原著論文

Secular Trends of Stroke Subtypes in Taiwan ~ National Taiwan University Hospital Stroke Registry, 1995~2018

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ABSTRACT

Background and Purpose: Stroke registries can provide important information on risk factors, pathogenesis, treatment and prognosis over time. Here, we report the secular trends of stroke subtypes between 1995 and 2018 from a hospital-based stoke registry in Taiwan.

Methods: The National Taiwan University Hospital (NTUH) Stroke Registry began in January 1995, recruiting all patients with stroke onset within 10 days of hospital arrival or stroke occurrence during hospitalization. The 24-year period until 2018 was divided into 1995-1999, 2000-2004, 2005-2009, 2010-2014 and 2015-2018. We analyzed the secular changes in stroke subtypes, risk factors and etiologies.

Results: There were 27,743 patients with 31,975 admissions to NTUH for stroke during the study period. Of these patients, 22,803 (male, 57.9%; mean age, 64.5 ± 15.5 years) had first-ever stroke. The percentage of cerebral infarcts increased slightly from 70.5% in 1995-2009 to 72.9% in 2010-2018, but the percentage of intracerebral hemorrhage decreased (23.9% to 21.3%). In patients with cerebral infarct, cardioembolism significantly increased from 19.9% in 1995-1999 to 28.5% in 2015-2018, as did atrial fibrillation (from 17.6% in 1995-1999 to 25.7% in 2015-2018, $p < 0.001$). The percentage of those receiving intravenous or intra-arterial reperfusion therapies increased significantly from 2005, reaching 12.4% in 2015-2018. In patients with intracerebral hemorrhage, the percentage of those with cerebral amyloid angiopathy and medication-related hemorrhage increased significantly (10.2% to 12.9% and 3% to 5.5%, respectively, both $p < 0.001$), but the percentage of those with hypertensive angiopathy decreased significantly (57.7% to 50.8%, $p = 0.008$) over time.

Conclusions: Over 24 years, rates of cardioembolism in cerebral infarct and cerebral amyloid angiopathy in intracerebral hemorrhage among first-ever acute stroke patients increased.

Keywords: intracerebral hemorrhage, ischemic stroke, secular change, stroke epidemiology, subarachnoid hemorrhage.

Introduction

In 2017, stroke was the second leading cause of mortality among non-communicative diseases, causing 6.17 million deaths, about 11% globally.[1] The global lifetime stroke risk from age 25 years onward among both men and women is 24.9%, with the highest risk in East Asia, 38.8%.[2] Over the past decades, similar with other developing countries, Taiwan has experienced a significant

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transition in the epidemiology of stroke, especially after the development of acute reperfusion therapies, and the identification of risk factors and their associated treatment.[3-5] Therefore, it is important for clinicians in Taiwan to have a general impression of the secular trends of distribution of stroke subtypes and risk factors, to enable them to make optimal decisions on diagnosis and therapy for individual patients.

A stroke data bank or stroke registry can record important information about the risk factors, pathogenesis, treatment and prognosis related to different types of stroke. In addition, a stroke registry can monitor and improve the quality of stroke care and can be used for a wide range of research studies.[6-10] The National Taiwan University Hospital (NTUH) Stroke Registry is a prospective hospital-based registry initiated in January 1995 with a high quality of data integrity and scientific results.[11-14] The aim of this study was to explore the epidemiological transition in stroke types, risk factors and etiologies of patients with first-ever strokes during the period of 1995 to 2018 from The NTUH Stroke Registry.

Methods

The NTUH Stroke Registry is a hospital-based registry initiated in January 1995. The NTUH Stroke Registry was developed to facilitate the study of the etiological factors, clinical course, prognosis and complications of stroke.[11-13] All patients who had stroke onset within 10 days of hospital admission or during hospitalization were included. We prospectively captured all cases of stroke in our hospital by daily screening all patients receiving head computed tomography (CT) or with a diagnosis of stroke at the emergency department or during hospitalization, as well as screening for a diagnosis at discharge, using the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes 430 to 437, excluding 432 (subdural hemorrhage) and 435 (transient ischemic attack). Since 2016, the diagnostic screening has been updated to the International Statistical Classification of Disease and Related Health Problems, Tenth Revision, Clinical Modification (ICD-10-CM) codes I60 to I68. Studies using The NTUH Stroke Registry have been approved by the Institutional Ethics Committee.

A detailed medical record, including medical history, stroke type, clinical course and outcome, was reviewed in each patient. Also included for each patient was the history of potential vascular risk factors, including hypertension, diabetes mellitus, hyperlipidemia, cardiac disease, ischemic heart disease, valvular heart disease, atrial fibrillation (AF), previous transient ischemic attack, malignancy, smoking and drinking habits and conditions assumed to be associated with stroke. Most patients received at least one brain CT and/or magnetic resonance imaging (MRI), and were classified as cerebral infarct (CI), intracerebral hemorrhage (ICH) or subarachnoid hemorrhage (SAH). Patients with CI were further classified into five categories in accordance with key clinical features: large artery atherosclerosis (LAA), lacunar stroke, cardioembolism, other determined etiologies and undetermined etiology, categories adopted from the Trial of Org 10172 in Acute Treatment (TOAST) classification system.[15]

Patients with traumatic ICH or primary subdural/epidural were excluded. The etiologies of ICH patients were further classified, by means of the SMASH-U classification method, as structural lesions, systemic disease-related, medication-related, cerebral amyloid angiopathy (CAA),

hypertensive angiopathy (HA) or undetermined etiology.[16, 17]

Statistical analysis

We used frequencies with percentages to describe discrete variables, and means ± standard deviations (SD) or medians (interquartile range) to describe continuous variables. For continuous variables, we used the independent sample Student's *t*-test and the Mann-Whitney U-test, as appropriate. Either chi-squared test or one-way analysis of variance (ANOVA) was used for categorical variables. We divided the 24-year period into five segments of 1995-1999, 2000-2004, 2005-2009, 2010-2014 and 2015-2018. A chi-square test for linear trend was used to calculate the changes in types of stroke, and the subtypes of CI and ICH across the period 1995-2018. A logistic regression analysis was used to adjust for factors related to the diagnosis of cardioembolism of cerebral infarct, and included age, sex, important risk factors and the different periods of time in the model. A P-value <0.05 was considered to indicate statistical significance. Statistical analysis was performed using SPSS Statistics for Windows, Version 17.0 (SPSS Inc., Chicago, IL).

Results

Between 1995 and 2018, there were 27,743 patients with 31,975 admissions to NTUH for stroke. Of these patients, 22,803 (male, 57.9%; mean age, 64.5 ± 15.5 years) had first-ever stroke, including 16,361 with CI, 4,971 with ICH and 1,471 with SAH. Table 1 shows the demographics of the overall study population and by each type of first-ever stroke from The NTUH Stroke Registry. In Table 2, there was a significant secular trend in age, but not gender, across the time period. The mean age increased from 62.9 ± 15.3 to 63.7 ± 15.6, 64.3 ± 15.7, 65.5 ± 15.5 and 65.8 ± 15.4 years in 1995-1999, 2000-2004, 2005-2009, 2010-2015 and 2015-2018, respectively. The percent of

Table 1. Demographics of Study Population

	All (n = 22803)	Cerebral infarct (n = 16361)	Intracerebral hemorrhage (n = 4971)	Subarachnoid hemorrhage (n = 1471)
Mean age, y	64.5 ± 15.5	66.8 ± 14.4	59.0 ± 17.1	57.1 ± 15.2
Male sex	13,210 (57.9)	9,513 (58.1)	3,140 (63.2)	557 (37.9)
Hypertension	13,974 (70.1)	11,526 (70.4)	3,718 (74.8)	730 (49.6)
Diabetes mellitus	6,868 (30.1)	5,732 (35.0)	955 (19.2)	181 (12.3)
Hyperlipidemia	7,944 (34.8)	6,629 (40.5)	1,159 (23.3)	156 (10.6)
Cardiac disease	7,343 (32.2)	6,338 (38.1)	831 (16.7)	174 (11.8)
Ischemic heart disease	3,199 (14.0)	2,702 (16.5)	411 (8.3)	86 (5.8)
Atrial fibrillation	3,983 (17.5)	3,621 (22.1)	315 (6.3)	47 (3.2)
Malignancy	3,266 (14.3)	2,441 (14.9)	709 (14.3)	116 (7.9)
Smoking habit	6,036 (26.5)	4,609 (28.2)	1,213 (24.4)	214 (14.5)
Alcohol drinking	3,349 (14.7)	2,334 (14.3)	868 (17.5)	147 (10.0)
1-month mortality	2,399 (10.5)	1,054 (6.4)	968 (19.5)	377 (25.6)

Values are mean ± standard deviation, or number (percentage).

Table 2. Secular Trend of Age, Sex, and Stroke Types in 1st-ever Stroke Patients

	1995-99 (n = 4150)	2000-04 (n = 4967)	2005-09 (n = 4558)	2010-14 (n = 4887)	2015-18 (n = 4241)	P-value
Mean age, year	62.9 ± 15.3	63.7 ± 15.6	64.3 ± 15.7	65.5 ± 15.5	65.8 ± 15.4	<0.001
Age ≦45 year	522 (12.6)	583 (11.7)	532 (11.7)	500 (10.2)	425 (10.0)	<0.001
Male sex	2,401 (57.9)	2,837 (57.1)	2,610 (57.3)	2,895 (59.2)	2,467 (58.2)	0.221
Stroke types						
Infarct	2,909 (70.1)	3,522 (70.9)	3,215 (70.5)	3,623 (74.1)	3,092 (72.9)	<0.001
ICH	992 (23.9)	1,075 (21.6)	1,028 (22.6)	972 (19.9)	904 (21.3)	<0.001
SAH	249 (6.0)	370 (7.4)	315 (6.9)	292 (6.0)	245 (5.8)	0.003

Values are mean ± standard deviation, or median (interquartile range), or number (percentage).
ICH indicates intracerebral hemorrhage; SAH, subarachnoid hemorrhage.

those who were young stroke patients (onset ≦45 years) decreased significantly over the period, from 12.6% in 1995-1999 to 11.7% in 2000-2009, 10.2% in 2010-2014, and 10.0% in 2015-2018. Recent years showed no evidence of greater occurrence of young stroke. In terms of stroke types, the percentage of CI did not change obviously between the first three periods encompassing 1995 to 2009 (70.1%, 70.9% and 70.5%, respectively), but it then increased significantly to 74.1% in 2010-2014 and 72.9% in 2015-2018 (p for trend <0.001). On the other hand, the percentage of ICH decreased during the study period, from 23.9% in 1995-99 to 21.3% in 2015-2018 (p for trend <0.001).

Table 3 shows the secular trends of major risk factors and subtypes in first-ever CI patients. The age at onset and rates of hypertension, diabetes, atrial fibrillation and malignancy all increased significantly over time (all p<0.001). By contrast, the percentage of those with smoking, alcohol drinking and previous transient ischemic attack tended to decrease (all p<0.001). Notably, the percentage of hyperlipidemia seems decreased in early year and increased in recent years (p<0.01). Furthermore, the percentage of AF had the most significant increase among the vascular risk factors in CI patients, from 17.6% in 1995-1999 to 25.7% in 2015-2018 (p for trend <0.001). In terms of the distribution of CI subtypes, the percentage of cardioembolism increased most significantly (19.9% to 28.5%, p<0.001) and that of small vessel occlusion decreased most significantly (32.5% to 21.7%, p<0.001) over time. Importantly, the trend of reperfusion therapies for CI patients, either by intravenous thrombolysis, intra-arterial thrombolysis or thrombectomy, increased significantly over time (p for trends, both <0.001), particularly since 2005 for intravenous thrombolysis and since 2015 for intra-arterial thrombolysis and thrombectomy.

Table 4 shows the logistic regression model for factors determining the diagnosis of cardioembolism in first-ever CI patients. The cardioembolism diagnosis, most from AF, was significantly related to older age, female sex and ischemic heart disease. After adjustment of these factors, we still found a significant period effect of greater likelihood of cardioembolism diagnosis, increasing 63-70% in 2010-2018 compared to 1995-1999.

Table 5 shows the secular trend in risk factors and subtypes in first-ever ICH patients. Similar to CI patients, over time the percentages of those with hypertension, diabetes and AF increased

Table 3. Secular Trend of Risk Factors and Subtypes in Patients with First-ever Cerebral Infarct

	1995-99 (n = 2909)	2000-04 (n = 3522)	2005-09 (n = 3215)	2010-14 (n = 3623)	2015-18 (n = 3092)	P-value
Age, year	65.1 ± 14.1	66.5 ± 14.0	66.7 ± 14.7	67.5 ± 14.6	68.0 ± 14.4	<0.001
Male sex	1,658 (57.0)	2,025 (57.5)	1,869 (58.1)	2,136 (59.0)	1,825 (59.0)	0.386
Risk Factors						
Hypertension	1,868 (64.2)	2,330 (66.2)	2,347 (73.0)	2,713 (74.9)	2,268 (73.4)	<0.001
Diabetes	925 (31.8)	1,223 (34.7)	1,146 (35.6)	1,270 (35.1)	1,168 (37.8)	<0.001
Hyperlipidemia	1,305 (44.9)	1,476 (41.9)	1,010 (31.4)	1,419 (39.2)	1,419 (45.9)	<0.001
Ischemic heart disease	705 (24.2)	600 (17.0)	471 (14.7)	469 (12.9)	457 (14.8)	<0.001
Atrial fibrillation	512 (17.6)	867 (18.9)	718 (22.3)	929 (25.7)	795 (25.7)	<0.001
Valvular heart disease	162 (5.6)	128 (3.6)	95 (3.0)	101 (2.8)	126 (4.1)	<0.001
Smoking habit	987 (33.9)	917 (26.0)	951 (29.6)	1,009 (27.8)	745 (24.1)	<0.001
Alcohol drinking	610 (21.0)	499 (14.2)	484 (15.1)	454 (12.5)	287 (9.3)	<0.001
Malignancy	368 (12.7)	507 (14.4)	421 (13.1)	558 (15.4)	587 (19.0)	<0.001
Previous TIA	114 (3.9)	182 (5.2)	132 (4.1)	130 (3.6)	91 (2.9)	<0.001
Infarct subtypes						
LAA	405 (13.9)	633 (17.5)	637 (19.8)	554 (15.3)	448 (14.5)	<0.001
SAO	945 (32.5)	1,041 (29.6)	939 (29.2)	909 (25.1)	671(21.7)	<0.001
Cardioembolism	578 (19.9)	695 (19.7)	735 (22.9)	1,003 (27.7)	882 (28.5)	<0.001
Other determined	168 (5.8)	194 (5.5)	187 (5.8)	226 (6.2)	217 (7.0)	0.099
Undetermined	813 (27.9)	959 (27.2)	717 (22.3)	931 (25.7)	874 (28.3)	<0.001
NIHSS	--	--	4 (2-10)	5 (2-11)	5 (2-12)	<0.001
GCS	--	--	15 (14-15)	15 (14-15)	15 (13-15)	<0.001
In-hospital stroke	170 (5.8)	280 (8.0)	255 (7.9)	269 (7.4)	390 (12.6)	<0.001
1-month mortality	162 (5.6)	222 (6.3)	196 (6.1)	233 (6.4)	241 (7.8)	0.008
IV thrombolysis	1 (0.03)	22 (0.62)	78 (2.42)	276 (7.61)	259 (8.37)	<0.001
IA thrombolysis or thrombectomy	0	11 (0.31)	32 (0.99)	27 (0.74)	195 (6.30)	<0.001
Reperfusion therapy	1 (0.03)	32 (0.90)	99 (3.07)	297 (8.19)	383 (12.38)	<0.001

Values are mean ± standard deviation, or median (interquartile range), or number (percentage).
GCS indicates Glasgow coma scale; IA, intra-arterial; IV, intravenous; LAA, large artery atherosclerosis; NIHSS indicates National Institute of Health Stroke Scale; SAO, small artery occlusion; TIA, transient ischemic attack.

significantly (p for trend, all <0.001), and the percentages of those with hyperlipidemia, smoking habit and alcohol drinking decreased significantly (p for trend, all <0.001). Most importantly, regarding the etiologies, the percentages of CAA and of medication-related ICH increased significantly (10.2% to 12.9% and 3% to 5.5%, respectively, both p<0.001), but the percentage of hypertension-related ICH decreased significantly (57.7% to 50.8%, p=0.008) over time.

Table 4. Factors Determining the Diagnosis of Cardioembolism in Patients with First-ever Cerebral Infract.

Variable	ß	Odds ratio	95% Confidence intervals	P-value
Age <45 y	--	1.00	--	
45-64 y	-0.034	0.97	0.81-1.15	0.697
≧65 y	0.531	1.70	1.44-2.00	<0.001
Female sex	0.290	1.34	1.23-1.45	<0.001
Hypertension	-0.232	0.79	0.73-0.87	<0.001
Diabetes mellitus	-0.387	0.68	0.62-0.74	<0.001
Ischemic heart disease	1.134	3.11	2.83-3.41	<0.001
Hyperlipidemia	-0.541	0.58	0.54-0.63	<0.001
Smoking Habit	-0.258	0.77	0.70-0.85	<0.001
Period 1995-1999	--	1.00		
2000-2004	0.059	1.06	0.93-1.21	0.371
2005-2009	0.256	1.29	1.14-1.47	<0.001
2010-2014	0.611	1.84	1.63-2.09	<0.001
2015-2018	0.658	1.93	1.70-2.19	<0.001

Discussion

This study comprehensively demonstrated the secular changes in stroke types, CI and ICH subtypes, risk factors and other related parameters in the NTUH Stroke Registry between 1995 and 2018. Apparently, stroke epidemiology changed significantly in our hospital during this 24 year-period, including not only the percentages of ischemic or hemorrhagic strokes, but also their subgroup characteristics. Whether this finding reflects the epidemiological trends of the whole population of Taiwan awaits further investigation. Nevertheless, the results of our study do provide information important to clinicians, especially for those who work in hospital settings similar to the NTUH in Taiwan.

Although significant, the distribution of ischemic and hemorrhagic stroke in The NTUH Stroke Registry did not change materially over time. These results were in contrast to those from a study of a hospital-based stroke registry in Peking during 2006-2015, which showed a significantly increasing proportion of CI and a decreasing proportion of ICH and SAH.[18] In the Japan Public Health Center-based prospective study, between 1995-1999 and 2005-2009, the proportion of ICH decreased for men, while the proportion of CI (among all types of stroke) and embolic infarction (among CI) increased for both men and women.[19] However, some stroke subtypes and risk factors did have remarkable secular trends, such as increased AF or malignancy-related CI and medication- or CAA-related ICH,[17, 20] and in turn reduced small vessel disease in CI and hypertensive ICH. Our study had similar results in terms of CI subtypes as those from the Korean Stroke Registry, which showed increased frequency of cardioembolism, decreased frequency of small vessel occlusion and a relatively steady frequency of large artery atherosclerosis.[21] Furthermore, the data showed a constantly increasing use of reperfusion therapy, whether intravenous or intra-arterial, in patients with acute CI, reflecting the rapid progress of the

Table 5. Secular Trend of Risk Factors and Subtypes in Patients with First-ever Intracerebral Hemorrhage

	1995-99 (n = 992)	2000-04 (n = 1075)	2005-09 (n = 1028)	2010-14 (n = 972)	2015-18 (n = 904)	P-value
Age, year	58.3 ± 16.8	57.6 ± 17.6	59.3 ± 17.2	59.9 ± 16.8	60.0 ± 16.7	0.005
Male sex	641 (64.6)	682 (63.4)	617 (60.0)	641 (65.9)	559 (61.8)	0.056
Risk Factors						
Hypertension	734 (74.0)	778 (72.4)	754 (73.3)	757 (77.9)	695 (76.9)	0.019
Diabetes	160 (16.1)	186 (17.3)	182 (17.7)	222 (22.8)	205 (22.7)	<0.001
Hyperlipidemia	308 (31.0)	263 (24.5)	154 (15.0)	211 (21.7)	223 (24.7)	<0.001
Cardiac disease	224 (22.6)	128 (11.9)	163 (15.9)	154 (15.8)	162 (17.9)	<0.001
Atrial fibrillation	52 (5.2)	40 (3.7)	73 (7.1)	71 (7.3)	79 (8.7)	<0.001
Smoking habit	297 (29.9)	241 (22.4)	206 (20.0)	266 (27.4)	203 (22.5)	<0.001
Alcohol drinking	233 (23.5)	174 (16.2)	151 (14.7)	183 (18.8)	127 (14.0)	<0.001
ICH subtypes						
Structure lesion	52 (5.2)	89 (18.3)	76 (7.4)	71 (7.3)	68 (7.5)	0.103
Systemic diseases	137 (13.8)	153 (14.2)	132 (12.8)	113 (11.6)	112 (12.4)	0.429
Medication-related	30 (3.0)	18 (1.7)	41 (4.0)	39 (4.0)	50 (5.5)	<0.001
CAA	101 (10.2)	109 (10.1)	145 (14.1)	150 (15.4)	117 (12.9)	<0.001
HA	572 (57.7)	604 (56.2)	534 (51.9)	510 (52.5)	460 (50.9)	0.008
Undetermined	100 (10.1)	102 (9.5)	100 (9.7)	89 (9.7)	97 (10.7)	0.816
NIHSS	--	--	12 (5-21)	12 (4-24)	14 (4-25)	0.280
GCS	--	13 (7-15)	13 (8-15)	14 (9-15)	13 (9-15)	0.241
In-hospital stroke	71 (7.2)	90 (8.4)	78 (7.6)	38 (3.9)	83 (9.2)	<0.001
1-month mortality	240 (24.2)	199 (18.5)	201 (19.5)	170 (17.5)	158 (17.5)	0.001

Values are mean ± standard deviation, or median (interquartile range), or number (percentage).
CAA indicates cerebral amyloid angiopathy; GCS, Glasgow coma scale; HA, hypertensive angiopathy; ICH, intracerebral hemorrhage; NIHSS indicates National Institute of Health Stroke Scale.

concept and employment of team-based care in acute stroke management over the past decade.[22]

Generally speaking, several major factors should be considered as affecting the secular trends of stroke epidemiology. Besides the changes in lifestyle and certain environmental factors, the promotion of aggressive risk factor control, especially hypertension, may lower the incidence of hemorrhagic stroke and small vessel occlusion in ischemic stroke over time. The empirical use of advanced imaging tools may increase the detection of large artery stenosis or occlusion. Recently, the identification of AF with prolonged electrocardiographic monitoring has been the critical factor for the increasing percentage of cardioembolisms. Furthermore, the aging of the population may also increase the occurrence some age-related risk factors, such as AF and, consequently, increase the number of cardioembolic stroke cases. Most importantly, various updated stroke guidelines and hospital accreditations have emphasized the performance of the aforementioned strategies for primary or secondary stroke prevention and management. In a database of consecutive patients with acute ischemic stroke or transient ischemic attack (TIA)

admitted to the Royal Melbourne Hospital stroke unit between 2004 and 2015, the prevalence of AF increased 1.4 times over 12 years.[23] In another hospital-based registry in Ontario, the proportion of cardioembolic stroke increased from 26% in 2002 to 56% in 2012, but AF increased only from 7% to 11%.[24] In the Athens Stroke Registry, between 1993 and 2012, the rate of newly-diagnosed AF increased significantly, as did the proportion of AF patients on proper antithrombotic treatment.[25]

Previously, similar studies of longitudinal stoke epidemiology had different results, which may be influenced by ethnicity, region, lifestyle, medical system and other factors.[26, 27] Therefore, results from local data in Taiwan are unique and irreplaceable. The greatest advantage of this study is the data generated from a prospectively gathered stroke registry with high quality. However, the NTUH is a tertiary referral center which may be biased toward selecting more serious patients. To minimize selection bias, we recruited acute stroke cases not only from the neurological ward, but also from any patient who had a stroke or TIA before being brought to our emergency room, as well as from all in-hospital stroke patients. Another study limitation would be that the interpretation of stroke etiology may be restricted to our hospital, and the changes in etiology may also be influenced by patients' tendency to seek medical care and changes in the natural population over time.

In conclusion, there were secular trends of an increasing percentage of ischemic stroke, especially AF-related, and a decreasing percentage of ICH, especially hypertension-related, among first-ever acute stroke patients over the past 20+ years in The NTUH Stroke Registry. Further studies with multi-center or population-based designs are needed to determine the changes over time in stroke subtypes and the stroke risk factors in Taiwan.

Disclosures of conflicts of interest

The authors report no conflicts of interest. All authors have seen and approved the final version of this manuscript, had full access to all of the data in the study, and take responsibility for the integrity of the findings and the accuracy of analyses.

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中風類型的年代變遷：1995-2018年臺大醫院中風登錄研究

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摘　要

背景與目的：中風登錄可提供相關風險因子、機轉、治療和預後的重要資訊。本研究探討1995至2018年的臺大醫院中風登錄的中風亞型的年代變遷長期趨勢。

方法：臺大醫院中風登錄於1995年1月開始，所有到院前10日或住院中發生中風均納入，至2018年將24年期間分為5個時期：1995-1999、2000-2004、2005-2009、2010-2014和2015-2018。分析了缺血中風、腦出血中風與蜘蛛膜下腔出血、及中風亞型及危險因子的長期年代變化。

結果：24年期間的初發中風共有22,803例(男性57.9%；平均年齡64.5 ± 15.5歲)。腦梗塞的百分比從1995-2009年的70.5%輕微增加到2010-2018年的72.9% (72.9%)，而腦出血的百分比則相對下降(23.9%至21.3%)。腦梗塞的心因性栓塞從1995-1999年的19.9%顯著增加到2015-2018年的28.5%，伴隨著心房顫動也明顯增加(1995-1999年為17.6%，2015-2018年為25.7%，$p < 0.001$)。2005年之後，靜脈或動脈內再灌注治療的百分比顯著增加，並在2015-2018年達到12.4%。腦出血的腦澱粉樣血管病變和藥物相關性出血顯著增加(分別為10.2%至12.9%和3.0%至5.5%，$p < 0.001$)，但高血壓性血管病顯著下降(57.7%至50.8%，$p = 0.008$)。

結論：1995至2018年間，初發中風患者的心因性腦栓塞和澱粉樣血管病變的腦出血顯著逐漸增加。

關鍵詞：腦出血、缺血中風、蜘蛛膜下腔出血、中風流行病學、年代變遷

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