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Editorial

Obesity—It Must Not Remain the Neglected Risk Factor in Cardiology

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The terms "overweight," "obese," and "severe obesity" refer to a clinical continuum. Excess adiposity should be considered a chronic disease that has serious health consequences impacting most health care professionals, including cardiologists, endocrinologists, internists, family practitioners, and pediatricians. The increasing prevalence of obesity led organizations to a call for action to curb the consequences of obesity more than 15 years ago.[1] All cardiology subspecialties are now confronted with the obese patient. Along with increasing concerns about the magnitude of the problem during the past few decades, great progress has been made in the understanding of the pathogenesis, manifestations, and clinical outcomes of obesity. Nonetheless, most algorithms to estimate cardiovascular risk do not typically include excess body weight as an independent risk factor. Historically, the Metropolitan Life Insurance Company data that express body fatness as percent ideal body weight were used to characterize obesity. In current clinical practice, body mass index (BMI) and, less commonly, waist circumference or waist-to-hip ratio are used as anthropometric indicators of adiposity, but they do not adequately take into account variations in body structure among different age, sex, and, especially, ethnic groups,[2] which is particularly important because the deleterious health consequences of excess body weight have now become epidemic worldwide.[3]

Obesity is a major public health issue in Canada, affecting about 1 in 5 Canadian adults.[4] It increases both the risk of other chronic health conditions as well as the use of health care resources.[5-7] Obesity-related comorbidities are well documented and include increased risk of high blood pressure, type 2 diabetes, dyslipidemia, arthritis, some cancers, sleep apnea, and depression.[8] An estimated 1 in 10 premature deaths among Canadian adults aged 20-64 years are directly attributable to obesity.[8] In addition to the physiological and psychological impact that obesity can have, social stigmatization and discrimination commonly occur, including barriers to job advancement and lower earnings relative to normal-weight individuals.[9] The financial impact of obesity is significant: estimated direct and indirect costs from 2000-2008 were between $4.6 billion and $7.1 billion annually.[5]

Worldwide, the proportion of adults with a BMI $\geq$ 25 kg/m^2 (overweight range) increased in the past 3 decades from 28.8%-36.9% in men and from 29.8-38.0% in women. Undeniably, the estimated number of overweight or obese individuals almost tripled from 857 million in 1980 to more than 2 billion individuals worldwide nowadays.[3] Of perhaps even greater concern, the prevalence has also increased substantially in children and adolescents in developed countries: 23.8% of boys and 22.6% of girls were overweight or obese. In developing countries, the prevalence of overweight and obesity has also increased in the past few decades in children and adolescents—from 8.1% to 12.9% for boys and from 8.4% to 13.4% for girls.[3]

Obesity impacts negatively both the quality and quantity of life. Overweight and obesity were estimated to cause 3.4 million deaths, 4% of years of life lost, and 4% of disability-adjusted life-years worldwide.[10] From a global perspective, these numbers are impressive but may be difficult to capture for a given individual from his/her own perception. In the Prospective Studies Collaboration, based on 66,552 deaths among 894,576 participants in 57 prospective studies, the observed reduction in median survival was 0-2 years in overweight individuals, 2-4 years in obese individuals, and 8-10 years in very obese individuals.[11]

Years of life lost describes only a fraction of the negative clinical impact of obesity; calculation of healthy life-years free from morbidity associated with obesity is of clinical paramount importance in today's preventive medicine.[12] The effect of excess weight on years of life lost was greatest for young individuals and decreased with increasing age. As an example, years of life lost for obese men ranged from 0.8 years for those aged 60-79 years to 5.9 years for those aged 20-39 years. Similar results were noted for women (6.1 years lost for very obese women aged 20-39 years; 0.9 years lost for very obese women aged 60-79 years). Healthy life-years lost were

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2 to 4 times higher than total years of life lost for all age groups and body weight categories. Basically, the more an individual weighs and the younger her/his age, the greater the effect of excess weight on health from a diabetes- and cardiovascular disease—free viewpoint.[12]

Health behaviour interventions (weight loss, physical activity, dietary quality, smoking cessation) in individuals identified as being at high cardiometabolic risk are of critical importance given the emerging crisis of obesity and type 2 diabetes.[13] This supplement of the *Canadian Journal of Cardiology* includes 14 articles that contain in-depth reviews as well as viewpoints on the issue of obesity that aim to provide a better understanding of adiposity/obesity and its relationship to cardiovascular medicine, shifting perspective from simply fatness caused by excessive caloric intake to a complex systemic disease with associated comorbidities impacting both quality and quantity of life. As a whole, overweight/obesity predisposes individuals to, or is associated with, numerous cardiac complications, such as coronary heart disease, heart failure, atrial fibrillation, and sudden death.

Beginning with a discussion regarding healthy food procurement policy, Campbell et al.[14] discuss how improved access and availability to affordable healthy foods/beverages in the public and private sectors could play a role in the prevention of obesity and ultimately improve cardiovascular health. This is important because obesity may present at a very young age. Obesity has changed the practice of pediatric subspecialists. Pediatricians who specialize in endocrinology and in cardiology are now confronted with type 2 diabetes and cardiovascular risk factor management, respectively. McCrindle discusses childhood obesity as a major public health problem with evident cardiovascular consequences in childhood that will track into adulthood.[15] Those consequences will accelerate the onset and increase the incidence of cardiovascular disease and events, with enormous social and health care system burden. Also, Tamayao et al.[16] report the prevalence and associated factors for obesity among children with congenital heart disease.

Valera et al.[17] discuss the prevalence of overweight and obesity across ethnic groups and among aboriginal people in Canada. The authors emphasize that body mass index (BMI) is a poor measure of adiposity and may over- or underestimate adiposity, especially in different ethnic groups who have a higher prevalence of abdominal adiposity. This includes South Asians, individuals of African origin, and aboriginal people. Variation in dietary and physical activity patterns, as well as the impact of genetics and ethnicity, are reviewed.[17] The management of obesity remains a major challenge, and lifestyle interventions focusing on sustainable changes in eating habits and increased physical activity are highly recommended for weight management.[18] For decades, the pharmaceutical industry has struggled to find an effective and safe drug for obesity management.[19] Despite efficacy in producing weight loss and often cardiometabolic improvement, many of the previous antiobesity drugs have also had serious adverse cardiovascular side effects. Pucci and Finer discuss the challenges and opportunities for obesity pharmacotherapy and review in detail the efficacy of new drugs to promote weight loss that may also have both desirable and potentially undesirable impacts on cardiovascular and metabolic risk factors.[20] At the other end of the obesity management spectrum, bariatric surgery, although successful, is resource intensive and therefore applicable only to a limited number of patients. Piché et al.[21] review the evidence showing that bariatric surgery can be an effective and safe strategy for long-term weight loss among severely obese patients, leading to the remission of several obesity-related comorbidities and reduced cardiovascular risk burden, as well as a reduction in overall mortality risk.[21]

The next articles provide a detailed review of the impact of obesity in the field of cardiology. There is little doubt that obesity is a risk factor for premature atherosclerosis, and risk factor management is pivotal. Sankaralingam et al.[22] discuss the impact of obesity on the pharmacology of medications used for cardiovascular risk factor management. Then Lovren et al.[23] review mechanisms—including abnormalities in lipid metabolism, insulin resistance, inflammation, endothelial dysfunction, adipocytokine imbalance, and inflammasome activation—that have been suggested to underlie the relationship between obesity and atherosclerosis. Without a doubt, cardiologists are now facing a growing population of obese patients who present diagnostic challenges as well as challenges for medical, interventional, and surgical management. The article by Garcia-Labbé et al.[24] focuses on strategies clinicians may use to ensure better outcomes when performing revascularization in obese and severely obese patients. The impact of evaluation of cardiac function before coronary revascularization and the short- and long-term outcomes after percutaneous and surgical coronary interventions are also briefly discussed. The article by Lim et al.[25] focuses on the strengths, limitations, and recommendations for use of the various noninvasive cardiac imaging modalities available for the detection of obstructive coronary artery disease.

BMI alone shows a U- or J-shaped association with clinical outcomes and mortality. Such an inverse relationship fuels a controversy in the literature, commonly referred to as the "obesity paradox," which associates better survival and fewer cardiovascular (CV) events for patients with elevated BMI with chronic diseases compared with nonobese patients. Reasons for this paradox remain unclear and may include an issue of selection bias. This paradox has been described in other CV conditions such as heart failure and atrial fibrillation, as well as in other chronic diseases including end-stage renal disease, type 2 diabetes mellitus, and chronic obstructive pulmonary disease. Gupta et al.,[26] through a detailed review focusing on obesity and heart failure, explore the various potential explanations for the obesity paradox and summarize the current evidence and guidelines for intentional weight loss treatments for heart failure in the obese population. Obesity is associated with an increased risk of sudden cardiac death and atrial fibrillation. The implications of obesity for cardiac arrhythmia mechanisms and management are reviewed by Pathak et al.[27]

Physical Inactivity/Poor Food Choices: The Next Tobacco?

It has been reported that only 31% of the coronary heart disease risk and 8% of the stroke mortality risk associated with obesity are mediated through raised blood pressure and cholesterol, suggesting that obesity management "per se" must also be undertaken aggressively.[28] The achievement of