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Original Article

Status of In-Hospital Acute Ischemic Stroke Treated by Mechanical Thrombectomy

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Objective: To elucidate the current state of in-hospital acute ischemic stroke under the introduction of acute-phase mechanical thrombectomy.

Methods: The study included 18 consecutive patients with in-hospital cerebral infarction who underwent thrombectomy between April 2014 and March 2020 at St. Marianna University School of Medicine Yokohama City Seibu Hospital. We analyzed the primary disease, department responsible for treatment, modified Rankin Scale (mRS) scores before onset and on discharge, status of onset, treatment course, and so on.

Results: The mean age was 79.9 (66–93) years. There were nine females. The admission methods included scheduled admission in 5 patients and non-scheduled admission in 13 patients. The primary diseases consisted of malignant tumors in five patients and heart disease in four patients. The departments responsible for treatment consisted of the Department of Digestive Surgery for six patients and Department of Cardiology for three patients. The mRS score before admission was evaluated as 0–2 in 15 patients and 3–5 in 3 patients. The embolism was evaluated as cardiogenic in 14 patients. Antithrombotic therapy was discontinued before the onset of cerebral infarction in three patients. The mean interval from onset or last well known (LWK) until CT/MRI and puncture was 88.4 and 157.6 minutes. The median Alberta stroke program early CT score (ASPECTS; minimum–maximum) was 8 (2–10). Tissue plasminogen activator (t-PA) was administered to five patients. Concerning the degree of recanalization, the thrombolysis in cerebral infarction (TICI) grade was evaluated as 1 to 2a in 2 patients and 2b to 3 in 16. In the latter, the mean interval from onset or final onset-free confirmation until recanalization was 197.7 minutes. mRS score on discharge was evaluated as 0–2 in four patients, 3–5 in nine, and 6 in five patients. The mortality was related to a primary disease requiring admission in three patients.

Conclusion: In-hospital onset cerebral infarction was markedly influenced by the primary disease requiring admission. Even when favorable recanalization was achieved, the number of patients with a favorable outcome was small.

Keywords in-hospital onset cerebral infarction, discontinuation of antithrombotic drugs, acute-phase revascularization, atrial fibrillation, Trousseau's syndrome

Introduction

In-hospital stroke reportedly accounts for 0.04%–0.06% of all inpatients[1,2] and its incidence is low. As a treatment for acute ischemic stroke, intravenous thrombolysis with tissue plasminogen activator (t-PA) was also introduced in Japan in 2005. After 2015, several randomized controlled trials demonstrated the usefulness of mechanical thrombectomy. In the American Heart Association/American Stroke Association (AHA/ASA) guidelines in 2015, this procedure is recommended as Class I.[3] To clarify the status of in-hospital acute ischemic stroke under the introduction of acute-phase mechanical thrombectomy, we retrospectively investigated

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patients with in-hospital acute ischemic stroke who underwent acute-phase mechanical thrombectomy at our hospital.

Our hospital is a branch hospital belonging to a university hospital located in Yokohama City, Kanagawa Prefecture, with 518 beds. The departments consist of the Department of Internal Medicine, Department of Surgery other than the Department of Respiratory Surgery, Department of Pediatrics/Neonatology, Department of Obstetrics and Gynecology, Department of Radiology, and seven other departments, including minor departments. Furthermore, our hospital has an emergency and critical care center and cardiovascular center.

Materials and Methods

Patients with cerebral infarction during admission to our hospital due to diseases other than cerebral infarction were regarded as having in-hospital cerebral infarction. The study period was from April 2014 until March 2020. During this period, mechanical thrombectomy was performed on 81 patients. Of these, the subjects were 18 consecutive patients with in-hospital cerebral infarction. We analyzed the age, sex, admission method, primary disease requiring admission, department responsible for treatment, date of cerebral-infarction onset, modified Rankin Scale (mRS) scores before onset and on discharge/referral, status of onset, presence of atrial fibrillation, use of antithrombotic drugs, interval until diagnosis and treatment, Alberta Stroke Program Early CT Score (ASPECTS), and presence of t-PA administration based on medical records regarding admission. Concerning the ASPECTS, diffusion-weighted imaging (DWI)-ASPECTS was adopted in patients in whom MRI was performed, CT-ASPECTS in those in whom only CT was performed, and posterior circulation-ASPECTS[4] in those with posterior circulation infarction. The intervals from onset until diagnosis, treatment, and recanalization were compared with those in patients with out-of-hospital cerebral infarction during the same period. For statistical analysis, the t-test and Mann–Whitney U-test were used.

Results

Summary of 18 patients

A summary of 18 patients is shown in **Table 1**. The mean age was 79.9 (66–93) years. There were nine females. The admission methods included scheduled admission in five patients and non-scheduled admission, involving transportation by ambulance, in 13 patients. The five patients consisted of 3 patients (Case 7: rectal cancer, Case 12: vertebral compression fracture, and Case 13: malignant skin tumor) who were admitted to undergo surgery, 1 with atrial fibrillation who was admitted for catheter ablation (Case 11), and 1 with rheumatoid arthritis who was admitted for detailed examination of severe anemia (Case 17).

Diseases requiring admission and departments responsible for treatment (Figs. 1 and 2)

The primary diseases consisted of malignant tumors in five patients, heart disease in four, pulmonary disease in three, digestive disease (excluding malignant tumors) in two, orthopedic disease in one, rheumatoid arthritis in one, Parkinson's disease in one, and acute renal failure in one patient. The malignant tumors consisted of gastrointestinal cancer in four patients (multiple organ metastases were present in three) and skin cancer in one. The heart diseases consisted of heart failure in two patients, atrial fibrillation (admitted for ablation) in one patient, and severe aortic valve stenosis (transported with cardiopulmonary arrest) in one patient. The departments responsible for treatment consisted of the Department of Digestive Surgery for six patients, Department of Cardiology for three, Department of Rheumatology for two, Department of Respiratory Medicine for one, Department of Plastic Surgery for one, Department of Nephrology for one, Department of Neurology for one, Department of Cardiovascular Surgery for one, Department of Orthopedics for one, and Emergency Department for one patient.

Source of embolism (Fig. 3)

Atrial fibrillation, including paroxysmal atrial fibrillation, was indicated before mechanical thrombectomy in nine patients (Cases 3, 6–8, 11–13, 17, and 18). The embolism was evaluated as cardiogenic in 14 patients (Cases 3 and 6–18), including those with atrial fibrillation.

Of the five malignant tumor patients, atrial fibrillation was indicated in two (Cases 7 and 13). In the other three patients (Cases 1, 2, and 5), the D-dimer levels were high (Case 1: 11.4 μg/mL, Case 2: >30.0 μg/mL, and Case 5: 23.7 μg/mL), suggesting Trousseau's syndrome.

Concerning the other factors, thrombotic tendency related to the use of an immunosuppressive agent was noted in one patient (Case 4).

Antithrombotic therapy

Antithrombotic therapy was administered to 10 patients (Cases 2, 3, 5, 7, 8, 11–13, 17, and 18) before admission.

The antithrombotic drugs consisted of direct-acting oral anticoagulants (DOACs) in four patients, warfarin in four, and antiplatelet drugs in two patients. As DOACs, a standard dose of apixaban was administered to one patient (Case 11), a standard dose of rivaroxaban to one (Case 12), and edoxaban to two in whom the dose was reduced in accordance with the reference body weight (Cases 17 and 18). Of the four patients who received warfarin (Cases 2, 3, 8, and 13), the prothrombin time-international normalized ratio (PT-INR) on admission was optimally prolonged in three, excluding Case 3.

Onset related to antithrombotic-drug discontinuation

Antithrombotic therapy was discontinued before the onset of cerebral infarction in 3 patients (Case 5, 12, and 17). The interval from post-discontinuation resumption until in-hospital cerebral infarction was very short in one patient (Case 13). This therapy was discontinued due to hemorrhage from colon cancer (Case 5) and severe anemia (Case 17). Discontinuation in the perioperative phase in two patients (Cases 12 and 13) is presented in the next section Perioperative onset.

In Case 5, the patient underwent coronary artery stenting and received two antiplatelet drugs. However, they were admitted with hemorrhage from colon cancer and administration of the two drugs was discontinued. After admission, no cardiogenic factor, such as atrial fibrillation, was indicated and the D-dimer level was 23.7 μg/mL, suggesting Trousseau's syndrome.

In Case 17, the patient received edoxaban for atrial fibrillation (the dose was reduced in accordance with the reference body weight). However, they were admitted for detailed examination of anemia and edoxaban therapy was discontinued. Cerebral infarction occurred 5 days after admission.

Perioperative onset

Surgery-associated onset was noted in three patients: one patient who underwent surgery for compression fracture (Case 12), one patient who underwent surgery for a malignant skin tumor (Case 13), and one patient who underwent surgery for severe aortic valve stenosis (Case 14).

In Case 12, the administration of rivaroxaban, which was orally administered for the treatment of atrial fibrillation, was discontinued on admission. After surgery, discontinuation was also continued and cerebral infarction occurred 3 days after surgery (discontinuation period: 6 days).

In Case 13, the oral administration of warfarin, which was prolonged to an optimal range, was discontinued on admission. For preoperative management, continuous intravenous drip of heparin, in which the activated partial thromboplastin time (APTT) was prolonged 1.5- to 2-fold, was performed and completed prior to surgery on the day of surgery. The absence of hemorrhage at the wound site was confirmed the day after surgery, and the administration of warfarin and heparin was resumed, but cerebral infarction occurred 2 days after surgery. At the time of onset, there was no prolongation of PT-INR, whereas the APTT was prolonged 2-fold.

In Case 14, an optimal PT-INR had been maintained by warfarin therapy following valve replacement, but cerebral infarction occurred 3 days after surgery.

Interval from admission until onset

Concerning the timing of onset in the inpatients, the mean interval from admission until onset was 14.6 days (1–44). The interval from admission was ≤3 days in 5 patients, 4–7 days in 3, and ≥8 days in 10.

In two patients with cerebral infarction related to the discontinuation of anticoagulant therapy (Cases 12 and 17), cerebral infarction occurred 5 and 6 days after admission/discontinuation, respectively.

Status at the time of onset

The time of onset was clear in 14 patients (Cases 1–14), including those who developed cerebral infarction in the presence of healthcare professionals and those who used a nurse call due to a mild condition in the initial phase.

Intervals from onset or last well known (LWK) until CT or MRI, puncture, and recanalization (in comparison with out-of-hospital onset patients)

The mean interval from onset or LWK until CT or MRI was 88.4 minutes (it was 71.4 minutes in patients in whom the time of onset was clear [Cases 1–14]). The median ASPECTS (minimum-maximum) was 8 (2–10). This score was ≥8 in 10 patients. t-PA was administered to five patients. The interval from onset or LWK until administration was 138 minutes. Of non-t-PA-treated patients, the interval from onset exceeded 4.5 hours in 1 (Case 16) and t-PA administration was not selected due to primary-disease-related matters in the other patients.

The mean interval from onset or LWK until puncture was 157.6 minutes (it was 140.6 minutes in patients in whom the time of onset was clear [Cases 1–14]). Concerning the degree of recanalization, the thrombolysis in cerebral

Table 1 Summary of all 18 in-hospital acute ischemic stroke patients (N=18)

Case	Age (years)	Sex	Hospitalization	Primary disease	Department	Onset date after hospitalization (days)	Antithrombotic drug before admission	Antithrom-botic drug at onset
1	79	F	Non-scheduled	Cecal cancer (multiple metastasis)	Digestive Surgery	3	-	-
2	66	F	Non-scheduled	Rectal cancer (multiple metastasis)	Digestive Surgery	42	Warfarin	Warfarin
3	74	F	Non-scheduled	Interstitial pneumonia	Rheumatology	24	Warfarin	Warfarin
4	75	F	Non-scheduled	Interstitial pneumonia	Respiratory Medicine	38	-	-
5	83	F	Non-scheduled	Colon cancer (no metastasis)	Digestive Surgery	10	Aspirin + clopidogrel	-
6	93	M	Non-scheduled	Emphysema	Cardiology	25	-	-
7	79	M	Scheduled	Rectal cancer (multiple metastasis)	Digestive Surgery	10	Aspirin	Aspirin
8	87	M	Non-scheduled	Cholangitis	Digestive Surgery	22	Warfarin	Heparin
9	77	F	Non-scheduled	Parkinson's disease	Neurology	1	-	-
10	77	M	Non-scheduled	Acute renal failure	Nephrology	9	-	-
11	75	M	Scheduled	Atrial fibrillation	Cardiology	3	Apixaban	Apixaban
12	82	F	Scheduled	Vertebral compression fracture	Orthopedics	6	Rivaroxaban	-
13	85	M	Scheduled	Myxoid fibro-sarcoma	Plastic Surgery	7	Warfarin	Warfarin + heparin
14	77	M	Non-scheduled	Aortic valve stenosis (after cardio-pulmonary arrest)	Cardio-vascular Surgery	3	-	Warfarin
15	89	F	Non-scheduled	Heart failure	Emergency Department	1	-	-
16	78	F	Non-scheduled	Heart failure	Cardiology	10	-	Heparin
17	84	M	Scheduled	Rheumatoid arthritis	Rheumatology	5	Edoxaban	-
18	78	M	Non-scheduled	Superior mesenteric artery occlusion	Digestive Surgery	44	Edoxaban	Edoxaban

ASPECTS: Alberta Stroke Program Early CT Score; IV t-PA: intravenous tissue-plasminogen activator; LWK: last well known; mRS: modified Rankin Scale; TICI: thrombolysis in cerebral infarction

Etiology	Onset or LWK to CT/MRI (min)	AS-PECTS	Onset or LWK to IV t-PA (min)	Onset or LWK to puncture (min)	Onset or LWK to recanaliza-tion (min)	TICI grade	mRS before admission	mRS at discharge	Post-discharge destination
Trousseau's syndrome	196	9	230	258	343	2b	3	3	Home
Trousseau's syndrome	118	10	Skip	88	-	1	2	6	Death
Atrial fibrillation	78	2	Skip	108	173	2b	4	6	Death
Thrombotic tendency	67	8	100	119	184	3	1	6	Death
Trousseau's syndrome	57	10	Skip	132	162	3	0	6	Death
Atrial fibrillation	59	2	Skip	93	121	3	1	4	Long-term care hospital
Atrial fibrillation	45	9	Skip	90	135	2b	0	4	Rehabilitaion hospital
Atrial fibrillation	72	2	Skip	240	297	3	0	4	Rehabilitaion hospital
Sick sinus syndrome	71	5	120	248	290	3	5	5	Long-term care hospital
Atrial fibrillation	48	4	100	174	217	3	1	5	Long-term care hospital
Atrial fibrillation	58	4	Skip	103	113	3	0	2	Rehabilitaion hospital
Atrial fibrillation	76	10	Skip	140	237	3	0	2	Rehabilitaion hospital
Atrial fibrillation	15	10	Skip	95	139	2b	0	2	Rehabilitaion hospital
After valve replacement	40	10	Skip	80	109	2b	0	4	Rehabilitaion hospital
Heart failure	89	6	140	175	205	3	0	3	Rehabilitaion hospital
Heart failure	372	5	Skip	395	-	1	0	6	Death
Atrial fibrillation	71	10	Skip	155	260	3	0	1	Home
Atrial fibrillation	60	8	Skip	144	178	3	0	3	Home

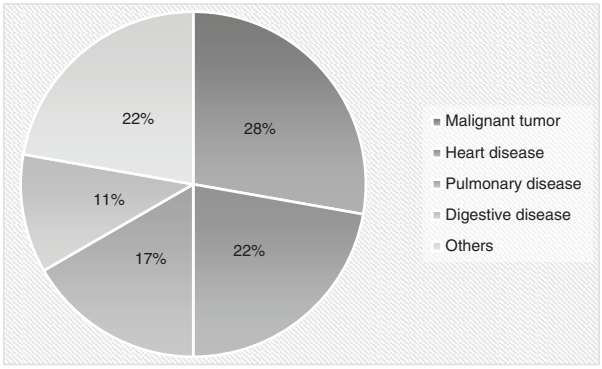

Fig. 1 Primary disease requiring admission

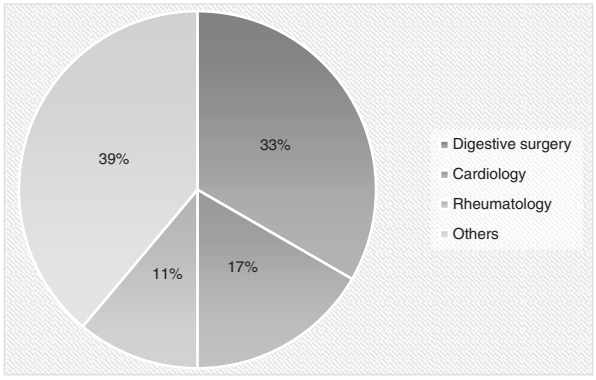

Fig. 2 Main clinical department of hospitalization

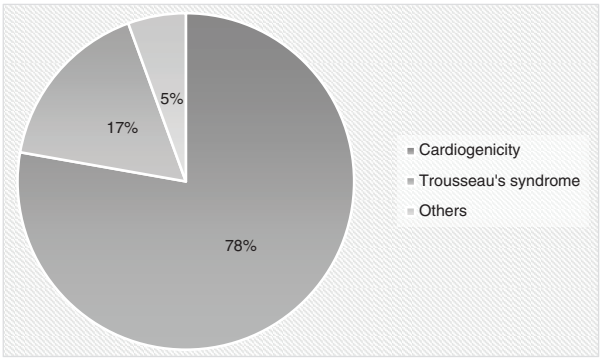

Fig. 3 Etiological factor of cerebral infarction

infarction (TICI) grade was evaluated as 1 to 2a in 2 patients and 2b to 3 in 16 patients. In the latter, the mean interval from onset or LWK until recanalization was 197.7 minutes (it was 193.8 minutes in patients in whom the time of onset was clear [Cases 1–14]).

We compared the subjects with 63 patients with out-of-hospital acute ischemic stroke in whom mechanical thrombectomy was performed during the same period (**Table 2**). In the in-hospital acute ischemic stroke patients, the intervals from onset or LWK until CT or MRI, puncture, and recanalization were 88.4, 157.6, and 197.7 minutes, respectively. In the out-of-hospital acute ischemic stroke patients, they were 125.5, 208.8, and 264.1 minutes, respectively. These parameters were shorter in the in-hospital onset group ($p = 0.04$, $p = 0.002$, and $p < 0.001$, respectively). Concerning the degree of recanalization, there was no significant difference ($p = 0.14$).

mRS scores before admission and on discharge (in comparison with out-of-hospital onset patients)

The mRS score before admission was evaluated as 0 in 11 patients, 1 in three, 2 in one, 3 in one, 4 in one, and 5 in one patient, with a median of 0 (**Fig. 4**). That score on discharge/referral to other hospitals was evaluated as 1 in one patient, 2 in three, 3 in three, 4 in four, 5 in two, and 6 in five patients, with a median of 4. On the other hand, in the out-of-hospital onset patients, the mRS score on discharge/referral to other hospitals was evaluated as 0 in 4 patients, 1 in 6, 2 in 15, 3 in 4, 4 in 20, 5 in 5, and 6 in 9 patients, with a median of 4 (**Table 2**). The outcome was slightly poorer in the in-hospital onset patients, although there was no significant difference ($p = 0.07$).

Of five patients who died in the in-hospital onset group, cerebral infarction was a direct factor for mortality in two (one who died of cerebral infarction because effective revascularization was not achieved [Case 2], and one in whom hemorrhagic infarction developed despite effective revascularization [Case 3]), and mortality was related to a primary disease requiring admission in the other three patients (Cases 4, 5, and 16). On the other hand, mortality was related to cerebral infarction in nine patients who died in the out-of-hospital onset group.

Discussion

We investigated 18 consecutive patients who underwent acute-phase revascularization for in-hospital acute ischemic stroke.

According to a previous study,[2] the cardiology department is frequently responsible for the treatment of in-hospital cerebral infarction. In Japan, similar results were also reported.[5,6] This is because arrhythmia, including atrial fibrillation, ischemic heart disease, and heart failure, which cause cardiogenic cerebral infarction, are treated in the cardiology department. Furthermore, stroke onset was reported in approximately 1% of inpatients with myocardial infarction.[7] As a characteristic of our subjects, the rate those admitted to the Department of Digestive Surgery was the highest. This was possibly because advanced cancer-bearing

Table 2 Comparison of time course, thrombolysis in cerebral ischemia grade, and modified Rankin scale between in-hospital onset cerebral infarction and out-of-hospital onset cerebral infarction

	IHCI (n = 18)	OHCI (n = 63)	p value
Onset or LWK to CT/MRI (min)	88.4	125.5	0.04
Onset or LWK to puncture (min)	157.6	208.8	0.002
Onset or LWK to recanalization (min)	197.7	264.1	<0.001
TICI grade (n)			0.14
1	2	3	
2a	0	8	
2b	5	17	
3	11	35	
mRS before discharge (n)			0.07
0	0	4	
1	1	6	
2	3	15	
3	3	4	
4	4	20	
5	2	5	
6	5	9	

IHCI: in-hospital onset cerebral infarction; LWK: last well known; mRS: modified Rankin Scale; OHCI: out-of-hospital onset cerebral infarction; TICI: thrombolysis in cerebral infarction

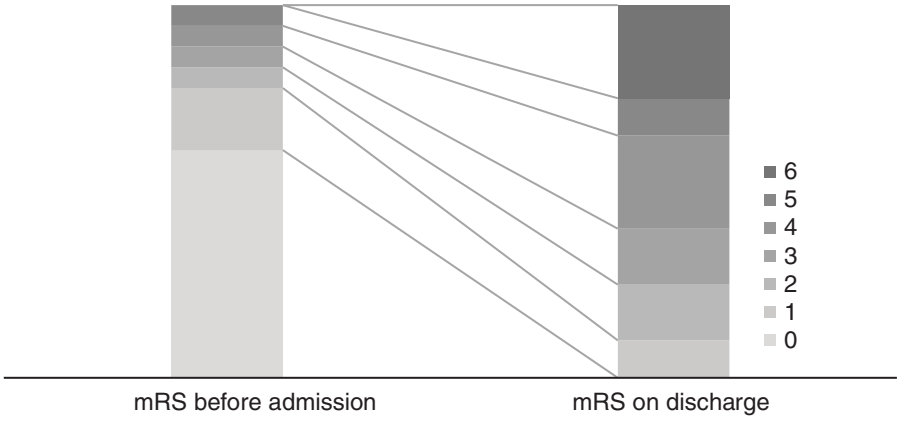

Fig. 4 Comparison of mRS scores between before admission and on discharge. mRS: modified Rankin Scale

patients with multiple organ metastases were admitted to the Department of Digestive Surgery for chemotherapy or systemic management. As departments responsible for treatment at the time of onset vary, it is necessary to educate all departments and wards where stroke treatment is not routinely performed in addition to the cardiology department, in which there is latently a risk of cerebral infarction to recognize the presence of in-hospital stroke.

As etiological factors for cerebral infarction in this study, cardiogenic factors, including atrial fibrillation, accounted for 78% and Trousseau's syndrome related to malignant tumors accounted for 17%. In two patients (11%), the perioperative discontinuation of antithrombotic drugs or a short interval from post-discontinuation resumption may have been etiologically involved. A previous study reported that in-hospital cerebral infarction related to the perioperative discontinuation of antithrombotic therapy accounted for 28.2% of all patients with in-hospital cerebral infarction.[8] Although the incidence was lower than previously reported, these problems may be avoided by complying with sufficient discontinuation and resumption. However, in Case 13, management by continuous intravenous drip of heparin, in which the APTT was optimally prolonged, was conducted from admission and completed prior to surgery, but cerebral infarction occurred 2 days after surgery even though warfarin and heparin administration was resumed after confirming the absence of hemorrhage at the wound site the day after surgery. This may be acceptable as perioperative management. Briefly, in departments responsible for procedures and surgery, it is

necessary to pay attention to the discontinuation or dose reduction of antithrombotic drugs again and sufficiently explain these matters to patients.

In two patients with cerebral infarction related to the discontinuation of anticoagulant therapy with DOACs (Cases 12 and 17), cerebral infarction occurred 5 and 6 days after admission/discontinuation, respectively. Concerning anticoagulants, it was reported that the incidence of thromboembolism during/after the discontinuation of warfarin therapy for ≤5 days due to outpatient surgery or procedures (cataract surgery, tooth extraction, or endoscopy) was 0.4%, and that its incidence during/after discontinuation for ≥7 days was 2.2%.[9] In another study, cerebral infarction associated with antithrombotic-drug discontinuation occurred 6–10 days after discontinuation.[10] In our group, cerebral infarction also occurred 5 or 6 days after discontinuation, and the interval from DOAC discontinuation until onset was similar to that from the discontinuation of other antithrombotic drugs; attention must be paid approximately 1 week after discontinuation.

As a characteristic of this study, the subjects included five patients with malignant tumors. Trousseau's syndrome has been used as a term representing thrombosis in malignant tumor patients since it was reported by Trousseau in patients with malignant tumors of the visceral organs.[11,12] In many malignant tumor patients with Trousseau's syndrome, the general condition is poor and the degree of independence in daily living before onset is low. For acute-phase revascularization, its results influence the outcome of a primary disease. In this study, mortality was directly related to the primary disease in some patients, as demonstrated in Case 5. However, some of the cancer-bearing patients were discharged to home facilitating home care, without worsening of mRS score, as demonstrated in Case 1. Although cooperation with a main department is necessary, specialists in endovascular treatment should provide positive treatment.

In patients with in-hospital cerebral infarction, the interval from onset until diagnostic imaging may be short due to in-hospital onset, but a previous study found that the interval from the detection of in-hospital stroke until diagnostic imaging was ≥60 minutes longer than that from the detection of community-onset stroke.[13] Focusing on cerebral infarction related to major vessels occlusion, the interval from LWK until detection in in-hospital stroke patients was reported to be significantly shorter than that from LWK until arrival to a hospital in out-of-hospital stroke patients.[5] On the other hand, concerning the time series until diagnosis and treatment, several studies noted that imaging was promptly performed after arrival to a hospital in patients with out-of-hospital stroke related to major vessel occlusion, and as a result, the interval until puncture was shorter than in in-hospital stroke patients.[14,15] If specialists in stroke treatment and nurses/rehabilitation staff belonging to the corresponding ward are involved in the initial consultation, imaging procedures may always be conducted for early diagnosis. However, if stroke occurs in a department or ward that is not responsible for stroke treatment, a specific interval may be required until diagnosis through follow-up. In our subjects, the interval from onset or LWK until CT or MRI was significantly shorter than in out-of-hospital onset patients during the same period ($p = 0.04$). Our hospital is a university-affiliated hospital which has a similar manpower/scale to those of municipal hospitals, and there may be a close inter-department or -ward relationship. However, a specific time was required in out-of-hospital onset patients, raising an issue.

Concerning treatment, non-t-PA-treated patients accounted for ≥50%. For most patients, t-PA administration was not selected due to the primary-disease-related general condition or treatment. The mean interval from onset or LWK until puncture was 157.6 minutes. The intervals from onset or LWK until puncture and recanalization were significantly shorter than in the out-of-hospital onset patients during the same period ($p = 0.002$ and $p < 0.001$, respectively). There was no significant difference in the degree of recanalization between the in-hospital and out-of-hospital onset patients ($p = 0.14$). However, the outcome was slightly poorer in the former ($p = 0.07$). Previous studies also suggested that the prognosis of in-hospital stroke patients was poor,[16,17] consistent with this study. The presence of a primary disease requiring admission is important and sequelae related to cerebral infarction in addition to the disease may have reduced the degree of independence in daily living. Concerning reasons for death-related discharge, cerebral infarction was a direct factor for mortality in the out-of-hospital onset patients, whereas primary-disease-related mortality accounted for ≥50% of the in-hospital onset patients.

As the limitation of this study, this was a retrospective study. All patients treated by acute-phase revascularization during the study period were able to be collected/analyzed. However, even among patients for whom acute-phase revascularization should have been essentially indicated, there may have been some in whom neither diagnostic

imaging nor consultation with specialists in stroke treatment was conducted for various reasons such as a poor general condition. Furthermore, our hospital is a university-affiliated hospital corresponding to a municipal hospital with approximately 500 beds. However, in large-scale or smaller-scale hospitals, the characteristics of in-hospital cerebral infarction may depend on the number of beds or departments.

Conclusion

We analyzed the characteristics of patients who underwent revascularization for in-hospital acute ischemic stroke. This in-hospital onset cerebral infarction was markedly influenced by the primary disease requiring admission. Even when favorable recanalization was achieved, the number of patients with a favorable outcome was small. As physicians may encounter patients with in-hospital cerebral infarction regardless of department, it is necessary to recognize its presence, and reconfirm the optimal use of antithrombotic drugs in the perioperative phase and risk of discontinuation.

Ethical Approval

The protocol of this study was approved by the ethics review board of St. Marianna University School of Medicine (Approval No.: 894 [Yokohama City Seibu Hospital]).

Disclosure Statement

The authors declare no conflict of interest.

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