Analysis of 1008 Consecutive Patients Aged 15 to 49 With First-Ever Ischemic Stroke. The Helsinki Young Stroke Registry

Jukka Putaala MD*; Antti J. Metso MD, PhD; Tiina M. Metso MD; Nina Konkola MD; Yvonn Kraemer MD; Elena Haapaniemi MD, PhD; Markku Kaste MD, PhD; and Turgut Tatlisumak MD, PhD

From the Department of Neurology, Helsinki University Central Hospital, Helsinki, Finland.

* To whom correspondence should be addressed. E-mail: jukka.putaala@hus.fi

**Background and Purpose**—To analyze trends in occurrence, risk factors, etiology, and neuroimaging features of ischemic stroke in young adults in a large cohort.

**Methods**—We evaluated all 1008 consecutive ischemic stroke patients aged 15 to 49 admitted to Helsinki University Central Hospital, 1994 to 2007. Etiology was classified by Trial of Org 10172 in Acute Stroke Treatment criteria. Comparisons were done between groups stratified by gender and age.

**Results**—Estimated annual occurrence was 10.8/100 000 (range 8.4 to 13.0), increasing exponentially with aging. Of our 628 male and 380 female (ratio 1.7:1) patients, females were preponderant among those <30, whereas male dominance rapidly increased around age of 44. The most frequent risk factors were dyslipidemia (60%), smoking (44%), and hypertension (39%). Males and patients >44 clearly had more risk factors. Cardioembolism (20%) and cervicocerebral artery dissection (15%) were the most frequent etiologic subgroups. Proportions of large-artery atherosclerosis (8%) and small-vessel disease (14%) began to enlarge at age 35, whereas frequency of undetermined
etiology (33%) decreased along aging. Posterior circulation infarcts were more common among patients <45 years of age. Left hemisphere infarcts were more frequent in general. There were 235 (23%) patients with multiple and 126 (13%) with silent infarcts, and 55 (5%) patients had leukoaraiosis.

Conclusions—The frequency of ischemic stroke increases sharply at age 40. Etiology and risk factors start resembling those seen in the elderly in early midlife but causes defined in younger patients still are frequent in those aged 45 to 49. Subclinical infarcts were surprisingly common in the young.

Key words: cerebral infarct • imaging • risk factors • stroke in young adults • young, stroke in