



## Letter to the Editor

# Letter: cervicocerebral atherosclerosis and its hepatic and coronary risk factors in patients with liver cirrhosis

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Dear Editor,

We have read with great interest the expert opinion by An et al.<sup>1</sup> regarding cervicocerebral atherosclerosis in patients with liver cirrhosis and the associated hepatic and coronary risk factors. The authors' valuable contributions to understanding the atherosclerotic burden of cervicocephalic vessels in cirrhotic patients and demonstrating the importance of subclinical cerebral atherosclerosis survey with coronary artery calcium score are much appreciated. However, we wish to reinforce two dimensions of this paper.

Firstly, this paper provided physical conditions of the patients, such as hepatic and blood pressure parameters. However, the socioeconomic status and education level of patients were not disclosed in the paper, which could be a potential major selective bias between the two cohorts. In South Korea, magnetic resonance angiography (MRA) is not provided in general health examination. Recent study showed that men and women with a higher income and education level appeared more likely to undergo opportunistic health check-ups (men: highest vs. lowest income: odds ratio [OR], 2.380; 95% confidence interval [CI], 1.218–4.653;

≥12 vs. <6 years education: OR, 2.121; 95% CI, 1.142–3.936; women: highest vs. lowest income: OR, 4.042; 95% CI, 2.239–7.297; ≥12 vs. <6 years education: OR, 2.475; 95% CI, 1.283–4.775).<sup>2</sup> On the other hand, although no difference was found according to income level in the population, education level was significantly associated with the presence of atherosclerosis. It was reported that participants with lower education level presented a higher risk of generalized atherosclerosis than those with higher education (OR, 1.46; 95% CI, 1.15–1.85;  $P=0.002$ ).<sup>3</sup> Thus, it is suggested that the authors should provide more detailed and valid data to minimize the potential selective bias.

Secondly, this study employed MRA to identify intracranial and extracranial atherosclerosis. However, the intraplaque hemorrhage and lipid core were not identified, which could significantly influence the severity of carotid atherosclerosis. It has been accepted that intraplaque hemorrhage is one of the features of vulnerable plaques.<sup>4</sup> Moreover, the presence of a lipid core was independently associated with incident cardiovascular disease events when adjusted for traditional cardiovascular disease risk factors and maximum coronary artery wall thickness (hazard ratio, 2.48;

### Abbreviations:

CI, confidence interval; MRA, magnetic resonance angiography; MRI, magnetic resonance imaging; OR, odds ratio

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95% CI, 1.36–4.51;  $P=0.003$ ).<sup>5</sup> The critical tissues of plaque could be identified including fibrous tissue, calcifications, lipid-rich necrotic core and intraplaque hemorrhage.<sup>6</sup> Hence, it is suggested that the authors should revise the magnetic resonance imaging (MRI)/MRA series to identify the intraplaque hemorrhage and lipid core to indicate the severity of carotid atherosclerosis.

In conclusion, we sincerely appreciate this valuable work for providing the very first evidence that liver cirrhosis has protective effect against intracranial atherosclerosis. However, to enhance the credibility of the above conclusion, we are convinced that the potential residual confounders should be revealed, and that the authors could provide more detailed MRI/MRA information in this study to make the outcomes more persuasive.

### Authors' contributions

Yi-Chun Huang: Conceived and wrote the manuscript. Chih-Wei Chen: English editing and proofreading. James Chun-Chung Wei: Conceived and supervised whole process.

### Conflicts of Interest

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The authors have no conflicts to disclose.

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