To the Editor:

Recently, Hirai et al reported a 40-year follow-up study on the effect of blood pressure on mortality by stroke or cardiovascular disease (CVD). The study group continuously had these events checked, mainly by official death certificates. I think that the numbers of events is satisfactory for Cox proportional hazard regression analysis, but some additional information would support the understanding of this important epidemiological study.

First of all, they used height and weight separately instead of using body mass index (BMI) as an independent variable for Cox proportional hazard regression analysis. In addition, they did not use serum cholesterol as an independent variable for Cox proportional hazard regression analysis. Furthermore, they speculated that the effect of systolic hypertension on CVD mortality was attenuated by very-long-chain n-3 fatty acids.

As they used several associated variables for the adjustment of the effect of blood pressure on stroke or CVD mortality, I recommend analysis by inclusion of serum cholesterol, BMI and dietary habits with exclusion of height and weight. In general, the number of independent variables should be limited to one-fifth of the number of events. Dummy variables should also be handled with caution, because the number of categories minus one is considered to be added to the total number of independent variables. I also recommend presenting the hazard ratios with 95% confidence intervals of the adjusted variables to ensure that the effect of several risk factors relating to CVD mortality is understandable.

Hirai et al mention that they could not use the data of repeated blood pressure measurements because of an incomplete data set. There are several reports that time-dependent Cox proportional hazard regression analysis presents more valid information on risk assessment, especially in long-term follow-up studies, although interpretation becomes complex compared with fixed (non-time-dependent) Cox proportional hazard regression analysis.

The mortality rates for stroke and coronary heart disease (CHD) have changed in the past 4 decades when the vital statistics in Japan are overviewed. Roughly speaking, the mortality of stroke has halved and the mortality of CHD has increased 3-fold. Furthermore, subclassification of stroke is also important because of the different trends for hemorrhagic stroke and cerebral infarction. I strongly recommend conducting Cox proportional hazard regression analysis, including place of residence, to elucidate the difference in the risk of place of residence on mortality, which would support the risk assessment of lifestyle on the mortality of stroke or CVD. In addition, the hazard ratio for CHD mortality should be calculated, although the limited number of events makes the results unstable. I feel that their database should include much more information about preventive cardiology, and I recommend continuous survey to add information from official death certificates in the most recent 10 years.

Disclosures

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References


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