การศึกษาปัจจัยที่สัมพันธ์กับการเสียชีวิตในกลุ่มผู้ป่วยโรคหลอดเลือดสมองตีบหลังได้รับยาอาร์ทีพีเอในโรงพยาบาลสระบุรี

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Factors associated with mortality rates in acute ischemic stroke patients after rt-PA administration in Saraburi hospital

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บทคัดย่อ

ปัจจุบันภาวะหลอดเลือดสมองตีบจากการขาดเลือดยังเป็นสาเหตุการตายหลักของประชากรไทย แต่ปัจจุบันยังไม่พบปัจจัยที่ชัดเจนที่ส่งผลต่ออัตราการตาย การศึกษานี้จึงมีจุดประสงค์เพื่อศึกษาปัจจัยที่ส่งผลต่อการเสียชีวิตในผู้ป่วยหลอดเลือดสมองตีบเฉียบพลันที่ได้รับยาละลายลิ่มเลือด การศึกษานี้เป็นการศึกษาย้อนหลัง โดยใช้การเก็บข้อมูลผู้ป่วยที่ได้รับการวินิจฉัยภาวะหลอดเลือดสมองตีบขาดเลือดชนิดเฉียบพลันและได้รับยาละลายลิ่มเลือดทางหลอดเลือดดำในโรงพยาบาลสระบุรี ระหว่าง พ.ศ. 2558 ถึง 2564 จากนั้นนำข้อมูลมาวิเคราะห์ผ่าน univariate และ multivariate binary logistic regression เพื่อให้ได้ค่า odds ratio (ORs) ผู้ป่วยในงานวิจัยนี้มีทั้งหมด 287 คน โดย 152 คน อายุมากกว่า 60 ปี (52.9%) และเป็นชาย 55.3% ผู้ป่วยที่ได้รับยาละลายลิ่มเลือด 38 คนเสียชีวิตในโรงพยาบาล คิดเป็น 13% นอกจากนี้ผู้ป่วยส่วนใหญ่นอนโรงพยาบาลประมาณ 5 วันและในกลุ่มที่เสียชีวิตมีค่าคะแนนความรุนแรงของหลอดเลือดสมองตีบ (NIHSS) 17 คะแนน ซึ่งมากกว่ากลุ่มที่รอดชีวิตที่มี NIHSS 10 คะแนน ส่วนสาเหตุการเกิดหลอดเลือดสมองตีบแบ่งตาม TOAST classification พบว่า ส่วนมากเป็นกลุ่มที่เกิดจาก cardio-embolic 55.3% รองลงมาคือ large vessel occlusion 34.2% และตำแหน่งที่พบการอุดตันมากที่สุดได้แก่ middle cerebral artery (MCA) 81.6% โดยผลวิเคราะห์พบว่าปัจจัยที่เพิ่มการเสียชีวิตคือ การอุดตันที่ MCA มีค่า OR 6.10 เท่า (95%CI 6.10 –17.16) ตามด้วยคนไข้ที่มาด้วย ภาวะการเปลี่ยนแปลงของระดับการรู้สึกตัว มีค่า OR 4.89 เท่า (95% CI 1.60-14.93) นอกจากนี้ในผู้ป่วยที่ความดันแรกรับสูงที่จำเป็นต้องได้รับยาลดความดันก่อนให้ยาละลายลิ่มเลือด ผู้ป่วยที่มีภาวะความผิดปกติทางการกลืนและการกลอกตา มีอัตราการตายที่สูงขึ้น นอกจากนี้ภาวะข้างเคียง ที่เพิ่มอัตราการตายอย่างมีนัยสำคัญได้แก่ ปอดอักเสบ โดยมีค่า OR 9.77 (95%CI 4.49-21.27) ตามด้วยภาวะเลือดออกในสมองมีค่า OR 3.41 (95%CI 1.64-7.09) เช่นกันกับภาวะหลอดเลือดสมองตีบที่รุนแรงมากขึ้นโดยมีค่า OR 7.75 (95%CI 3.24-18.51) ภาวะสมองบวม มีค่า OR 16.33 (95%CI 4.64-57.51) จากการศึกษานี้อาจสามารถช่วยแพทย์ในการวางแผนการรักษา รวมถึงช่วยในการสื่อสารกับผู้ดูแลผู้ป่วยถึงพยากรณ์ของโรค

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Abstract

Ischemic stroke is a main Thai public health issue and leading cause of death in both men and women. The information on precise predictors of in-hospital stroke mortality is insufficient but often requested in clinical practice. Therefore, we aimed to study the significant factors that increasing mortality tPA given acute ischemic stroke patients. This was retrospective study using data from all patients that was diagnosed acute ischemic stroke and was given tPA admitted in Saraburi stroke unit between 2015 and 2021. All baseline characteristics and complications data were analyzed using univariate and multivariate binary logistic regression analysis to estimate crude and adjusted odds ratio (OR). Total 287 patients diagnosed with acute ischemic stroke were included in this analysis (52.9% older than 60 years, 55.3% men). The mortality rate at the stroke unit was 13% and median stay of deceased patients was 5 days. In non-survivor group the median NIHSS score was 17 higher than in NIHSS 10 in survivor group. Etiology of stroke by TOAST classification, 55.3% was cardio-embolic stroke followed by 34.2% large artery atherosclerosis, most common sites is MCA (81.6%). Main factors that increased risk of in-hospital death as following MCA with an OR of 6.10 (95%CI 6.10 –17.16), AOC with an ORs 4.89(95% CI 1.60-14.93), given IV antihypertensive before tPA with OR 3.89 (95%CI 1.50-10.11), also swollen dysfunction and gaze disturbance. Complications increased mortality as following pneumonia with OR 9.77 (95%CI4.49-21.27), intracranial hemorrhage with ORs 3.41 (95% CI 1.64-7.09), progressive stroke with an OR 7.75 (95%CI 3.24-18.51) brain herniation with ORs 16.33(95%CI 4.64-57.51), and arrythmia with an OR 4.34 (95%CI 2.14-8.82). These results might help physicians planning the care team management, recognizing the need for intensified monitoring and providing the information to help in the communication with family members or care-giver.

Key words: acute stroke, stroke outcomes, mortality, risk factor

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Introduction

Stroke remains the major cause of poor-quality of life in adults. It is also the second leading cause of death worldwide[1]. 30-days mortality rate of ischemic stroke has been estimated at around 15% in high outcome countries[2-4]. In addition, Stroke is a main Thai public health issue and leading cause of death in both men and women (First leading cause of death in men and third leading cause of death in women, death rate about 16-23%)[5]. The main treatment in acute ischemic stroke nowadays is recombinant tissue plasminogen activator(tPA) given intravenous. The study from The National Institute of Neurological Disorders and Stroke (NINDS) Study published in 1995 show benefit of improved 3 months clinical outcomes and decrease mortality from 21 to 17 % compare with placebo.[6] Nowadays, predictors of in-hospital mortality are less intensive well-documented, in prior studies the risk factor for mortality is not the same. But mostly is severe NIHSS, elderly and cardiovascular disease.[7-15]If we know the risk factors for death This will allow us to plan treatment, intensive monitoring and communicate information to family members and care-giver about the risk associated in-hospital mortality in acute ischemic stroke patients receiving intravenous tPA.

Objective

to study the significant factors that increasing mortality tPA given acute ischemic stroke patients.

Material and Method

This retrospective cohort study included 287 patients diagnosed acute ischemic stroke and was given intravenous tPA according to indication of thrombolytic drugs. Medical folders of patients admitted to Saraburi stroke unit were searched from the hospital computer database system, using ICD-10,I60 – I69.We used an upper limit of time from symptoms onset to intravenous tPA initiation of 4.5 hours. Inclusion criteria were acute ischemic stroke patients who met the indications for intravenous tPA. The exclusion criteria were as follows: AIS patients treated with tPA who did not undergo CT brain 24 hours after receiving tPA, patients receiving tPA which thrombolytic dose was miscalculated, and patients were referred to another hospital.

NIHSS is a systematic assessment tool that provides a quantitative measure of stroke-related neurologic deficit. The NIHSS was originally designed as a research tool to measure baseline data on patients in acute stroke clinical trials. Now, the scale is also widely used as a clinical assessment tool to evaluate stroke severity, determine appropriate
treatment, and predict clinical outcome.
Additionally, definition of symptomatic intracranial hemorrhage (sICH) was defined by ECASS II and ECASS III[20] as any type of ICH on follow-up imaging between 22 and 36 hours and 7 days after stroke onset and an increase of ≥4 points on the NIHSS from baseline or the lowest value within 7 days, or mortality. Along with, definition of arrythmia in this study included atrial fibrillation(AF), ventricular
fibrillation(VF), ventricular achycardia(VT), atrioventricular block(AV lock). Patients with a history of atrial fibrillation or had new arrhythmia in hospital were considered as having arrhythmias.

The data collected between January 2015 to February 2021 from patients was diagnosed acute ischemic stroke admitted in Saraburi stroke unit located in the central region of Thailand—It represents a common tertiary hospital of the country. The chart review was collected the clinical data, baseline characteristics, clinical presentation, laboratory, CT brain imaging and complication. Correlations between categorical variables were

identified using the chi square test, and correlations between continuous variables were determined using the Student t-test to identify any identifiable risk factors associated with in-hospital mortality after thrombolysis. The individual factors were defined as statistically significant when P-value < 0.05 (Pearson chi-square) and then put all data in univariate and multivariate binary logistic regression analysis to estimate crude and adjusted odds ratio (ORs) to reduce the confounding factors. Baseline characteristics found to be significantly associated with mortality on univariate analysis, were evaluated by multivariable binary logistic regression. Adjusted odds ratios (ORs) were obtained along with 95% confidence intervals (CIs). All analyses were done using STATA version14.0. The Saraburi Hospital Ethical Committee for Clinical Research accepted this study protocol (SRBR64-033). In this retrospective data evaluation, no patient consent forms were required. Patient names and other traceable identifiers were kept private and omitted from all data management processes. The authors received no outside funding and disclosed no conflicts of interest.

Results

Among 287 patients who was diagnosed acute ischemic stroke and recieved IV tPA within 4.5 hours, 52.9% of all patients were 60 years or older,38 patients were dead (13%). Emphasize on the dead patients, 24 patients (63.2%) are older than 60 years, 55.3% were men(table1).Further, in non-survivor group the median NIHSS score was 17 (range 0–42), which higher than in survivor group (NIHSS 10).The majority of patients had hypertension and the other comorbidities are presented in Table1. The proportion of smokers was 37.8%, and the median length of stay was 5-days (range 3–20) (table2.2). Laboratory that we record for example hemoglobin, platelet, creatinine and blood sugar, all laboratory data is not significant different between survivor or no survivor groups(table2.1).For part of etiology of stroke by TOAST classification, we found that cardioembolic stroke had the highest proportion (55.3%),followed by large artery atherosclerosis (34.2%). In addition, most common sites of occlusion was middle cerebral artery (81.6%) (table1). Among 287 AIS patients treated with IV tPA, 38 (13%) died during the hospital admission. Unadjusted analyses showed no variation in the proportion of in-hospital deaths in relation to age, gender, smoking, alcohol consumption and many comorbidities except atrial fibrillations(AF)(Table 1 and 3).

Table 1 Baseline characteristics of Acute ischemic stroke patients who received IV tPA between two groups (survivors vs non survivors).

Baseline characteristic/risk factor	Survivors (N=249)(%)	Non survivors (N=38) (%)	P value*
General characteristics			
Age			0.18
1.<60 years	121 (48.6%)	14 (36.8%)	
2.≥60 years	128 (51.4%)	24 (63.2%)	
Sex			
1.Male			0.91
2.female	140 (56.2%)	21 (55.3%)	
	109 (43.8%)	17 (44.7%)	
Coexisting conditions			
History of smoke	95 (38.2%)	10 (26.3%)	0.16
Alcohol	103 (41.4%)	18 (47.4%)	0.49
Prior stroke	29 (11.6%)	4 (11.5%)	0.84
Myocardial infarction	15 (6.0%)	4 (11.5%)	0.30
CHF	19 (7.6%)	6 (15.8%)	0.10
Valvular heart disease	11 (4.4%)	2 (5.3%)	0.82
DM	66 (26.5%)	8 (21.1%)	0.47
Use antiplatelet before tPA	45 (18.1%)	7 (18.4%)	1.00
HTN	168 (67.5%)	29 (76.3%)	0.27
CKD	30 (12.0%)	2 (5.3%)	0.22
DLP	101 (40.6%)	12 (31.6%)	0.29
Gout	5 (2.0%)	2 (5.3%)	0.23
Complete heart block	4 (1.6%)	0 (0.0%)	0.43
History of malignancy	4 (1.6%)	3 (7.9%)	0.02

*Unadjusted.

AIS, acute ischemic stroke; IV tPA, intravenous tissue plasminogen activator; CHF, chronic heart failure; DM, diabetes mellitus; HTN, hypertension; CKD, chronic kidney disease; DLP, dyslipidemia

Table 1 Baseline characteristics of Acute ischemic stroke patients who received IV tPA between two groups (survivors vs non survivors) continue.

Baseline characteristic/risk factor	Survivors (N=249) (%)	Non survivors (N=38) (%)	P value*
Clinical presentation			
Hemiparesis/hemiplegia	246 (98.8%)	37 (97.4%)	0.49
Dysarthria	192 (77.1%)	28 (73.7%)	0.64
Swallowing dysfunction	38 (15.3%)	17 (44.7%)	<0.001
Ataxia	32 (12.9%)	5 (13.2%)	0.96
Alteration of consciousness	69 (27.7%)	31 (81.6%)	<0.001
Hemianopia	14 (5.6%)	3 (7.9%)	0.58
aphasia	77 (30.9%)	21 (55.3%)	<0.001
Neglect	49 (19.7%)	17 (44.7%)	<0.001
Cranial nerve palsy	9 (3.6%)	1 (2.6%)	0.76
Gaze paresis	56 (22.5%)	27 (71.1%)	<0.001
Antihypertensive drug prior	51(20.5%)	18(47.4%)	<0.001
TOAST classification			
Large artery atherosclerosis	58 (23.3%)	13 (34.2%)	0.15
Cardioembolic stroke	55 (22.1%)	21 (55.3%)	<0.001
Small vessel occlusion	122 (49.0%)	3 (7.9%)	<0.001
Other determine of etiology	6 (2.4%)	1 (2.6%)	0.93
Stroke of underdetermine of etiology	8 (3.2%)	0 (0.0%)	0.26
Site of occlusion			
ACA	3 (1.2%)	1 (2.6%)	0.49
MCA	82 (32.9%)	31 (81.6%)	<0.001
Basilar	1 (0.4%)	0 (0.0%)	0.70
ICA	9 (3.6%)	0(00%)	0.23
PCA	6 (2.4%)	1(2.6%)	0.93

*Unadjusted.

ACA, anterior cerebral artery; MCA, middle cerebral artery; ICA, internal carotid artery; PCA, posterior cerebral artery

Table 2.1 Laboratory data of AIS patients who received IV tPA between two groups (survivors vsnon survivors).

Laboratory data	Survivors median	Q1-Q3	Non survivors median	Q1-Q3
Hemoglobin (g/dL)	12.9	11.9 - 14	12.4	10.77-14.0
Hematocrit (%)	38.9	35.8 – 42.0	38.8	32.60-43.25
Platelet (cell/mm^3)	243,000	204,000- 290,000	229	181,000 -273,000
INR	0.94	0.9 - 1.0	0.98	0.91-1.00
Creatinine (mg/dL)	0.94	0.77-1.13	0.94	0.77-1.14
DTX (mg%)	113	99-142	138	109-170

Table 2.2 Medical recorded,workflow data and length of hospital stay of AIS patients who received IV tPA between two groups (survivors vs non survivors).

Laboratory data	Survivors median	Q1-Q3	Non survivors median	Q1-Q3
Blood pressure before tPA (mmHg)				
SBP	153	140 - 172	169.5	139 – 195
DBP	90	80 - 100	99	86 – 110
NIHSS	10	7 – 15	17	11 – 21
Hospital stays (days)	5	3 – 7	5	3 – 20
Door to onset (mins)	46	30 – 67	34	27 - 55
Door to needle (mins)	90	60 – 120	93	60 – 130

IV tPA, intravenous tissue plasminogen activator; SBP, systolic blood pressure; DBP, diastolicblood pressure; NIHSS, National Institutes of health stroke scale

Table 3 Characteristics complication of AIS patients who received IV tPA between survivor and non survivor.

complications	Survivors (N=249) (%)	Non survivors (N=38) (%)	P value
Pneumonia	21 (8.4%)	18 (47.4%)	<0.001
Urinary tract infection	17 (6.8%)	2 (5.3%)	0.72
Bedsore	2 (0.8%)	1 (2.6%)	0.30
Intracranial hemorrhage	40 (16.1%)	15 (39.5%)	<0.001
Progressive stroke	14 (5.6%)	12 (31.6%)	<0.001
Upper GI bleed	5 (2.0%)	4 (10.5%)	<0.001
Seizure	4 (1.6%)	3 (7.9%)	0.02
Falling	0 (0.0%)	1 (2.6%)	0.01
Arrythmia	65(26.1%)	23 (60.5%)	<0.001
Septicemia	5 (2.0%)	3 (7.9%)	0.04
Anaphylaxis to tPA	1 (0.4%)	0 (0.0%)	0.70
Brain herniation	4 (1.6%)	8 (21.1%)	<0.001

GI bleed, gastrointestinal bleed;

Characteristics factors and in-hospital mortality

Adjusted model analysis showed five factors that were associated with the risk of in-hospital mortality. The site occlusion at MCA was significantly associated with risk of in-hospital death, with an adjusted OR of 6.10 (95%CI 6.10 – 17.16, P-value = 0.001.). Patients with a clinical presentation alteration of conscious (AOC) or given IV anti-hypertensive before tPA administration, swollen dysfunction and gaze disturbance had a higher risk of in-hospital death (adjusted ORs 4.89,95%CI 1.60-14.93, P-value =0.01),(adjusted ORs 3.89,95%CI 1.50-10.11, P-value =0.01), (adjusted ORs 2.79 ,95%CI 1.04-7.47, P-value =0.04) and (adjusted ORs 4.03,95%CI 1.55-10.48, P-value =0.04) respectively (Table 4.2).

Table 4.1 Characteristic in AIS patients who received IV tPA and clinical presentation of predictors for in-hospital death from multivariable binary logistic regression

Prognostic factors	OR	95% CI	P-value
Swollen dysfunction	2.79	1.04-7.47	0.04
Alteration of conscious	4.89	1.60-14.93	0.005
Gaze disturbance	4.03	1.55-10.48	0.04
Antihypertensive drug prior tPA given	3.89	1.50-10.11	0.005
MCA infarction	6.10	6.10-17.16	0.001

IV tPA, intravenous tissue plasminogen activator

Table 4.2 Comparisons of complication outcomes between survivors and nonsurvivors among acute ischemic stroke treated with tPA : adjusted odds ratios of predictors of in-hospital death from multivariable binary logistic regression

Complication	outcome			
	Survivors (N=249)	Non survivors (N=38)	OR (95% CI)	P-value
pneumonia	21 (8.4%)	18 (47.4%)	9.771 (4.488 - 21.273)	<0.001
Urinary tract infection	17 (6.8%)	2 (5.3%)	0.758(0.168 - 3.421)	0.72
Bedsore	2 (0.8%)	1 (2.6%)	3.380(0.295 – 37.732)	0.33
Intracranial hemorrhage	40 (16.1%)	15 (39.5%)	3.408(1.637 - 7.093)	<0.001
Progressive stroke	14 (5.6%)	12 (31.6%)	7.747(3.243 – 18.510)	<0.001
UGIB	5 (2.0%)	4 (10.5%)	5.741(1.469 – 22.433)	0.01
Seizure	4 (1.6%)	3 (7.9%)	5.25(1.127 – 24.447)	0.03
Septicemia	5 (2.0%)	3 (7.9%)	4.183(0.957 – 18.275)	0.03
Brain herniated	4 (1.6%)	8 (21.1%)	16.333(4.639 – 57.506)	<0.001
Arrhythmia	65(26.1%)	23 (60.5%)	4.341(2.136 – 8.822)	<0.001

UGIB, upper gastrointestinal bleeding

Complication factors and in-hospital mortality

In univariate analysis of complication variables might influence in-hospital mortality among AIS treated with tPA, we identified nine covariates: pneumonia, intracranial hemorrhage, progressive stroke, UGIH, seizure, falling, arrythmia, septicemia and brain herniation (Table 3). The following complication independent predictors for In hospital mortality were estimated using multivariable binary logistic regression analysis: pneumonia (adjusted ORs 9.77 ,95%CI4.49-21.27,P-value <0.001) , intracranial hemorrhage(-adjusted ORs 3.41 ,95%CI 1.64-7.09,P-value <0.001), progressive stroke(adjusted ORs 7.75 ,95%CI 3.24-18.51,P-value <0.001), UGIH (adjusted ORs 5.74 ,95%CI1.47-22.43,P-value = 0.01) , seizure (adjusted ORs 5.25 ,95%CI 1.23-24.45,P-value =0.03), septicemia(adjusted ORs 4.18 ,95%CI 0.96-18.28,P-value =0.03) ,brain herniation (adjusted ORs 16.33,95%CI 4.64-57.51,P-value <0.001) and arrythmia(adjusted ORs 4.34 ,95%CI 2.14-8.82,P-value <0.001) respectively. Furthermore, all 12 patients with arrhythmias composed of 11(92%) AF and 1 (8%) AV block, no one have VT or VF. Urinary tract infection and bedsore was no evidence of association with in-hospital mortality among AIS patients who receive tPA treatment (Table 4.2).

Discussion

We found that, consistent with results from other studies (7,10) in-hospital death among ischemic stroke patients who received IV tPA was associated with arrhythmia and pneumonia and MCA infarction. Regression analyses showed AOC, MCA infarction, antihypertensive prior Intravenous tPA, pneumonia, intracranial hemorrhage, progressive stroke, brain herniation, arrhythmia, septicemia, seizure and UGIB were independent predictors of in-hospital mortality.

However, there is prior study[5]developed a simple score to estimate early mortality of ischemic stroke-PREMISE score that consist of age over 60years, NIHSS over 4, DM and CVD, posterior circular stroke and non-lacunar stroke. This study started in 2003 in Austria and the mortality patients is 1,567. Moreover, the define age over 60 years to 4 groups, (70-79, 29%; 80-89, 43%; over 90, 14%) and more than 86% elder than 70 years. The elder might have more severe stroke or more severe complication from stroke. So, this might be the reason why age over 60 years is not statistics significant in our study. Accordingly, comorbidities DM and CVD in prior study the proportion of DM patients and CVD patients is 28% and 40.8% respectively, in our data only 21% was DM and 26% was CVD. The last one, we have non lacuna stroke in non-survival group just 1(2.6%) patient. Additionally, AF that we found increase risk of in-hospital death has correlated result with prior studies[2,7,10]. On the other hand, PREMISE study[5] not include AF in risk factors, they have 49%of patients with AF in non-survival group but in our study, there is 32%of AF in dead patients this might explained by AF can cause arrhythmia that affect the severity of stroke. In addition, regression analysis of clinical presentations shows increasing mortality in patients with swallowing dysfunction, AOC, gaze paresis, antihypertensive drug prior tPA and MCA lesion. This could be explained by these significant presentations related to cortical signs except swallowing dysfunction (that might affect by not full conscious status). Prior study shows the relation between cortical sign and large vessels obstruction[19]. According to the result that MCA lesion also related to non-survival group.

Atrial fibrillation was studied many times prior to have related to increase mortality of acute ischemic stroke patients[15,16]. Moreover, one small autopsy study of dead acute ischemic stroke patient cardiac disease was the main cause of death in approximately half of the nonvalvular AF patients, whereas in the sinus rhythm group, complications of the initial stroke or a recurrent acute stroke were the predominant causes of death. However, the underlying pathophysiological mechanisms remain unclear. Accordingly, our result found that atrial fibrillation was the one of potential factor associate stroke mortality. The reason might be that worse stroke severity in patients with AF might be attributable to larger infarct size, greater likelihood of hemorrhagic transformation, AF related lower cardiac output, and less developed collateral circulation in the brain compared with chronic arterial atherosclerotic disease.[17]So we should emphasize not only the importance of secondary prevention of stroke by anticoagulation but also the treatment of coexisting cardiac disease and cardiovascular risk factors in stroke patients with atrial fibrillation.[18] Thereason why complications during admission—pneumonia, intra cerebral hemorrhage, brain herniation. This result was related to prior study might because that many complications increase mortality itself like intracranial hemorrhage, septicemia, arrhythmia. Stroke patients usually have limited activities like cannot move so it increases bed sore risks or urinary tract infection or some swollen dysfunction cause aspirate pneumonia easier.

Our strength in this study is we had collected a long data since stroke fast track and IV tPA was use in Saraburi hospital, Thailand. The number of patients in this study is much enough for one single center.In our study we try to find out factors which could affect the mortality outcome in terms of clinical presentation at first admission and baseline characteristic, including in-hospital complication factors to obtain reliable data and be able to apply the results in real world practice stroke care for acute ischemic stroke patients treated with tPA.In addition, we use multivariable binary logistic regression to diminish the possible confounding factors. Our study has some limitations. The ASPECT program CT perfusion or MRI perfusion was still not available in our center. Moreover, some clinical presentation like gaze disturbance or alteration of conscious using data from medical record that may be affected by the professional and accuracy of physical examination from physicians.However,a more valid study will be needed to study the correlation between risk factors and mortality in thrombolytic given patients. By the way, the results could be using for more intensive care in patients who have some complications and severe clinical presentations.

In conclusion, we have identified the following independent characteristic and clinical predictors for in-hospital mortality after thrombolytic therapy: swollen dysfunction, alteration of conscious, gaze disturbance, antihypertensive drug intravenous given prior thrombolytics, site of occlusion at middle cerebral artery. Along with, complications factor during admission which correlated with in-hospital mortality: pneumonia, intracranial hemorrhage, progressive stroke, upper GI bleed, seizure, septicemia, brain herniation, and arrhythmia. This result might help physicians planning the care team management. Which can range from recognizing the need for intensified monitoring, also might helpful in the communication with family members and care-giver about the possible of stroke mortality.

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