

# Stroke in Women: Still the Scent of a Woman

Jong S. Kim

Department of Neurology, Gangneung Asan Hospital, University of Ulsan College of Medicine, Gangneung, Korea

When I was a young professor, I conducted experimental stroke research that involved inducing middle cerebral artery infarction with the use of a thread. At that time, I only used male rats because I heard that due to the complex and fluctuating female physiology, research results may not be consistent if female animals were used. I soon got questions. If this is true, what would be different? Would the infarct size be bigger or smaller in female rats? Would there be a difference in infarct size during the ovulatory and menstrual stages? Can the results obtained from male rats be applied to female human patients? And, would a newly developed medicine be equally effective in women?

In this issue of the *Journal of Stroke*, the two review papers by Yoon and Bushnell,<sup>1</sup> and Ospel and his colleagues<sup>2</sup> focused on "stroke in women," which reminded me of my old questions. Actually, "stroke in women" is even more complex than "stroke in female rats." The physiologic changes that occur with age and in response to the surrounding environment are more abrupt and dramatic in women than men, who experience unique events such as puberty, pregnancy, and lactation. Unlike rats, women also experience menopause and long-lasting post-menopausal lives. More importantly, in human society, sex is linked with social-economic-cultural issues in a very complex manner. In general, women are less educated, economically poorer, and have a lower social status than men.<sup>2</sup> Practically, this difference is especially marked and impactful in underdeveloped countries. If only a father can earn money, family members may take care of the father more carefully than the mother. This social discrimination may be one of the reasons why stroke outcomes are worse and the risk factors are less well managed in women than in men. Although the two papers are very informative, they also emphasized how difficult it is to understand "stroke in women" in which

sex is closely related to ever-changing physiology and complex socioeconomic issues. Unfortunately, the majority of high-quality scientific papers are from developed countries where sex discrimination is less marked. Hence, "stroke in women" has not gained sufficient interest in the literature, and many important issues remain unclarified.

In the movie, "Scent of a Woman," Al Pacino appreciated the scent of a woman while he danced the tango with her, but could not visualize her due to his blindness. After reading the two papers, you may ask the same questions that I am asking. And yes, we can appreciate the scent of a woman, but when can we see her clearly?

## References

1. Yoon CW, Bushnell CD. Stroke in women: a review focused on epidemiology, risk factors, and outcomes. *J Stroke* 2023;1:2-15.
2. Ospel J, Singh N, Ganesh A, Goyal M. Sex and gender differences in stroke and their practical implications in acute care. *J Stroke* 2023;1:16-25.

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### Correspondence: Jong S. Kim

Department of Neurology, Gangneung Asan Hospital, University of Ulsan College of Medicine, 38 Bangdong-gil, Gangneung 25440, Korea  
Tel: +82-33-610-4196  
E-mail: [jongskim@amc.seoul.kr](mailto:jongskim@amc.seoul.kr)  
<https://orcid.org/0000-0002-3999-4992>

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