Original Article

Is Node Community Hospital Successful for Stroke Fast Track?

Jantasri S, MD[1,2], Tiamkao S, MD[2,3], Sirikarn P, PhD[4], Sawanyawisuth K, MD PhD[5]

[1] Division of Neurology, Department of Medicine, Udon Thani Hospital, Udon Thani, Thailand
[2] Integrated Epilepsy Research Group, Khon Kaen University, Khon Kaen, Thailand
[3] Division of Neurology, Department of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand
[4] Department of Epidemiology and Biostatistics, Khon Kaen University, Khon Kaen, Thailand
[5] Department of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand

Objective: To compare readiness of the stroke fast track system between Udon Thani Hospital and its node community hospitals in terms of recombinant tissue plasminogen activator (rtPA) treatment.

Materials and Methods: This study was a retrospective, descriptive study. We studied numbers of adult patients diagnosed as acute ischemic stroke and participated in stroke fast track with or without rtPA treatment. The study sites included Udon Thani Hospital and four node community hospitals. The outcomes of the study were onset to door time (minute), door to needle time (minute) and onset to needle time (minute).

Results: There were 8,796 acute ischemic stroke patients in Udon Thani province during the study period. There were significant differences in the three outcomes between both groups. The median onset to door and onset to needle times were shorter in the node community hospitals than Udon Thani Hospital (85 vs. 120 minutes and 147 vs. 175 minutes). But, the door to needle time was shorter in Udon Thani Hospital than noder community hospitals (50 vs. 58 minutes).

Conclusion: Node community hospital for stroke fast track is feasible in terms of rtPA treatment compared with the main referral hospital.

Keywords: Recombinant tissue plasminogen activator, Stroke fast track, Community hospital

J Med Assoc Thai 2020;103(Suppl. 6): 84-6
Website: http://www.jmatonline.com

Acute ischemic stroke is a common neurological disease leading to morbidity and mortality[1]. There are several risk factors associated with acute ischemic stroke including metabolic syndrome or obstructive sleep apnea[2,3]. The mainstay treatment for acute ischemic stroke is intravenous is recombinant tissue plasminogen activator (rtPA) within 4.5 hours after stroke onset if no contraindications[4]. The rtPA treatment improved clinical outcomes significantly compared with placebo (52.4% vs. 45.2%; $p = 0.04$).

Udon Thani Hospital, a tertiary care hospital in northeast Thailand, has implemented stroke fast track and rtPA treatment since October 2010. However, the issue of rtPA treatment is delayed referral system from community hospitals to meet with the golden treatment period. Since October 2013, the node community hospitals of the stroke fast track were developed in four community hospitals. The purpose of node community hospitals is to facilitate the rtPA treatment in acute ischemic stroke patients. One factor associated with an outcome of the rtPA treatment in acute ischemic stroke is readiness and availability of the rtPA including onset to needle time period[5]. The present study aimed to compare readiness of the stroke fast track system between Udon Thani Hospital and its node community hospitals in terms of rtPA treatment.

Correspondence to:
Tiamkao S.
Division of Neurology, Department of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002, Thailand.
Phone: +66-43-366869, **Fax:** +66-43-366870
E-mail: somtia@kku.ac.th

Materials and Methods

The present study was a retrospective, descriptive study. The authors studied numbers of adult patients diagnosed as acute ischemic stroke and participated in stroke fast track with or without rtPA treatment. The study sites included Udon Thani Hospital and four node community hospitals: Kumpawapee Hospital, Bandung Hospital, Nonghan Hospital, and Banpue Hospital. The study period was between October 1st, 2013 and September 30th, 2018.

The studied variables included percentage of stroke fast track activitation and rate of rtPA treatment in both Udon Thani Hospital and node community hospitals. The outcomes of the study were onset to door time (minute), door to needle time (minute) and onset to needle time (minute). The definitions of these three outcomes were time from acute ischemic stroke occurrence to arrival to the hospital, time from hospital arrival to rtPA treatment, and time from acute ischemic stroke occurrence to rtPA treatment.

How to cite this article: Jantasri S, Tiamkao S, Sirikarn P, Sawanyawisuth K. Is Node Community Hospital Successful for Stroke Fast Track?. J Med Assoc Thai 2020;103(Suppl.6): 84-6.

The studied variables and outcomes were compared between Udon Thani Hospital and node community hospitals. The study protocol was approved from the Udon Thani Hospital Ethics Committee in Human Research (I034/2562).

Results

There were 8,796 acute ischemic stroke patients in Udon Thani province during the study period (Table 1). Of those 5,901 patients (67.09%) were diagnosed at Udon Thani Hospital and 2,895 patients (32.91%) were diagnosed at community hospitals. The activation of stroke fast track was 37.8% in average and slightly higher in the community hospitals than Udon Thani Hospital (45.6% vs. 34.0%). The rtPA rate was also slightly higher in the community hospitals than Udon Thani Hospital (7.4% vs. 6.8%) with an average rate of 7.0%.

Regarding the rtPA treatment, there were significant differences in the three outcomes between both groups (Table 2). The median onset to door and onset to needle times were shorter in the node community hospitals than Udon Thani Hospital (85 vs. 120 minutes and 147 vs. 175 minutes). But, the door to needle time was shorter in Udon Thani Hospital than noder community hospitals (50 vs. 58 minutes).

Discussion

The present study showed that stroke fast track activation rates in both Udon Thani Hospital and node community hospitals were comparable with a previous study from Khon Kaen University, a teaching hospital[6]. The rates in the present study were slightly higher than the previous study (37.8% vs. 24.76%). This higher rate may be due to stroke fast track campaign and availability of the stroke care. The better health care may have improved over time since both studies were conducted with an eight-year gap. For the rtPA use, the average rate in the present study was lower than the previous reports from the University Hospital (7.0% vs. 11%). These differences may depend on patient characteristics which may indicate or been excluded from the rtPA treatment as shown by various rtPA treatments among health care facilities around Thailand. The rtPA rate in Chulalongkorn and Thammasat Universities were 20% and 15%, respectively[7,8]. The rtPA rate in this study was higher than the average use in Thailand (3.8%). These results showed the success of the node community hospital stroke fast track project.

Regarding rtPA treatment, the door to needle time and onset to needle time in this study and were longer than the previous study from Khon Kaen University (42 and 109 minutes) but comparable with a study from Thammasat

Table 1. Statistics on acute ischemic stroke and its related treatment in Udon Thani province

	Udon Thani Hospital	Node Community Hospitals	Totals
Acute ischemic stroke	5,901	2,895	8,796
Activated stroke fast track	2,006	1,319	3,325
Activated stroke fast track rate	34.0%	45.6%	37.8%
Intravenous rtPA	403	215	618
Intravenous rtPA rate	6.8%	7.4%	7.0%

Data presented as number or percentage

Table 2. Outcomes of stroke fast track for acute ischemic stroke in Udon Thani province categorized by hospital types

Factors	Udon Thani Hospital (n = 403)	Node Community Hospitals (n = 215)	*p*-value
Onset to door (min)			<0.001
≤60	85 (21.1)	84 (39.1)	
>60	318 (78.9)	131 (60.9)	
Median (min: max)	120 (10:240)	85 (5:244)	
Door to needle (min)			
≤45	166 (41.2)	68 (31.6)	0.018
>45	237 (58.8)	147 (68.4)	
≤60	309 (76.7)	132 (61.4)	<0.001
>60	94 (23.3)	83 (38.6)	
Median (min: max)	50 (9:157)	58 (7:205)	
Onset to needle (min)			0.006
≤120	89 (22.1)	69 (32.1)	
>120	314 (77.9)	146 (67.9)	
Median (min: max)	175 (41:270)	147 (42:270)	

University (54 and 160 minutes). These two variables were 50 and 58 minutes and 147 and 175 minutes for node community hospitals and Udon Thani Hospital. When compared with Udon Thani Hospital, the node community hospitals had shorter times in these three outcomes except the door to needle time. These results once again showed the success of the node community hospital stroke fast track project. Less busy and less congested traffic may explain better times in terms of onset to door and onset to needle times. But, the shorter door to needle time in Udon Thani Hospital may show better preparation of CT or laboratory investigation than the community hospital.

The present study has some limitation. Only outcome from rtPA treatment was focused on for the community hospital stroke network. There was no clinical outcome reported. Similarly, no evaluations on stroke risk factors or associated diseases and its related conditions were reported[9-16].

Conclusion

Node community hospital for stroke fast track is feasible in terms of rtPA treatment compared with the main referral hospital.

What is already known on this topic?

Stroke fast track system and recombinant tissue plasminogen activator (rtPA) treatment are beneficial for acute ischemic stroke patients.

What this study adds?

Node community hospital for stroke fast track is feasible to assist the referral center in terms of rtPA treatment.

Potential conflicts of interest

The authors declare no conflicts of interest.

References

1. Feigin VL, Forouzanfar MH, Krishnamurthi R, Mensah GA, Connor M, Bennett DA, et al. Global and regional burden of stroke during 1990-2010: findings from the Global Burden of Disease Study 2010. Lancet 2014;383: 245-54.
2. Ashtari F, Salari M, Aminoroaya A, Deljoo BK, Moeini M. Metabolic syndrome in ischemic stroke: A case control study. J Res Med Sci 2012;17:167-70.
3. Johnson KG, Johnson DC. Frequency of sleep apnea in stroke and TIA patients: a meta-analysis. J Clin Sleep Med 2010;6:131-7.
4. Hacke W, Kaste M, Bluhmki E, Brozman M, Davalos A, Guidetti D, et al. Thrombolysis with alteplase 3 to 4.5 hours after acute ischemic stroke. N Engl J Med 2008;359:1317-29.
5. Bahnasy WS, Ragab OAA, Elhassanien ME. Stroke onset to needle delay: Where these golden hours are lost? An Egyptian center experience. eNeurologicalSci 2019;14:68-71.
6. Chindaprasirt J, Sawanyawisuth K, Chattakul P, Limpawattana P, Tiamkao S, Aountri P, et al. Age predicts functional outcome in acute stroke patients with rt-PA treatment. ISRN Neurol 2013;2013:710681.
7. Muengtaweepongsa S, Dharmasaroja P, Kummark U. Outcomes of intravenous thrombolytic therapy for acute ischemic stroke with an integrated acute stroke referral network: initial experience of a community-based hospital in a developing country. J Stroke Cerebrovasc Dis 2012;21:42-6.
8. Suwanwela NC, Phanthumchinda K, Likitjaroen Y. Thrombolytic therapy in acute ischemic stroke in Asia: The first prospective evaluation. Clin Neurol Neurosurg 2006;108:549-52.
9. Nilanont Y, Nidhinandana S, Suwanwela NC, Hanchaiphiboolkul S, Pimpak T, Tatsanavivat P, et al. Quality of acute ischemic stroke care in Thailand: a prospective multicenter countrywide cohort study. J Stroke Cerebrovasc Dis 2014;23:213-9.
10. Phitsanuwong C, Ariyanuchitkul S, Chumjan S, Domthong A, Silaruks S, Senthong V. Does hypertensive crisis worsen the quality of life of hypertensive patients with OSA?: A pilot study. Asia Pac J Sci Technol 2017;22:APST-22-02-01.
11. Sawunyavisuth B. What are predictors for a continuous positive airway pressure machine purchasing in obstructive sleep apnea patients? Asia Pac J Sci Technol 2018;23:APST-23-03-10.
12. Kingkaew N, Antadech T. Cardiovascular risk factors and 10-year CV risk scores in adults aged 30-70 years old in Amnat Charoen Province, Thailand. Asia Pac J Sci Technol 2019;24:APST-24-04-04.
13. Buttichak A, Leelayuwat N, Bumerraj S, Boonprakob Y. The effects of a yoga training program with fit ball on the physical fitness and body composition of overweight or obese women. Asia Pac J Sci Technol 2019;24:APST-24-02-07.
14. Churak P, Praditsorn P, Meenongwah J, Wimonpeerapattana W. Factors associated with nutritional status of elderly in Ubon Ratchathani, Thailand. Asia Pac J Sci Technol 2019;24: APST-24-01-08.
15. Jingmark S, Kuhirunyaratn P, Theeranut A, Nonjui P. Subjective well-being and related factors among community-dwelling elderly in Udon Thani Province, Thailand. Asia Pac J Sci Technol 2020;25:APST-25-01-09.
16. Senaphan K, Kukongviriyapan U, Pakdeechote P, Kukongviriyapan V, Pannangpetch P. Rat model of a metabolic syndrome induced by a high-carbohydrate, high-fat diet with fructose in drinking water. Asia Pac J Sci Technol 2017;22: APST-22-02-07.

เครือข่ายโรงพยาบาลชุมชนสำหรับเส้นเลือดสมองตีบแบบเร่งด่วนประสบความสำเร็จหรือไม่

สตรีรัตน์ จันทะศรี, สมศักดิ์ เทียมเก่า, ประภัสรา ศิริกาญจน์, กิตติศักดิ์ สวรรยาวิสุทธิ์

วัตถุประสงค์: เพื่อเปรียบเทียบความพร้อมในสำหรับโรคเส้นเลือดสมองตีบแบบเร่งด่วนระหว่างโรงพยาบาลอุดรธานีและเครือข่ายโรงพยาบาลชุมชนในแง่ของการรักษาด้วยยาละลายลิ่มเลือด

วัสดุและวิธีการ: เป็นการศึกษาย้อนหลังเชิงพรรณนา คณะผู้นิพนธ์ได้ทำการศึกษาจำนวนผู้ป่วยผู้ใหญ่ที่ได้รับการวินิจฉัยและเข้าร่วมการรักษาโรคเส้นเลือดสมองตีบแบบเร่งด่วนทั้งได้รับและไม่ได้รับการรักษาด้วยยาละลายลิ่มเลือด โรงพยาบาลที่เข้าร่วมได้แก่ โรงพยาบาลอุดรธานีและเครือข่ายโรงพยาบาลชุมชนอีก 4 แห่ง ผลลัพธ์ของการศึกษาได้แก่ เวลาจากการเกิดโรคถึงโรงพยาบาล เวลาจากที่ถึงโรงพยาบาลถึงการได้รับยาและเวลาจากการเกิดโรคถึงการได้รับยา

ผลการศึกษา: มีผู้ป่วยโรคเส้นเลือดสมองตีบจำนวน 8,796 คนในจังหวัดอุดรธานีระหว่างช่วงเวลาที่ศึกษา ผลลัพธ์ของการศึกษามีความแตกต่างอย่างมีนัยสำคัญระหว่างทั้งสองกลุ่ม ค่ามัธยฐานของเวลาจากการเกิดโรคถึงโรงพยาบาลและเวลาจากการเกิดโรคถึงการได้รับยาของโรงพยาบาลเครือข่ายมีค่าสั้นกว่าของโรงพยาบาลอุดรธานี (85 ต่อ 120 นาที และ 147 ต่อ 175 นาที) แต่เวลาจากที่ถึงโรงพยาบาลถึงการได้รับยาของโรงพยาบาลอุดรธานีสั้นกว่าโรงพยาบาลเครือข่าย (50 ต่อ 58 นาที)

สรุป: เครือข่ายโรงพยาบาลชุมชนสำหรับโรคเส้นเลือดสมองตีบแบบเร่งด่วนมีความเป็นไปได้ในแง่การรักษาด้วยยาละลายลิ่มเลือด