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Review Article

Dyslipidemia Management for Elderly People with Metabolic Syndrome: A Mini-Review

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SUMMARY

The proportion of people whose age exceeds 65 years is growing rapidly throughout the world and the prevalence of metabolic syndrome (MetS) is increasing among older adults. MetS had a two-fold increased risk for cardiovascular (CV) disease. Most patients with MetS exhibit atherogenic dyslipidemia, which includes elevated triglycerides (TG) and reduced high-density lipoprotein cholesterol (HDL-C). Therefore, physicians are advised to recognize the presence of dyslipidemia in elderly patients with MetS and provide appropriate therapy to reduce CV risk. Lifestyle modification is the initial step for treating dyslipidemia. For older adults with MetS who cannot attain treatment goals by lifestyle modification, pharmacological intervention is usually considered. Treating dyslipidemia in older adults with MetS requires knowledge of the benefits and adverse effects of various pharmacologic agents in the presence of possible multiple comorbidities. The purpose of this article is to review the evidence for recognition and management of atherogenic dyslipidemia in elderly individuals with MetS.

1. Introduction

The proportion of people whose age exceeds 65 years is growing rapidly throughout the world, and the prevalence of metabolic syndrome (MetS) is increasing among older adults. Cardiovascular (CV) and cerebrovascular events occur frequently in elderly patients and carry high morbidity and mortality, including the clustering of several metabolic and CV risk factors termed the metabolic syndrome (MetS). The most prominent components of MetS are abdominal obesity, high blood pressure (BP), impaired glucose tolerance, and dyslipidemia. The prevalence of MetS varies in different countries but, most commonly, is highly age-dependent, and older adults are at higher risk for developing MetS.[1,2] Insulin resistance (IR), which is prevalent in people with MetS, also parallels the increased age and predicted clinical events, including hypertension (HTN), coronary heart disease (CHD), stroke, cancer, and type 2 diabetes mellitus (T2DM).[3] Economic development, medical advances, and changes in socioeconomic status and lifestyles have greatly improved the quality of health in Taiwan, occurring along with rapid growth of the aging population. To face the increase in the number of older adults with MetS in Taiwan, it is essential to understand how to reduce the CV risk associated with MetS.

Atherogenic dyslipidemia is a key metabolic risk factor. Effective lipid management in older adults with MetS may reduce the risk of developing CV disease (CVD) with improvement of quality of life and may also potentially increase longevity. Therefore, this review article focuses on lipid management in older adults with MetS.

2. Prevalence of MetS in older adults in Taiwan

Table 1 summarizes several definitions of MetS provided by different organizations. The International Diabetes Federation (IDF), World Health Organization (WHO) and the National Cholesterol Education Programme (NCEP) have similar definitions of MetS and the corresponding CHD risk.[4] The Framingham Offspring Study[5] observed that MetS is equally associated with CVD using three separate MetS definitions, including those of NECP ATP III, IDF,

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Table 1
Diagnostic criteria for metabolic syndrome.

Criteria	WHO	EGIR	IDF	NCEP ATP III	Taiwan
Criteria	(Insulin re- sistance/Diabetes + >2)	(hyperinsulinemia + >2)	(Obesity + >2)	(≥3)	(≥3)
Central or general obesity	Waist/hip ratio> 0.9 inch males and >0.85 inch females or BMI ≥ 30 kg/m^2	WC for males ≥ 94 cm, females ≥80 cm	BMI ≥ 30 kg/m^2 or ethnic specific group WC cutoffs	WC for males ≥40 inch, females≥35 inch	WC for males ≥ 90 cm, female ≥ 80 cm
TG	TG ≥ 150 mg/dL	TG ≥ 180 mg/dL	TG = 150 mg/dL or treatment of this lipid abnormality	TG = 150 mg/dL or treatment of this lipid abnormality	TG = 150 mg/dL
HDL	HDL<35 mg/dL in males and <40 mg/dL in females	HDL< 40 mg/dL	HDL <40 mg/dL in males and <50 mg/dL in females or specific treatment for this lipid abnormality	HDL<40 mg/dL in males and <50 mg/dL in females or treatment for this lipid abnormality	HDL<40 mg/dL in males and <50 mg/dL in females
BP	≥140/90 mm Hg	≥140/90 mmHg or taking medication for HTN	SBP ≥ 130 or DBP ≥ 85 mm Hg or treatment of previously diagnosed HTN	SBP >130 or DBP >85 mm Hg or taking medication for HTN	SBP ≥ 130 mmHg or DBP ≥ 85 mmHg or taking medication for HTN
Glucose	Insulin resistance required	Insulin resistance required (plasma insulin >75th percentile)	Fasting plasma glucose ≥100 mg/dL or previously diagnosed type 2 diabetes	Fasting glucose ≥100 mg/dL or taking medicine for high glucose	Fasting glucose ≥100 mg/dL, or use of insulin or other hypoglycemic agents
Others	Urine albumin ≥20 μg/min or Albumin/creatinine ratio ≥ 30 mg/g				

Abbreviation: WHO: World Health Organization; EGIR: European Group for the Study of Insulin Resistance; IDF: International Diabetes Federation; NCEP ATP III: National Cholesterol Education Program-Adult Treatment Panel III; BMI: Body Mass Index; WC: waist circumference; SBP: systolic blood pressure, DBP: diastolic blood pressure; BP: blood pressure; HTN: hypertension; TG: triglycerides; HDL: high density lipoprotein.

and European Group for the Study of Insulin Resistance (EGIR). Compared with other MetS definitions, the prognosis and risk management of these three definitions appear to be similar.

The prevalence of MetS increases with aging and varies widely depending on the definition, region, and population. Taiwan provides a typical example. Hwang et al.[6] showed that age-standardized prevalence of MetS was 15.7% using the modified ATP III criteria, 14.3% using the IDF criteria and 16.4% by the MetS -Taiwan criteria, and the prevalence of MetS increased with age in a Taiwanese population. Huang et al.[7] demonstrated that MetS is a common disorder in elderly Taiwanese, and the NCEP defined MetS prevalence in elderly patients to be as high as 21.5% in men and 37.6% in women.

MetS was shown to have a five-fold increase in the risk of T2DM and patients with MetS are at twice the risk of developing CVD over the next five to 10 years after diagnosis as compared to individuals without the syndrome.[8] In a meta-analysis of 21 studies, individuals with MetS had an increased incidence of CVD, CHD and stroke compared to those without MetS.[9] However, few studies have investigated the association between MetS and CV mortality in older adults. In the Health, Aging, and Body Composition (Health ABC) study,[10] subjects over age 70 years with MetS had greater risk of CV events but no significant difference in mortality was observed between older adults with and without MetS. In a study of non-diabetic older adults (age 65–74 years) in Finland,[11] MetS had an increased risk of CHD mortality but was not associated with all-cause mortality. In the Italian Longitudinal Study on Aging,[12] MetS increased risk of stroke and DM, but significantly increased CV mortality occurred only in older men. Older adults with MetS had a higher CVD and all-cause mortality in Taiwan compared to those without MetS.[13] Observations from epidemiological studies suggest associations between age-related increases in the prevalence of MetS and increased risk of CV mortality. Therefore, preventing CV diseases in older adults with MetS has become increasingly important issue.

3. Changes in blood lipids with aging

The prevalence rates of LDL-C ≥160 mg/dL, TG ≥ 200 mg/dL and HDL-C ≤35 mg/dL were 14.8%, 1.2%, 11.0% and 13.6%, 13.4%,12.9%, respectively, in Taiwanese men and women aged over 65 years.[14] Increased TGs, low HDL-C, and the presence of small dense LDL with normal or slightly increased LDL-C in MetS are called the atherogenic triad. Elderly patients with CVD are treated less aggressively and receive less evidence-based care. Clinical recognition and management of older adults with MetS emphasizes the importance of applying adequate treatment to reduce the risk of developing subsequent diseases. The following sections of this article will focus on how to manage dyslipidemia in older adults with MetS.

4. Goals of lipid lowering treatment

Previous studies have reported that high LDL-C, low HDL and high TG were associated with high CV adverse events.[15–17] The Taiwan lipid guidelines recommend the following: 1. For patients with acute coronary syndrome (ACS) and stable CHD, LDL-C < 70 mg/dL is the major target; 2. A LDL-C <55 mg/dL can be considered in ACS patients with DM; 3. For diabetic patients who are ≥40 years old, the LDL-C target should be < 100 mg/dL. After achieving the LDL-C target, combinations of other lipid-lowering agents with statins is reasonable to attain TG < 150 mg/dL and HDL-C >40 in men and >50 mg/dL in women with T2DM.[18] The effects of lipid lowering agents on blood lipid levels are summarized in Table 2.