STUDYING THE DRUG USE CHARACTERISTICS AND COMMENTING ON THE RESULTS OF CEREBRAL INFARCTION TREATMENT AT NGHE AN GENERAL FRIENDSHIP HOSPITAL STROKE CENTER IN 2023

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ABSTRACT

With the desire to fully understand the use of drugs in the treatment of ischemic stroke to improve treatment effectiveness as well as safety for patients, the article presents the results of research on drug use characteristics and comments on the results of cerebral infarction treatment at the Stroke Center of Nghe An General Hospital. 113 medical records of infarction patients treated at the Stroke Center of Nghe An General Hospital from January 1, 2023 to June 30, 2023 were researched and analyzed. The results showed that thrombolytic therapy was consistent with the guidelines, most patients were stable and discharged from the hospital, and 6 adverse events were recorded, including 4 bleeding, 1 increased intracranial pressure, and 1 seizure.

Keywords: Ischemic stroke; cerebrovascular accident; thrombolytic therapy.

1. Introduction

Ischemic stroke is characterized by a sudden loss of blood circulation to an area of the brain due to vascular obstruction by a thrombus or embolus in a cerebral artery, leading to a corresponding loss of neurological function, and is a common clinical form. Epidemiological studies show that 82-92% of strokes are ischemic strokes [1]. The burden of stroke is continuously increasing, concentrated mainly in developing countries, with a mortality rate of 75.2% worldwide, including Vietnam. Ischemic stroke is a priority emergency, requiring medical staff to respond quickly. Medicines used in the treatment of ischemic strokes depend on the characteristics of each patient including the time of symptom onset or the last time the patient was seen normal, history of blood pressure, blood sugar level, etc. Neuroprotective methods are used to preserve penumbra brain parenchyma and expand the time window for revascularization techniques. With the desire to fully understand the use of drugs in the treatment of cerebral infarction to improve the effectiveness of treatment as well as making it safer for patients, the present

study was conducted to investigate the drug use characteristics and comment on the results of ischemic stroke treatment at the Stroke Center of Nghe An Friendship General Hospital from January 1, 2023 - June 30, 2023.

2. Research method

113 medical records of ischemic stroke patients, treated at the Stroke Center of Nghe An Friendship General Hospital from January 1, 2023 - June 30, 2023, have been fully investigated. The research data were analyzed using SPSS 20.0 software.

3. Results of treatment

3.1. Characteristics of the research sample

3.1.1. General information about research objects

Table 1: *General information about research objects*

Feature		Number of patients	Percentage (%) (N= 113)
Age	< 50	4	3.5
	50 - 59	30	26.5
	60 - 69	31	27.4
	≥ 70	48	42.5
	Mean	67.51 ± 11.39	
Gender	Male	64	56.6
	Female	49	43.4

Table 1 shows that the average age of the study sample is 67.51 ± 11.39 years old, in which the group aged 70 years and older accounts for the highest proportion of 42.5%. The male/female ratio is 1.3.

3.1.2. Comorbidities

Table 2: *Comorbidities*

Comorbidities	Number of patients	Percentage (%)
Hypertension	103	91.2
Heart failure	10	8.8
Diabetes	20	17.7
Blood lipid disorders	46	40.7
Atrial fibrillation	17	15.0
Other cardiovascular (heart valves, angina, stent placement)	11	9.7

Statistics in Table 2 show that the most common comorbidity is hypertension, accounting for 91.2%, followed by dyslipidemia (40.7%), diabetes (17.7%), and atrial fibrillation (15). %), heart failure (8.8%).

3.1.3. Clinical and paraclinical symptoms

Table 3: *Clinical and paraclinical symptoms*

Symptoms		**Number of patients**	**Percentage (%) (N=113)**
Clinical symptoms			
Headache		42	37.2
Nausea, vomiting		4	3.5
Dizzy		80	70.8
Difficulty speaking		112	99.1
Hemiplegia		107	94.7
Hemiplegic sensory disorder		6	5.3
Blood pressure increases	Yes	79	69.9
	No	34	30.1
Average Glasgow score	14.22 ± 1.08		
Average NIHSS score	9.58 ± 4.18		
Subclinical symptoms			
Average glucose	7.58 ± 1.62		
Average platelets	234.87 ± 68.17		
Average INR	1.01 ± 0.2		

Most patients have symptoms of difficulty speaking and hemiplegia (99.1%; 94.7%), followed by symptoms of Dizziness (70.8%), headache (37.2%). The proportion of patients with symptoms of nausea and vomiting is low (3.5%).

3.1.4. Onset time

Table 4: *Onset time*

Onset time	**Number of patients**	**Percentage (%) (N= 113)**
< 3 hours	52	46.0
3- 4.5 hours	61	54.0
Average ± SD	2.72 ± 0.99	

The average onset time recorded was 2.72 ± 0.99, of which 54.0% of cases recorded an onset time of 3-4.5 hours; 46.0% of cases had an onset time of less than 3 hours.

3.2. Analysis of characteristics of drug use to treat ischemic stroke

3.2.1. Drugs used in the research sample

The drugs used have been analyzed and divided into groups: (1) Neuron protection group; (2) Hypertension control group; (3) Anticoagulation and antiplatelet aggregation; (4) Other drugs. Characteristics of use of each analyzed drug group are shown in Tables 5-8.

Table 5: *Neuron protection group*

Active ingredients	Brand name medicine	Usage	Dosage (mg/use)	Number of patients	Percentage (%) (N=113)
Peptide essence from pig brain	Cerebrolysine	IV	21520	20	17.7
Citicoline	Cerecozine	Oral	500	35	31.0
	Nacitie				
	Cilexxice				
Choline alfoscerate	Glitatiline	IV	400	14	12.4
Ginkgo Biloba	Gintecine	IV	17,5	5	4.4
	Neucitine	Oral	120	1	0.9

Table 6: *Hypertension control group*

Group	Drug	Usage	Dosage (mg/use)	Number of patients	Percentage (%) (N=113)
ACE	Perindoprile	Oral	5	10	8.8
Inhibits AT1 receptor	Losartane	Oral	25	40	35.4
			50		
	Telmisartane	Oral	40	21	18.6
	Irbesartane	Oral	150	5	4.4
Calcium channel blocker	Nicardipine	IV	10	12	10.6
	Amlodipine	Oral	59	5	52.2
Beta blocker	Metoprolole	Oral	25	14	12.4

Table 7: *Anticoagulation and antiplatelet aggregation*

Group	Drug	Usage	Dosage (mg/use)	Number of patients	Percentage (%) (N=113)
Anti-platelet aggregation	Aspirine	Oral	81	42	37.2
	Clopidogrele	Oral	75	12	8.1
	Clopidogrele + aspirine	Oral	75/100	33	29.2
Anticoagulant	Enoxaparine	Subcutaneously	40	6	5.3
	Acenocoumarole	Oral	1	4	3.5
	Rivaroxabane	Oral	20	8	7.1

Table 8: *Other drugs*

Group	Drug	Number of patients	Percentage (%) (N=113)	
Reduce dizziness	Acetyl-DL-leucine	99	87,6	
Statine	Rosuvastatine	100	88,5	100
	Pravastaine	13	11,5	
Pain relievers	Paracetamole	26	23	23
Drugs used to treat Diabetes	Metformine	8	7,1	17.7
	Gliclazide	3	3,7	
	Empaglifozine	4	3,5	
	Dapaglifozine	2	1,7	
	Insulline	2	1,7	
Antibiotics		14	12,4	

The above statistics and analysis show that the most commonly used neuroprotective drug is citicoline (31.0%), followed by Cerebrolysin (17.7%), Choline alfoscerate (12.4%) and Ginkgo Biloba injection (4.4%). To control patients' hypertension, the most commonly used medication was Amlodipine (52.2%), followed by Losartane (35.5%). The main way to use the drug is in oral form. Injectable antihypertensive drugs included only Nicardipine (10.6%).

In the antiplatelet group, the most commonly used is aspirin alone (37.2%), followed by the combination of clopidogrel and aspirin (29.2%). There are 3 anticoagulant active ingredients, of which rivaroxabane was used by 7.1% of patients, enoxaparin and aceocoumarol were used by 5.3% and 3.5%, respectively.

In other drug groups, shown in Table 8, 100% of patients used Statins and 87.6% used acetyl-DL-leucine.

3.2.2. Characteristics of using the drug in controlling high blood pressure above 185/110mmHg

Table 9: *Characteristics of drug use in controlling high blood pressure above 185/110mmHg*

Drug used	Number of patients	Compliance with recommendations n(%)	
		Suitable	Not suitable
Nicardipine	10	10 (100.0)	0 (0.0)

10 patients with elevated blood pressure above 185/110mmHg were all given nicardipine and 100% complied with recommendations.

3.2.3. Characteristics of using fibrinolytic

Data in Table 10 show that 100% of cases used fibrinolytic drugs with the brand name Actilyse, of which 58.4% used a dose of 0.9 mg/kg, 41.6% used a dose of 0.6mg/kg, 100% in accordance with the Ministry of Health's 2020 guidelines.

Table 10: *Characteristics of fibrinolytic drug use*

Drug	Brand name	Dosage (mg/kg)	Number of patients	Compliance with recommendations n(%)	
				Suitable	Not suitable
Alteplase (rt-PA)	Actilyse	0.9	47	113 (100.0)	0 (0.0)
		0.6	66		

3.3. Comment on the results of treatment

3.3.1. Results at hospital discharge

To evaluate the treatment results at hospital discharge, the following factors were considered and analyzed: (1) Number of days of treatment; (2) Rates of hospital discharge, hospital transfer, and death; (3) Clinical condition at discharge. The results are presented in Tables 11-13.

Table 11: *Number of days of treatment*

Time (day)	Number of patients	Percentage (%) (N= 104)
< 10	58	55.8
10 – 20	37	35. 6
≥ 20	9	8. 7
Average stay	10.54 ± 5.75	

Among 104 patients discharged from the hospital with stable treatment, 55.8% were treated for less than 10 days, 35.6% were treated for 10-20 days and 8.7% were treated for 20 days or more. Average hospital stay was 10.54 ± 5.75

Table 12: *Patient's condition upon discharge from hospital*

Patient's condition	Number of patients	Percentage (%) (N=113)
Stabilized and discharged from the hospital	104	92.0
Seriously ill patients asking to return home or be transferred to a higher-level hospital	9	8.0
Dead	0	0

The majority of stable patients were discharged from the hospital (92.0%) and 8% of seriously ill patients asked to return home or be transferred to a higher-level hospital. No deaths occurred.

Of the 104 stable patients discharged from the hospital, the majority were paraplegic (94.23%), 5 cases of non-weakness, and 1 case of paraplegia. 92.31% of cases recorded limb muscle weakness and paralysis (1/5-4/5) and 3 cases of complete paralysis. 5 normal cases have been recorded.

Table 13: *Clinical condition at discharge*

Clinical condition at discharge		Number of patients	Percentage (%) (N=104)
Weak and paralyzed features	Weak, paralyzed on both sides	1	0.96
	Weakness in half of body	98	94.23
	No weakness	5	4.81
Weak and paralyzed limb muscle strength	Totally paralyzed	3	2.88
	Weak, paralyzed (1/5-4/5)	96	92.31
	Normal (5/5)	5	4.81

3.3.2. Adverse events occurring during treatment

Table 14: *Adverse events recorded*

Adverse events	Number of patients	Percentage (%) (N=113)
Increased intracranial pressure	1	0.88
Gastrointestinal bleeding	1	0.88
Tooth bleeding	1	0.88
Cerebral infarction transformed into hemorrhage	2	1.77
Convulsion	1	0.88

A total of 6 adverse events were recorded, specifically increased intracranial pressure (1 case); gastrointestinal bleeding (1 case); Cerebral infarction transformed into hemorrhage (2 cases); Tooth bleeding (1 case) and convulsions (1 case).

4. Discussion

4.1. Characteristics of the research sample

The average age of the research sample is 67.51 ± 11.39, of which the group aged 70 and over accounts for the highest proportion of 42.5%. This result is consistent with a number of previously conducted studies. Nguyen Vinh Quoc also showed that the disease tends to increase with age, in which the age group over 60 accounts for a high proportion (70.3%) with an average age of 70.6 ± 8.5 (years) [2]. Nguyen Thanh Cong has evaluated 112 patients with cerebral infarction at the Department of Cardiology and Intensive Care Department - Hue University of Medicine and Pharmacy Hospital from September 2015 to December 2017 and found that the average age of illness was 67.5 ± 7.8 [3]. The results of studies show that the risk of stroke increases with increasing age. This can be explained by the fact that due to aging, the body's organs and functions gradually degenerate. At the same time, comorbid diseases increase the risk of stroke.

The results of this study show that the rate of cerebral infarction in men is higher than in women (64/49). This can be explained by living habits and some risk factors that increase cerebral infarction commonly found in men such as smoking, drinking alcohol, hypertension, diabetes, and dyslipidemia, etc. According to the results of this study, the most common comorbidity is hypertension accounting for 91.2%, followed by dyslipidemia (40.7%), diabetes (17.7%), atrial fibrillation (15%), heart failure (8.8%). The majority of cases had at least one comorbidity related to increased risk of ischemic stroke.

According to Nguyen Vinh Quoc, hypertension is the comorbidity with the highest rate (48 .5%), followed by diabetes (21.8%), dyslipidemia (17.8%) [2]. Hypertension is an important risk factor in the pathogenesis of stroke. Long-term hypertension causes damage to blood vessel walls, formation of atherosclerotic plaques, thromboembolism, micro-aneurysms in the brain... causing lacunar infarction, cerebral bleeding and other disorders. Studies indicate that diabetes is a risk factor for cerebral infarction, increasing the risk of atherosclerosis three times, increasing the incidence of stroke from 2 to 6.5 times. Atrial fibrillation often appears when there are structural or electrophysiological abnormalities of the atrial muscle, causing abnormal impulses and/or conduction pathways, thereby promoting blood clot formation and increasing the risk of stroke. The overall incidence of stroke is increased fivefold in patients with atrial fibrillation.

Regarding clinical and paraclinical symptoms: Most have symptoms of difficulty speaking and hemiplegia (99.1%; 94.7%), dizziness (70.8%), headache (37.2%), rarely experiencing nausea and vomiting (3.5%). This result is similar to other studies [2, 4]. Thus, it can be seen that in the early symptoms of ischemic stroke, the patient is already experiencing severe symptoms. If not treated promptly, it will leave serious sequelae for the patient. Therefore, it is necessary to bring patients with cerebral infarction to the hospital as soon as possible.

All hospitalized patients with cerebral infarction who are selected to be considered for treatment with the thrombolytic drug alteplase must have a blood count test to determine platelet composition, basic coagulation, and blood glucose before receiving drug treatment. Research results show that, both platelet index and INR were within normal limits with the average platelets were 234.87 ± 68.17 and mean INR were 1.01 ± 0.2.

Regarding the onset time until thrombolytic therapy is applied: Research results showed that the average time from the onset of symptoms to the time of using thrombolytic therapy was 2.72 ± 0.99 hours, of which 54.0% of onset time is from 3 to 4.5 hours; 46.0% of onset time is less than 3 hours. Through this, it can be seen that within 4.5 hours, the patient had dangerous symptoms such as difficulty speaking (99.1%), and hemiplegia (94.7%).

4.2. Drug use in patients with cerebral infarction

4.2.1. Drugs used

Citicoline is an exogenous form of cytidine-5′-diphosphocholine, an essential intermediate in the generation of phosphatidylcholine and is required for the biosynthesis of membrane phospholipids, which are degraded during cerebral ischemia to fatty acids and free radicals. Additionally, citicoline has been shown to restore the activity of mitochondrial ATPase and membrane Na+/K+ATPase, inhibit phospholipase A2 activation and accelerate cerebral edema resorption in various experimental models. Thus, it acts at multiple levels of the ischemic cascade and a variety of brain regenerative effects have been reported [5].

Cerebrolysin helps stabilize the structural integrity of nerve cells based on calpain inhibition, enhances nerve function recovery, and reduces the damage of infarction [6]. A study in Jiangsu Provincial Hospital, China with 348 patients included 179 patients treated with 450 mg of Ginkgo Biloba extract combined with 100 mg aspirin daily and the remaining group of 169 patients treated with only 100 mg aspirin daily, has been shown to

reduce cognitive and neurological deficits after acute ischemic stroke without increasing the incidence of vascular events [7].

According to the research results shown in Table 6, 03 groups of drugs to control hypertension were used, including UCMC, UCAT1, Calcium channel blockers. These are 3 out of 5 groups given priority in the treatment of hypertension according to the recommendations of the Vietnam Heart Association 2022. 12.4% of cases used metoprolol, a drug belonging to the Beta Blocker group, suitable for hypertension with atrial fibrillation, coronary artery disease while controlling ventricular rate and lowering blood pressure. This is also appropriate because patients with atrial fibrillation account for 15%.

Regarding antiplatelet use: In the antiplatelet group, the most commonly used is Aspirin alone (37.2%), followed by the combination of Clopidogrel and Aspirin (29.2%) and Clopidogrel alone 8.1%. According to the Ministry of Health's instructions, the use of antiplatelet groups should be applied within 24 - 48 hours from the start of cerebral infarction. The benefits of aspirin were modest but statistically significant and were mainly related to reducing recurrent strokes. Dual antiplatelet therapy (aspirin and clopidogrel) is safe and effective in reducing stroke recurrence and other vascular events [1].

Regarding the use of anticoagulants: There are 3 active anticoagulant ingredients used, including Rivaroxabane (7.1%), Enoxaparin (5.3%) and Aceocoumarol (3.5%). According to the Ministry of Health's instructions, patients with ischemic stroke and atrial fibrillation can be treated with anticoagulants with the goal of preventing thromboembolic disease [1].

For other drug groups, the results indicate that 100% of patients use Statins. According to a systematic review study by Wang Zhao (2019), a meta-analysis by Brandon Christophe (2019) shows that statin therapy is associated with a significant beneficial effect in ischemic stroke [8]. 87.6% used acetyl-DL-leucine, which is also appropriate because the majority of patients in the study sample had clinical symptoms of dizziness. 17.7% used antidiabetic drugs due to the prevalence of diabetes.

4.2.3. Characteristics of fibrinolytic use

The fibrinolytic drug used in 100% of the studied cases was alteplase (brand name Actilyse). This is consistent with the Ministry of Health's (2020) guidelines for choosing fibrinolytic drugs [1]. Regarding dosage: 58.4% used a dose of 0.9 mg/kg, 41.6% used a dose of 0.6 mg/kg. Many studies show that a low dose of 0.6 mg/kg is effective and safe in the treatment of acute cerebral infarction. Huynh Quoc Sy and Pham Phuong Sung both showed that low-dose intravenous alteplase in cerebral infarction in less than 4.5 hours is effective and safe [9].

4.3. The results of treatment for cerebral infarction

Most patients were stabilized and discharged from the hospital (92.0%), 8% of seriously ill patients asked to return home or be transferred, and there were no deaths. Pham Phuoc Sung noted a clear clinical recovery over time based on the assessment of the level of improvement in neurological function according to the NIHSS scale: average NIHSS before treatment was 11.93 ± 4.23; decreased to 7.64 ± 5.69 24 hours later. The mean NIHSS score was 7.21 ± 5.32 at discharge time [10]. In present research, 8% of seriously ill patients asked to return home or be transferred to another hospital. This shows

that although thrombolytic therapy provides good clinical results for patients, there is still a certain percentage of patients who become seriously ill or die. Every 1 minute in an ischemic stroke, 1.9 million nerve cells die and cannot recover. Reperfusion to the damaged brain area is a race against time to avoid complications that occurs when the infarct area spreads and therefore "time is brain".

Of the 104 stable patients discharged from the hospital, the majority were paraplegic (94.23%). There were 5 cases of non-weakness, and 1 case of paraplegia. 92.31% of cases were recorded limb muscle strength weak and paralyzed (1/5-4/5), 3 cases of complete limb muscle paralysis and 5 normal cases. Thus, it can be seen that after acute treatment, most patients still have symptoms of hemiplegia (94.23%). In the study of Nguyen Vinh Quoc (2020), it was shown that 100% of patients with cerebral infarction after acute treatment still had symptoms of hemiplegia [2]. Due to the short duration of the study, there was no follow-up of the clinical effectiveness of patients after discharge from the hospital. Therefore, there is a need for studies that follow patients for a longer period of time after discharge to better evaluate the clinical improvement of patients after an acute attack.

4. Conclusion

With the desire to fully understand the use of drugs in the treatment of ischemic stroke to improve treatment effectiveness as well as safety for patients, the article presents the results of research on drug use characteristics and comments on the results of cerebral infarction treatment at the Stroke Center of Nghe An General Hospital. 113 medical records of infarction patients treated at the Stroke Center of Nghe An General Hospital from January 1, 2023 to June 30, 2023 were researched and analyzed. The average age of the research sample is 67.51 ± 11.39, of which the group aged 70 and over accounts for the highest proportion of 42.5% and the male/female ratio is 1.3.

The most common comorbidities are hypertension (91.2%), dyslipidemia (40.7%), diabetes (17.7%), atrial fibrillation (15%), and heart failure (8.8%). Most had symptoms of difficulty speaking and hemiplegia (99.1%; 94.7%), Dizziness (70.8%), headache (37.2%), and rarely nausea and vomiting (3.5%). INR, platelet, and glucose indexes were within normal limits. The average onset time is 2.72 ± 0.99, of which 54.0% of the onset time is from 3 to 4.5 hours; 46.0% of onset time is less than 3 hours.

The most commonly used neuroprotective drug is citicoline (31.0%), followed by Cerebrolysin (17.7%). choline alfoscerate (12.4%), injectable Ginkgo Biloba (4.4%). The most commonly used medication to control hypertension is amlodipine (52.2%), followed by losartan (35.5%). Drugs to control injectable hypertension include only nicardipine (10.6%).

In the antiplatelet group, the most commonly used is aspirin alone (37.2%), followed by the combination of clopidogrel and aspirin (29.2%). There are 3 anticoagulant active ingredients, of which rivaroxabane was used by 7.1% of patients, enoxaparin and aceocoumarol were used by 5.3% and 3.5%, respectively. In other drug groups, 100% of patients used Statins and 87.6% used acetyl-DL-leucine.

10 patients with high blood pressure above 185/110mmHg had appropriate blood pressure control. 100% of cases used fibrinolytic drugs with the brand name Actilyse, of which 58.4% used a dose of 0.9 mg/kg, 41.6% used a dose of 0.6mg/kg. 100% received appropriate thrombolytic therapy. Most stable patients were discharged from the hospital

(92.0%), with 8% of seriously ill patients asking to return home or be transferred.

Of the 104 stable patients discharged from the hospital, the majority were paraplegic (94.23%), there were 5 cases of non-weakness, and 1 case of paraplegia. There are 92.31% of limb muscle weakness and paralysis (1/5-4/5), there are 3 cases of complete paralysis and 5 normal cases. A total of 6 adverse events were recorded, including increased intracranial pressure, gastrointestinal bleeding; cerebral infarction with hemorrhagic transformation; tooth bleeding and convulsions.

The above results showed that thrombolytic therapy was consistent with the guidelines, most patients were stable and discharged from the hospital, and 6 adverse events were recorded, including 4 bleeding, 1 increased intracranial pressure, and 1 seizure.

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TÓM TẮT

NGHIÊN CỨU ĐẶC ĐIỂM SỬ DỤNG THUỐC VÀ NHẬN XÉT KẾT QUẢ ĐIỀU TRỊ NHỒI MÁU NÃO TẠI TRUNG TÂM ĐỘT QUỴ BỆNH VIỆN HỮU NGHỊ ĐA KHOA NGHỆ AN NĂM 2023

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Ngày nhận bài 12/10/2023, ngày nhận đăng 13/11/2023

Với mong muốn tìm hiểu một cách đầy đủ về sử dụng thuốc trong điều trị nhồi máu não nhằm góp phần nâng cao hiệu quả, an toàn hơn cho bệnh nhân, bài viết trình bày kết quả nghiên cứu đặc điểm sử dụng thuốc và nhận xét kết quả điều trị nhồi máu não tại tại Trung tâm Đột quỵ Bệnh viện Hữu Nghị Đa khoa Nghệ An. 113 hồ sơ bệnh án của bệnh nhân nhồi máu nào điều trị tại Trung tâm Đột quỵ Bệnh viện Hữu Nghị Đa khoa Nghệ An từ 01/01/2023- 30/6/2023 đã được nghiên cứu, phân tích. Kết quả cho thấy liệu pháp tiêu sợi huyết phù hợp với hướng dẫn, đa phần bệnh nhân ổn định ra viện, ghi nhận 6 biến cố bất lợi xảy ra gồm xuất huyết 4, tăng áp lực nội sọ 1, co giật 1.

Từ khóa: Nhồi máu não cấp; đột quỵ tắc mạch máu não; tiêu sợi huyết.