg + Montignac Diet March '01
Triglycerides	2.09 mmol/L	1.83 mmol/L	1.13 mmol/L	1.16 mmol/L
Total cholesterol	7.37 mmol/L	5.33 mmol/L	4.50 mmol/L	4.45 mmol/L
Low-density lipoprotein cholesterol (LDL-C)	5.20 mmol/L	3.43 mmol/L	2.43 mmol/L	2.28 mmol/L
High-density lipoprotein cholesterol (HDL-C)	1.21 mmol/L	1.26 mmol/L	1.70 mmol/L	1.75 mmol/L
Total cholesterol/HDL-C ratio	6.09 mmol/L	4.38 mmol/L	2.70 mmol/L	2.50 mmol/L

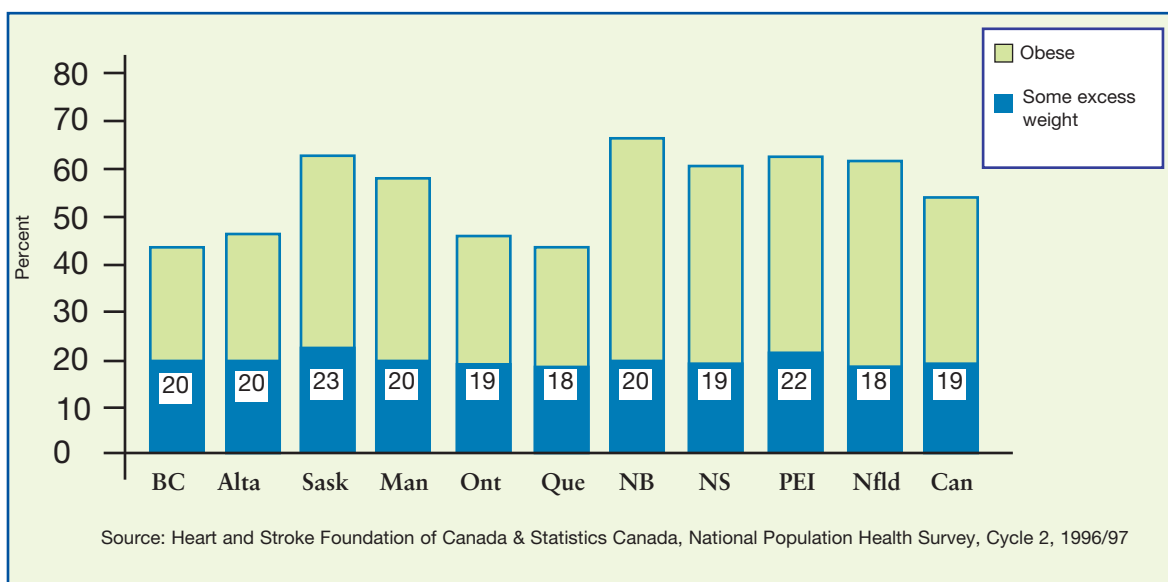


Figure 1. Proportion of adults who are overweight by province, Canada, 1996/97 (Source: Heart and Stroke Foundation of Canada & Statistics Canada, National Population Health Survey, Cycle 2, 1996/97).

LIPITOR: Hitting targets.

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Table 2

Current dietary recommendations of the American Heart Association

1. Fats: 30% less of caloric intake.
2. Carbohydrates: 55% or more of caloric intake.
3. Protein: +/- 15% of caloric intake.
4. Avoid saturated fats and cholesterol.
5. Privilege intake of fresh fruits, vegetables, and whole cereals.
6. No strong recommendation with regard to the use of sugar, white flour, or processed foods containing the latter.

ber of people with Type 2 diabetes worldwide will approximate 220 million in 2010.

Finally, it should also be noted that obesity is the only modifiable major risk factor that is presently out of control. Hypertension, hypercholesterolemia, and smoking have known remedies and are being progressively brought under control.

Conversely, obesity is increasing at an exponential rate, and the main culprits are deemed to be poor nutrition and lack of exercise. Genetics may also be a factor, but cannot be seen as the major explanation for the epidemic. Otherwise, one would have to postulate that genetic mutations are occurring at an accelerated rate. In this context, it should also be emphasised that exercise alone does not produce weight loss, but may be helpful in maintaining it when a dietary regimen is applied.

What do the guidelines say?

Although all evidence would logically point to nutritional behaviour as being the main cause of



LDL-C
39-60%
(type IIa and IIb)[†]

LIPITOR is an HMG-CoA reductase inhibitor (statin). LIPITOR is indicated as an adjunct to lifestyle changes, including diet, for the reduction of elevated total cholesterol, LDL-C, TG and apolipoprotein B in hyperlipidemic and dyslipidemic conditions (including primary hypercholesterolemia, combined [mixed] hyperlipidemia, dysbetalipoproteinemia, hypertriglyceridemia and familial hypercholesterolemia) when response to diet and other non-pharmacological measures alone has been inadequate.

LIPITOR also raises HDL-cholesterol and therefore lowers the LDL-C/HDL-C and Total-C/HDL-C ratios (Fredrickson Type IIa and IIb). These changes in HDL-C with HMG-CoA reductase inhibitors should be considered as modest when compared to those observed in LDL-C and do not play a primary role in the lowering of LDL-C/HDL-C and Total-C/HDL-C ratios.

See Prescribing Information for complete warnings, precautions, dosing and administration.

LIPITOR is contraindicated: During pregnancy and lactation; active liver disease or unexplained persistent elevations of serum transaminases exceeding 3 times the upper limit of normal; hypersensitivity to any component of this medication.

Case Discussion

The 1994 lipid profile showed elevated values for total cholesterol, low-density lipoprotein cholesterol (LDL-C), and total to high-density lipoprotein cholesterol (HDL-C) ratio. Triglyceride levels were borderline. Various drug regimens were attempted, but discontinued due to digestive intolerance. The only one tolerated was simvastatin, 10 mg. Significant improvement was noted on the 1995 profile and, as is usually the case with the use of statins, the main effect was a lowering of the LDL-C and its related values. The triglycerides and HDL-C were only marginally improved.

In November 1995, the patient started following a low-glycemic index/low-fat/high-protein regimen based on the Montignac method. This resulted in a 20 kg weight loss during the first six months (BMI was 23.5; waist circumference was 83.8 cm).

The lipid profile done in 1996 showed an additional 29% decrease in LDL-C, a 35% increase in HDL-C, and a 38% decrease in triglyceride levels (Table 1). These improvements were maintained and still present five years later, as is evident by the lipid profile done in 2001. The effects on the triglycerides and HDL-C are particularly impressive, given that a 10% increase in HDL-C following a pharmacologic treatment is usually considered a great success and that such an increase is almost unheard of with any type of intervention, let alone a dietary one.

obesity, it is somewhat puzzling that the present success rate for long-term maintenance of weight loss after dieting is below 5%. In my opinion, there are two major causes for this failure:

Restriction. Most dietary regimens are based on restriction and do not procure satiety,

rendering them virtually impossible to adhere to for most people.

Assumptions. Current dietary recommendations, such as the AHA diet and the Canadian and American Food Guides, are based on arbitrary assumptions and have paradoxically contributed to an increase in obesity.

Guidelines on “fats.” Indeed, the rationale underlying these recommendations is that the overeating of fats is the main culprit in the genesis of obesity, metabolic disorders, and heart disease. The recommendations have, therefore, mainly emphasised a decrease in fat intake (Table 2). As a result, fat consumption in North America has gone down from 42% to 34% of total caloric intake in the past 30 years.

Guidelines on “carbohydrates.” The restriction of fats has largely been compensated by an increase in the consumption of carbohydrates without any particular distinction being made between the types of carbohydrates being consumed. Hence, because of continued industrialisation and evolving cultural patterns, the carbohydrates consumed have consisted largely of processed foods containing sugar and/or white flour. There is, as of yet, no strong recommendation with regard to restricting the use of refined carbohydrates, in stark contrast with the language used to condemn the consumption of saturated fats and cholesterol.

Guidelines on “fruits and vegetables.” Consumption of fresh fruits and vegetables has been kept to a minimum. It is only recently that the guidelines have given more emphasis to the consumption of fresh fruits, vegetables, and whole grains.

Changes. If one compares the changes made to the Canadian Nutrition Guide between 1982 and 1992, there has been an increase in the recommended quantities of

cereal products. However, for most people, the implementation of these recommendations has translated into an increased consumption of many highly-processed foods, such as cereal bars, breakfast cereals, and white bread and its derivatives.

Unfortunately, as revealed by the nutritional information on the labels, the great majority of these foods contain large quantities of sugar and/or white flour, as well as saturated or hydrogenated fatty acids. Moreover, because they are more energy-dense, these foods will procure less satiety and will, therefore, be conducive to an increase in total caloric intake. It is not unreasonable to think that the important increase in the average total daily caloric intake of the North American diet witnessed during the last 30 years is largely due to these changes in eating patterns. These patterns are largely responsible for the present epidemics of obesity and Type 2 diabetes. Also, it is somewhat distressing to realise that dietary interventions to treat obesity have largely failed (success rate < 5%) and that more and more emphasis is being put on pharmacologic and/or surgical treatment. Given the prevalence of the disease and its progression, the implications of such a consideration are enormous, as they could translate into treating 25% to 50% of the population with either drugs or an operation!

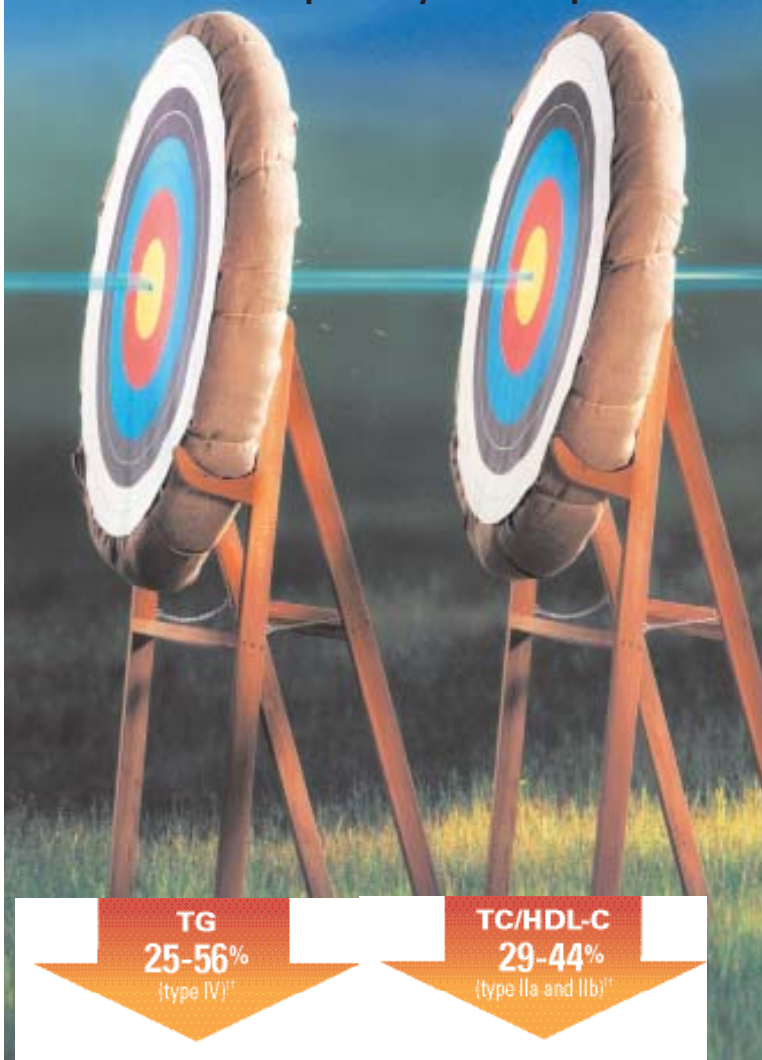
A new perspective: Using glycemic loads and indices

The glycemic index relates to the blood glucose response to an amount of a particular food containing 50 g of carbohydrates. It is very different from the usual simple versus complex classification of carbohydrates, which relates to their chemical structure rather

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EXPERIENCE ➤ More than ~~40~~ 44 million patient-years of experience^{2‡}



Lipid levels should be monitored periodically and, if necessary, the dose of LIPITOR adjusted based on target lipid levels recommended by guidelines.

Caution should be exercised in severely hypercholesterolemic patients who are also renally impaired, elderly, or are concomitantly being administered digoxin or CYP 3A4 inhibitors.

Liver function tests should be performed before the initiation of treatment, and periodically thereafter. Special attention should be paid to patients who develop elevated serum transaminase levels, and in these patients, measurements should be repeated promptly and then performed more frequently.

The effects of atorvastatin-induced changes in lipoprotein levels, including reduction of serum cholesterol on cardiovascular morbidity, mortality, or total mortality have not been established.

‡ A patient-year represents the total time of exposure to LIPITOR as defined by the sum of each patient time on LIPITOR.⁵

Point of View

The fact that the Montignac method allows one to eat with no restricted quantities is the reason why my wife and I decided to try it ourselves. We were fascinated by how quickly we lost weight without feeling restricted or deprived, and how we maintained a sense of well-being. Being a researcher, I decided to share my enthusiasm with some colleagues who are experts in the field of obesity and metabolism. Despite their original skepticism, we nonetheless decided to undertake a short-term research study comparing the Montignac method with the conventional AHA diet. The results of this research, recently published in the *British Journal of Nutrition*, were very surprising and can be summarised as follows:

- Compared to the AHA diet, the Montignac regimen resulted in a 25% decrease in total caloric intake, while achieving the same level of satiety. This result is difficult to achieve even with pharmacologic interventions.
- The Montignac regimen also improved the metabolic profile as follows: 35% reduction in triglyceride levels, significant decreases in insulin levels and insulin resistance, and an increase in the size of small, dense low-density lipoprotein particles.
- The AHA diet resulted in no such benefit, but rather in a deterioration of the lipid profile, evidenced by a 25% increase in triglycerides and a 10% decrease in high-density lipoprotein levels.

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Table 3

Frequently consumed foods on the basis of their glycemic index and their utilisation in the Montignac method

High Glycemic Index (> 50)

What to avoid:

potatoes, most rices, breads with white flour and/or sugar, crackers, sugar, honey, corn, cereals with sugar, fruit yoghurts with sugar, chocolate bars, soft drinks with sugars, most pasta, bananas, pineapple, processed orange juice, cereal bars, processed biscuits, energy bars, fruit punches, energy drinks

Intermediate Glycemic Index (20 - 50)

Not to be eaten with fats:

100% whole grain breads, spaghetti (whole wheat & al dente), whole wheat shredded wheat, muesli without sugar, all bran or fibre one, most fruits (except above), wild rice, barley, most legumes (e.g., lentils, chickpeas, beans)

Low Glycemic Index (< 20)

To be eaten at will:

Most vegetables, tomatoes, salads, plain yogurt, nuts and grains, mushrooms

than to the blood glucose response. Table 3 gives a sample listing of foods according to their glycemic index.

Montignac method. The concept of glycemic indices as a tool in the treatment of diabetics was first pioneered in the early '80s by a Canadian, Dr. David Jenkins. A Frenchman, Michel Montignac, then promoted its use in the prevention and treatment of obesity (1986). His hypothesis was that the main cause of obesity was not fats, but hyperglycemia and hyperinsulinemia, and that the remedy was therefore to avoid foods which are more prone to increase blood glucose and insulin levels (*i.e.*, foods with a

Table 4

Summary of Montignac method

1. Avoid foods with a glycemic index > 50.
2. Do not eat fats when eating foods with a glycemic index between 20 and 50.
3. Eat foods with a glycemic index < 20 and proteins at will.
4. Given these principles, eat at satiety, with no restriction on quantity.

high glycemic index), as well as to avoid consuming fats when consuming carbohydrates with an intermediate glycemic index. The Montignac method is summarised in Table 4.

Nurses' Health Study. Indirect evidence of the relevance of glycemic indices is also supported by the results of the Nurses' Health Study, which included 75,521 women aged 38 to 63. The authors discussed the case as follows: "Although almost all existing dietary guidelines advise the substitution of complex


Take-home message

- Obesity is becoming extremely prevalent and is considered a major risk factor for cardiac disease.
- Most dietary guidelines assume fat to be the main cause of obesity and simply restrict it. Diets based on this principle often fail.
- The Montignac method involves balancing glycemic loads and can result in weight loss without the feeling that one is being restricted or deprived.

carbohydrates for simple sugars or fat, data that directly relate types of carbohydrate to congestive heart disease (CHD) risk are limited. Our findings cast doubt on the usefulness of the simple versus complex classification of carbohydrates. A better measure would be the glycemic index of carbohydrates, which, in the present study, was more closely related with CHD risk.”

What are the practical applications of glycemic indices?

In processed foods, one should consult the nutrition information and the list of ingredients, remembering that sugar and/or white flour are present in many of them, and in particular in most breakfast cereals and fruit yogurts, which are usually thought of as being healthy foods. However, appropriate products can be found. Likewise, most breads, even so-called whole wheat breads, contain white flour, as well as sugar and fats.

In addition, saturated, hydrogenated, and animal fats should be avoided as much as possible. Cooking should be done without fats or using olive oil. Canola (a good source of omega-3), olive, or soja oil should be used for salads. Fish and poultry should be the preferred source of protein. Eggs and cheese can be eaten in moderation, but the cheese must be eaten alone or on a vegetable, such as celery, and not with bread or crackers. One or two glasses of red wine per day is also acceptable. 

Suggested Readings

1. Dumesnil JG, Turgeon J, Tremblay A, et al: Effect of a low glycaemic index, low-fat, high-protein diet on the atherogenic metabolic risk profile of abdominally obese men. *Br J Nutr* 2001; 86(5):557-68.
2. Liu S, Willett WC, Stampfer MJ, et al: A prospective study of dietary glycemic load, carbohydrate intake, and risk of coronary heart disease in U.S. women. *Am J Clin Nutr* 2000; 71(6):1455-61.
3. Foster-Powell K, Holt SH, Brand-Miller JC, et al: International table of glycemic index and glycemic load values 2002. *Am J Clin Nutr* 2002; 76(1):5-56.
4. Dumesnil JG, Montignac M: *Bon Poids, Bon Cœur*. Flammarion Quebec, Quebec, 2002.
5. Montignac M, Dumesnil JG, Erin Goodwillie: *Eat Yourself Slim*. Michel-Ange Publications, 1999.



Lipidil SUPRA™ is indicated as an adjunct to diet and other therapeutic measures for the treatment of: patients with Fredrickson classification type IIa hypercholesterolemia and IIb mixed hyperlipidemia, to reduce serum triglycerides (TG) and LDL cholesterol levels, and elevate HDL cholesterol; adult patients with very high serum TG levels, Fredrickson classification type IV and type V hyperlipidemias, at high risk of sequelae and complications from their hyperlipidemia.

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