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Editorial

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Lifetime Risk of Coronary Heart Disease in Japan

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The Japan Atherosclerosis Society guidelines (2017) recommended the use of the absolute risk equation for the primary prevention of atherosclerotic cardiovascular disease (ASCVD)[1], similar to recommendations in the US[2] and European countries[3]. According to the recommendation, high-risk individuals were identified using risk stratification for lipid management performed according to the individual's absolute risk.

The Suita score was adapted for individuals aged 30–79 years in the guideline[1], and the estimation tool provided the probability of incident coronary heart disease (CHD) during a 10-year period. However, the 10-year absolute risk of CHD was very low for young adults, regardless of low-density lipoprotein cholesterol (LDL-C) levels because CHD incident rates were highly dependent on age. For example, according to the equation, a 35-year-old man with 160 mg/dl of LDL-C and Grade 2 hypertension is estimated to have only 3% CHD prediction within 10 years. Nonetheless, this may mislead patients with a high-risk of CHD. As a risk communication tool between physicians and patients, informing them of the 10-year absolute risk may be unsuitable for motivating lifestyle interventions at an early age.

The 2018 American Heart Association and American College of Cardiology (AHA/ACC) guidelines proposed "Healthy lifestyle over the lifespan," and recommended to provide an estimate of lifetime risk (LTR) of ASCVD for younger individuals aged 20–39 years. The US guideline declared that a healthy lifestyle initiated during childhood reduced the lifetime risk of ASCVD[2]. LTR is defined as a cumulative risk assessment of diseases from a particular age until the end of life. In accordance with the conditions of ASCVD risk factors, it can provide the estimated provability of disease onset during the remainder of the patient's life. The pooled cohort equations (PCE) in the AHA/ACC guidelines can be used to estimate the lifetime risk of ASCVD occurrence for individuals aged 20–59 years and the 10-year absolute risk for those aged 40–79 years[4].

Satoh M, *et al.* reported that high total cholesterol levels elevated LTR of CHD mortality in hypertensive individuals in a pooled large cohort study[5]. For example, LTR of CHD mortality for 35-year-old men with total cholesterol ≥ 220 mg/dl and Grade 2 hypertension was 7.73%; however, the 10-year CHD mortality risk was almost zero among the same cohort. The LTR of CHD mortality remarkedly increased with the progression of cholesterol levels and stage of hypertension Grades 2–3. They estimated that the LTR of CHD mortality was 7.73% for men and 5.77% for women at the age of 35 years. The LTR decreased by 7.71% and 5.19% at the age of 75 years for men and women, respectively. Interestingly, these results suggest that it is essential to encourage lifestyle modifications to reduce risk factors, such as elevated blood pressure and LDL-C, early in life.

LTR is usually calculated using the survival analysis with age-specific hazards, incidence, or mortality rates from CHD or other endpoints. A long-term prospective study reported that incidence rates of CHD in men were approximately two times the mortality rates[6]. Thereby, given the difference incidence and mortality rates, LTR calculated using each rate will be different, as the Suita cohort study reported LTR using CHD incidence rates[7].

In a linear manner, we presented the age-adjusted hazard ratio for incident CHD in men in the highest quintile (≥ 170 mg/dl) versus the lowest quintile (< 111 mg/dl) of non-high-density lipoprotein cholesterol (non-HDL-C) increased by 6.55 (95% CI, 3.45–12.4)[8]. The Suita study reported the 10-year absolute risk and LTR of incident CHD for 45-year-old men with non-HDL-C ≥ 190 to be 5.1% and 41.45%, respectively[7]. There were several ways to

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inform the patients of the risk impact on CHD. We should pay more attention to young adults aged 20–39 years for early prevention of ASCVD based on LTR in Japan.

Conflicts of Interests

None.

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