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Risk Factors and Etiology of Young Ischemic Stroke

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Summary (Abstract):

Stroke incidence rises steeply with age; therefore, stroke in younger people (18-50 years) is less common and is currently estimated to constitute up to 15–18% of all ischemic strokes. However, stroke in a young person can be devastating in terms of productive years lost and impact on a young person's life, so knowledge of the risk factors and causes of stroke is essential to inform them on the cause of the disease and to possibly prevent future vascular disease. The etiologic and prognostic features that characterize strokes in older persons may not apply to young adults ending up as being classified with a stroke due to an unknown cause; hence, it is important to develop a classification system for strokes in young adults to identify more risk factors and causes of stroke in young adults, leaving a smaller residual category of patients with an unknown cause of stroke.

Introduction:

1.1. The Definition of a Stroke: Stroke was defined as a focal neurologic deficit persisting for more than 24 hours. It occurs when the blood supply to a part of your brain is interrupted or reduced, depriving brain tissue of oxygen and nutrients, leading to brain cell death within minutes.¹

1.2. Types of Stroke: Ischemic and hemorrhagic strokes. About 80 percent of strokes are ischemic strokes. Ischemic strokes occur when the arteries to the brain become narrowed or blocked, causing severely reduced blood flow (ischemia). While hemorrhagic strokes occur when a blood vessel in the brain leaks or ruptures.¹

1.3. The Incidence of Stroke in Young Adults: The incidence of ischemic stroke among young adults (18–50 years) is rising and is currently estimated to constitute up to 15–18% of all ischemic strokes. However, etiology remains unknown in 30–40% of these patients when current classification systems designed for the elderly are used. And as these patients generally still at risk of recurrent strokes, it is essential to inform them on the cause of the disease and to possibly prevent future vascular disease.²

1.4. Trial of Org 10172 in Acute Stroke Treatment (TOAST) Classification: Is a classification system developed for elderly stroke patients. This classification does not take into account other potential mechanisms of stroke, that particularly occur in the young, including (reversible) vasoconstriction, migraine and non-atherosclerotic (e.g. inflammatory) arteriopathies, and so at best, young patients with these causes end up as being classified with a stroke due to an “other determined” cause. Another potential disadvantage of using a classification system developed for elderly patients is that treatment options are not the same.²

1.5. The International Pediatric Stroke Study (IPSS) Classification: Is a classification system developed for young adult stroke patients (18-50) and for stroke at the other end of the age spectrum, namely between 1 and 18 years, the so-called pediatric stroke. Applying this approach to a large group of young stroke patients lead to an improved identification of risk factors and causes for stroke in young adults, leaving a smaller residual category of patients with an unknown cause of stroke.²

1.6. The Aim of This Report: To investigate the prevalence of all potential risk factors and etiology in patients with a first-ever ischemic stroke or transient ischemic attack (TIA) aged 18–50 years and categorize them according to the approach of the International Pediatric Stroke Study (IPSS). The second aim was to evaluate the effect of this approach on the residual proportion of patients that were classified as having an “unknown etiology” according to TOAST criteria. Finally, we aimed to assess whether risk factor categorization according to IPSS may result in identifying more patients with a risk factor or cause of the disease in specific subgroups, such as age or sex.

2. Discussion:

2.1. A Comparison of Risk Factor Categorization Between IPSS & TOAST Criteria: A prospective cohort study of 656 patients aged between 18-50 with a first ever ischemic stroke or TIA were eligible for assessment.

- **According to IPSS Criteria:** 619 patients (94%) were classified into at least one IPSS category, and 315 patients (48.0%) were classified in two or more IPSS categories. In addition, in almost 90% of patients who would have been categorized as “unknown etiology” according to the TOAST classification, new risk factors were identified. Chronic systemic conditions (19.2%), chronic head and neck disorders (14.6%), cardiac disorders (13.9%) and arteriopathy (12.2%) were the most reported risk factor categories among patients with a young stroke, besides 1 risk factor for early atherosclerosis (95.3%). When stratified according to age, chronic systemic conditions were significantly more present in stroke patients <35 years old compared with those 35 years old. On the other hand, risk factors for early atherosclerosis were more present in stroke patients aged 35 or older. When stratified by sex women were more likely to have a chronic head and neck disorder and a chronic systemic condition than men.²

Additional risk factors were identified, 13 patients (5.8%) with a prothrombotic disorder, three patients (1.3%) with an autoimmune disorder, 11 patients (4.9%) with hyperhomocysteinemia, one patient (0.4%) with antiphospholipid syndrome and one patient (0.4%) with Factor V Leiden. Migraine was reported in 38 patients (16.9%). Ten cases (8.1%) were pregnancy related, with nine women suffering from stroke during pregnancy and one woman within six weeks postpartum.²

- **According to TOAST Criteria:** Patients aged 35 years were more likely to be classified as having “large artery disease”. On the other hand, stroke was more likely to be classified as “other defined etiology” in patients younger than 35 years (23.2% vs. 35 years 12.4% $p < 0.05$). In 226 patients (34.5%), the cause of stroke was not found according to TOAST criteria and was accordingly classified as “unknown etiology”, this was the most reported category in patients younger than 35 years.²

2.2. Assessment of Risk Factors and Etiology of First-Ever & Recurrent Strokes: Analyzation of risk factors and causes of ischemic stroke in 837 young patients aged (18-54), 741 patients with first-ever stroke and 96 patients with recurrent stroke.³

Among first-ever patients, men predominated in all age groups and the prevalence of well-documented risk factors was 83% and was significantly higher in older age group. The most frequent risk factors were hypertension (53%), dyslipidemia (46%), and smoking (35%). Patients aged over 44 years suffered more often from dyslipidemia, hypertension, diabetes mellitus, coronary heart disease, and atrial fibrillation. women more often had migraine and recent infection, whereas men more frequently were heavy alcohol users. In eighty-four patients (11.4%), among them 49 (9.8%) men and 35 (14.5%) women, no risk factors were identified, the so called Other Definite Etiology (ODE).³

The recurrent stroke patients, were older and had fewer less well-documented risk factors but the prevalence of well-documented risk factors was 91%, and The proportion of men was 71.9%. The patients more often had hypertension, diabetes mellitus, peripheral artery disease, and cardiac conditions other than atrial fibrillation, including acute myocardial infarction, cardiomyopathy, valvular heart disease. Five patients (5.2%) did not have any risk factors so recurrent stroke was more frequently caused by Large Artery Atherosclerosis (LAA) and less often by ODE.³

2.3. A Review of Population-Based Studies on Stroke Incidence of Patients Under 45 Years of Age:

-It is apparent that even within the “young stroke” category, incidence increases sharply with age particularly among the 34 to 44 years old age group. While a greater proportion of strokes are due to subarachnoid hemorrhage and intracranial hemorrhage in young adults (40–55%), an increased risk of cerebral infarction among young adults with conventional vascular risk factors is observed, particularly in developing countries due to increasing smoking rates and urbanization. There may be a greater incidence of stroke in developing countries, such as Libya with a reported rate of 47 in 100 000 people/year for all stroke under the age of 45. Atherosclerosis remains an important risk factor (accounting for 15–25) but cardioembolic stroke is more common among younger patients (15–35% of cases). Less common causes of stroke that are more common in women include systemic lupus erythematosus (SLE), central venous thrombosis (CVT) and fibromuscular dysplasia. With regard to sex differences in the incidence of young stroke, rates are greater among men than women in the 35 to 44 years old age, and Some population-based studies demonstrate an increased incidence among women under 30 years old. With regard to stroke in women, they are particularly susceptible to stroke in the puerperium, also oral contraceptive use is associated with a 2- to 5-fold increased risk of stroke of all subtypes, depending on the estrogen content. In as many as 35% of cases, the underlying etiology remains unclear.⁴

Conclusion:

Stroke in the young requires a different approach to investigation and management than stroke in the elderly given differences in the relative frequencies of possible underlying causes. classifying risk factors according to the IPSS in patients with a stroke at young age may lead to a more appropriate categorization and identification of more risk factors. Finally, the incidence of stroke appears greater in women than in men

under the age of 30, and women who use oral contraceptives or those who are in the puerperium are at increased risk of hemorrhage and infarction.

References:

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