

Poor Recognition of Prompted Treatment Seeking Even with Good Knowledge of Stroke Warning Signs Contribute to Delayed Arrival of Acute Ischemic Stroke Patients in Thailand

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Intravenous recombinant tissue plasminogen activator given within 4.5 hours after the onset of ischemic stroke is the most powerful standard treatment for patients with acute ischemic stroke. However, most of the patients arrive at the hospital later than 4.5-hours time window for intravenous thrombolysis. We study the factors that might contribute to delayed arrival in patients with acute ischemic stroke. One hundred eighty-one acute ischemic stroke patients (or their respondents) who admitted in stroke unit of 3 different hospitals were interviewed with a questionnaire regarding knowledge of stroke warning signs and recognition of prompted treatment seeking (Stroke Act FAST). Eighty-nine patients who arrived during 4.5 hours after onset were categorized as on-time group and the rest fell into delayed group. Initial National Institutes of Health Stroke Scale, nature of onset (sudden or gradual/fluctuation), day interval of the onset (8 AM to 4 PM, 4 PM to midnight, or midnight to 8 AM), mode of transportation, place of onset, knowledge of stroke warning signs, and prompted treatment seeking (Stroke Act FAST) were compared between 2 groups. Patients in on-time group presented with sudden-onset nature much more than patients in delayed group ($P = .006$). Association factors including day interval of the onset, mode of transportation, place of onset and knowledge of stroke warning signs are not different between groups ($P > .05$), whereas recognition of prompted treatment seeking is better in on-time group than in delayed group. In conclusion, good knowledge of stroke warning signs, most severe stroke, onset at workplace, onset during daytime, and ambulance for transportation are not associated with early arrival within 4.5-hours time window. However, sudden-onset nature and prompted treatment seeking may predict early arrival. **Key Words:** Acute stroke—awareness—early arrival—delayed arrival.

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Introduction

Stroke is the principal cause of adult disability particularly in elderly patients and remains the third most common cause of death in Thailand.¹ Intravenous recombinant tissue plasminogen activator (rt-PA) given within 4.5 hours after the onset of ischemic stroke improves clinical outcomes in acute ischemic stroke patients.^{2,3} The similar benefit has also been accepted in Thai population.⁴ Unfortunately, less than 5% of ischemic stroke patients in overall are able to reach thrombolytic therapy.⁵ The majority proportion of acute stroke patients arrives at the hospital later than time window of intravenous (IV) thrombolytic treatment.^{6,7}

อาการบ่งชี้โรคหลอดเลือดสมอง



ปากเบี้ยว, มุมปากด้านใดด้านหนึ่งตกลง หรือไม่ขยับ
สังเกตได้โดยให้ผู้ป่วยยิ้มหรืออ้าปาก



แขนข้างใดข้างหนึ่งอ่อนแรง ให้ผู้ป่วยยกแขนตั้งฉากกับ
ลำตัวนาน 10 วินาที แล้วพบว่าแขนด้านใดด้านหนึ่งตกลง



ผู้ป่วยพูดไม่ชัด, พูดไม่สะดวก, ใช้คำผิด คำพูดสับสน
หรือไม่สามารถพูดได้

หากมีอาการใดอาการหนึ่งข้างต้นอย่างทันทีทันใด โทร 1669

Figure 1. Stroke Act FAST in Thai. (Color version of figure is available online.)

Stroke Chain of Survival is the linkage of systems to ensure thrombolytic therapy for stroke patients.⁸ It needs to begin with detection of stroke warning signs.⁹ Lack of recognizing stroke warning signs by patients or relatives is the most common cause of delayed arrival.¹⁰ Public educational program for stroke warning awareness in community raises the rate of stroke identification and then increases rate of thrombolytic use.⁸ Stroke warning awareness is relatively low in most population.^{11,12} Lack of stroke warning awareness may be the main reason of delayed arrival in acute stroke patients in Thailand. We study the role of stroke warning awareness in acute stroke patients or their relatives who admitted because of acute ischemic stroke.

Methods

The Northern suburban of Bangkok (4000 km²) has been served with Acute Stroke Referral Network since 2007.⁴ There are approximately 1.9 million people living in this area.¹³ The mean age of population is 32.8 years and around 12% of population is older than 60 years.¹⁴ Crude prevalence of stroke in this area is 2.4%.¹ Public education about stroke including stroke warning awareness was implemented. Three different setting hospitals in the network including Thammasat University Hospital, Bhumibol Air Force Hospital, and 1 private hospital were involved in this study. Patients with acute ischemic stroke (or their responsible relatives) who admitted in stroke unit from October 2011 to December 2011 were interviewed with questionnaire regarding recognition

of stroke warning signs and prompted treatment seeking. The main contents of questionnaire are designed to evaluate knowledge and awareness of individual presenting signs and symptoms. Stroke: Act FAST campaign for the community around the Stroke Network began in 2009. The presenting signs and symptoms are adapted and translated from the one established by the National Institute of Neurological Disorder and Stroke, Act FAST, which includes (1) 1 side of the face droop, (2) 1 arm drift downward, (3) speech slurred or strange, and (4) time to immediate treatment seeking.^{15,16} The poster for public campaign (in Thai) is showed in Figure 1.

Patients who arrived during 4.5 hours after onset were categorized as on-time group and the rest fell into delayed group. Demographic data including gender, age, educational level, incomes, risk factors, and IV rt-PA therapy were collected. Initial National Institutes of Health Stroke Scale (NIHSS), nature of onset (sudden or gradual/fluctuation), day interval of the onset (8 AM to 4 PM, 4 PM to midnight, or midnight to 8 AM), if the onset was unknown, last-seen-normal time was accounted, places of onset, method of transportation for dispatch, knowledge of stroke warning signs, and prompted treatment seeking were collected and compared between 2 groups.

Univariate associations of variables were evaluated by chi-square test. The difference of mean was evaluated by *t* test or Mann-Whitney *U* test. Nature of onset, initial NIHSS, day interval of the onset, place of onset, awareness of stroke warning signs, and method of transportation were evaluated by logistic regression for the

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