Sex-related differences of acute stroke unit care: results from the Austrian stroke unit registry

Evaluation of: Gattringer T, Ferrari J, Knoflach M et al. Sex-related differences of acute stroke unit care results from an Austrian stroke unit registry. Stroke 45, 1632–1638 (2014). The authors analyzed data from 47,209 patients diagnosed with ischemic stroke or transient ischemic attack from January 2005 to December 2012. In this study, epidemiological data, stroke type, diagnostics and clinical scores were analyzed for age-adjusted preclinical and clinical characteristics as well as quality of acute stroke care. Moreover, outcome at 3 months was included in a multivariate model corrected for demographic and clinical confounders. While there were no reported sex differences in stroke care and thrombolysis rates, males more often received magnetic resonance imaging (MRI) brain scans. From follow-up data, a worse functional outcome was observed for females in univariate and multivariate analysis. In fact, females were less likely to be prescribed statins and more likely to receive antiplatelet therapy. As a stroke risk factor, a higher rate of atrial fibrillation was observed in females.

Keywords: outcome • sex differences • stroke • stroke registry

We have read the paper by Gattringer et al. entitled Sex-related Differences of Acute Stroke Unit Care Results from an Austrian Stroke Unit Registry [1], which sought to examine the existence of sex-related differences in stroke unit care. They analyzed data from a prospective nationwide Austrian stroke registry having 47,209 patients diagnosed with ischemic stroke or transient ischemic attack from January 2005 to December 2012. Epidemiological data, stroke type, diagnostics and clinical scores were analyzed for age-adjusted preclinical and clinical characteristics and quality of acute stroke care in males and females. Moreover, outcome at 3 months was included in a multivariate model, correcting for demographic and clinical confounders. From this, females represented 47.3% of stroke patients and 23.3% of transient ischemic attack patients. The median age of females was higher than in males (77.9 vs 70.3 years). There were more reported severe strokes in females and they had a higher rate of atrial fibrillation compared with males. No difference in the use of oral anticoagulants between the sexes was observed, whereas more anterior circulation strokes and cardio-embolic pathogeneses were more commonly observed in females. While there were no reported sex differences in stroke center and thrombolysis rates, males more often received MRI brain scans. Follow-up data were available for 38.4% of females and 39.5% of males. From these data, a higher mortality and a worse functional outcome were observed for females in univariate analysis. Likewise, multivariate analyses revealed a higher grade of disability and a comparable rate of rehabilitation for females. However, females were less likely to be prescribed statins and more likely to receive antiplatelet therapy.

Discussion
This study found that, despite no observed differences in acute stroke care and rehabilitation, females had a worse functional outcome, evaluated by modified Rankin scale and dependence on nursing scale, 3 months...
after the acute cerebral ischemic event. Previous published studies from Europe and North America, including the Framingham Heart Study, have reported similar results [2–7].

However, this seemingly standardized care is based only upon studies on male populations, typically between the ages of 50 and 75 years, Caucasians with Western lifestyles. Furthermore, the secondary prevention treatments including the latest anticoagulants have been studied in populations with predominantly male patients younger than 75 years of age. This is in great conflict with the fact that stroke onset begins in women at this age. In fact, the Austrian study, as well as all major studies to date, have clearly evidenced that the highest risk for stroke onset in females is after 75 years [5–8]. Being so, this could explain the worse outcome results in all major published studies to date. Another hypothesis that has been greatly debated in the literature is that estrogens may play a protective role, up until menopause, in females in delaying the onset of stroke.

The number of patients enrolled in the Austrian study can be considered adequate and the data has been collected in an accurate manner. However, the number of patients not participating in follow-up was a weakness of the study. The authors do not provide any data on the number of patients enrolled in the Austrian study. Despite equal acute stroke care and a comparable rate of neurorehabilitation, females had a worse functional outcome at 3-month follow-up (modified Rankin scale 3–5; odds ratio: 1.26; 95% CI: 1.17–1.36).

In conclusion, the Austrian study addresses a very important issue that needs to be further investigated, not only in the clinical setting but more importantly in sex-balanced animal and cell studies.

Future perspective
Females, owing to their older age at stroke onset, numerous comorbid conditions and the fact that they are more likely to live alone all of which typically leads to greater burdens for national health care services, need to be considered a distinct subgroup. By exploring sex differences we would be able to better tailor both treatment and long-term care for elderly females.

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Executive summary

In this Austrian study females were significantly older (median age: 77.9 vs 70.3 years), had higher pre-existing disability and more severe strokes.

No significant sex-related differences in quality of care were identified. Females and males had comparable onset-to-door times, times to and rates of neuroimaging, as well as door-to-needle times and rates of intravenous thrombolysis.

Despite equal acute stroke care and a comparable rate of neurorehabilitation, females had a worse functional outcome at 3-month follow-up (modified Rankin scale 3–5; odds ratio: 1.26; 95% CI: 1.17–11.36).

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