Acute Stroke Symptoms: Do Differences Exist between Sexes?

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Background: Previous studies have reported that women with stroke often present different stroke symptoms than men. The aim of our study was to assess for the relevance of these differences from a large case series. *Methods:* Consecutive patients admitted to the Stroke Unit at the University of Perugia, with acute stroke or transient ischemic attack between 1 June, 2005, and May 2012, and recorded in Perugia Stroke Registry were prospectively included. Associations between the recorded symptoms and sex were assessed by preliminary cross-tabulations with the Chi-square test or Fisher exact test with Yate correction when appropriate. Multivariable regression analysis was used to identify independent predictors of a single symptom including sex as an independent variable. *Results:* Overall, 1072 men and 811 women were included in this study. Women had a higher average age at onset (75.40 ± 12.90 years in women and 70.14 ± 12.61 years in men) and presented more severe strokes with higher National Institute of Health Stroke Scale scores than men, whereas men were more likely to have a posterior stroke.Regarding symptoms, multivariate analysis revealed correlations between postural instability and male sex and between dysphagia and female sex. *Conclusions:* We found no differences in the clinical presentation of stroke between the sexes, except that men were more likely to have postural instability and females were more likely to have dysphagia. These findings suggest that stroke locations and stroke severity were associated with sex. **Key Words:** Epidemiology—sex—symptoms—stroke—risk factors—stroke subtypes.

Introduction

Clinical presentations of stroke have been reported to vary among the sexes. In fact, stroke in women has been reported to be more frequently associated with anterior circulation ischemia, whereas men are believed to more likely to have cerebellar and brain stem symptoms and higher incidences of posterior circulation syndromes than women.[1,2] Moreover, Labiche et al[3] have reported that females at stroke onset were more likely to present with "non-traditional" stroke symptoms compared with men (odds ratio [OR], 1.6; 95% confidence interval [CI], 1.2-2.2), which included pain and a reduced level of consciousness. In contrast, men were more likely to present with "traditional" stroke symptoms including imbalance and hemiparesis.

In contrast, we have previously observed that females tended to have more total anterior infarction and higher National Institute of Health Stroke Scale (NIHSS) at admission.[4,5]

The aim of our study was to review the clinical presentations of stroke patients both in men and women of all ages from our large case series to investigate sex differences in symptoms at stroke onset.

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Methods

Consecutive patients admitted to the Stroke Unit of the Division of Cardiovascular Medicine, University of Perugia, Italy, with acute stroke (ischemic or hemorrhagic) or transient ischemic attack (TIA) between 1 June, 2005, and May 2012 and recorded in Perugia Stroke Registry[6,7] were included in this prospective single-center cohort study. For the purpose of this study, all patients were assessed by an expert neurologist to determine the diagnosis of stroke and its etiologic subtype. Stroke severity was assessed using the NIHSS on admission.[8] Also, stroke was classified as either large artery atherosclerotic, cardioembolic, cryptogenic, or lacunar according to the Trial of Org 10172 in Acute Stroke Treatment criteria.[9] Clinical subtypes of ischemic stroke were rated according to the Oxfordshire Community Stroke Project criteria as total anterior circulation infarct, partial anterior circulation infarct, posterior circulation infarct, or lacunar infarct.[10]

We collected data on demographics, stroke subtype, stroke etiology, vascular risk factors, history and type of treatment, NIHSS and Glasgow Coma Scale at admission and at discharge, signs and symptoms at first neurologic evaluation, stroke complications, outcome at 90 days (modified Rankin Scale[11]), and destination after hospital discharge.

Recorded symptoms and signs were the following:

(1) Type of neurologic deficit: motor, sensory, and sensory-motor
(2) Localization of neurologic deficit: facial, facial–brachial, facial–brachial–crural, brachial–crural, facial–crural, brachial, and crural
(3) Side: left, right, and bilateral
(4) Disorder of cortical functions: aphasia, apraxia, and neglect
(5) Dysarthria
(6) Disorders of visual function: hemianopsia and cortical blindness
(7) Brain stem syndromes: Weber, Wallenberg, Foville–Millard–Gubler, Parinaud, and Benedict
(8) Headache
(9) Ocular motor dysfunction: conjugate gaze palsy, one and half syndrome, and internuclear ophthalmoplegia
(10) Cranial nerve disorders except VII cranial nerve because the latter is included in the localization of neurologic deficit (facial)
(11) Dysphagia
(12) Postural instability: ataxia, vertigo, and dizziness
(13) Bernard–Horner syndrome
(14) Consciousness disorders
(15) Babinski sign
(16) Epilepsy at onset
(17) Other atypical symptoms and signs: diplopia (without oculomotor nerves dysfunction), retinal ischemia, pseudobulbar syndrome, locked-in syndrome, paraparesis, hemichorea syndrome, global amnesia, and amaurosis fugax.

Statistical Analysis

Associations between the recorded symptoms and sex were assessed by preliminary cross-tabulations with the Chi-square test or Fisher exact test with Yate correction when appropriate. Multivariable regression analysis was used to identify independent predictors of a single symptom (dependent variables), including sex as an independent variable.[12] The independent variables included in the models, in addition to sex, were: age, NIHSS on admission, stroke etiology, history of previous TIA/stroke, hypertension, diabetes mellitus, smoking, hyperlipidemia, obesity, history of ischemic heart disease, and clinical syndromes. The results of the multivariable regression analysis are reported as OR with 95% CI. Data were analyzed with SPSS/PC Win package version.[13]

Results

This study included 1883 patients, 1072 men (56.9%) and 811 women (43.1%) with women having a higher average age at onset (75.40 $\pm$ 12.90 years in women and 70.14 $\pm$ 12.61 years in men). Ischemic strokes accounted for most of the cases: 1626 ischemic strokes and TIAs (86.4%) and 257 hemorrhagic strokes (13.6%). Patient characteristics are listed in Table 1. Differences were observed in etiopathogeneses, with a higher prevalence of cardioembolic events in women, in the presence of their greater frequency of atrial fibrillation compared with men, whereas men had a higher percentage of atherosclerosis and small vessel disease.

Regarding risk factors, we did not observe any significant disparities between the sexes concerning hypertension, diabetes mellitus, hyperlipidemia, history of TIA, or peripheral artery disease. Although males were more likely to have a history of ischemic heart disease, smoking habit, and suffer from alcoholism, females were significantly more obese (Table 2).

From the univariate analysis, distinctions were found in both for the distribution and extent of deficits (facial, brachial, crural, and associations between them) as well as the type of system involved (motor, sensory, or both).

Regarding clinical presentation, women had higher NIHSS scores than men. So, women more frequently had disorders of higher cortical functions, ocular motor dysfunctions, Babinski sign, and consciousness state disorders. Instead, men had a higher incidence of postural instability.

No differences were seen between sexes regarding dysarthria, headache, disorders of higher visual functions, alternating syndrome, Bernard–Horner syndrome,