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RESEARCH ARTICLES

Mechanical thrombectomy in acute ischaemic stroke: 1 year stroke centre experience

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ABSTRACT

Aim: Although successful recanalization is frequently achieved in acute ischemic stroke, favorable clinical outcomes are not universal. Multiple independent factors influence post-thrombectomy prognosis. This study aimed to identify the determinants of good clinical outcomes following mechanical thrombectomy (MT) in patients with acute ischemic stroke.

Methods: We retrospectively reviewed patients who underwent MT and/or intravenous thrombolytic therapy at our comprehensive stroke center between 2022 and 2023. Patients were classified by occlusion site: Group 1—middle cerebral artery (MCA, M1–M2) and anterior cerebral artery (ACA, A1); Group 2—internal carotid artery (ICA, cervical/distal) and tandem occlusions; Group 3—posterior circulation (distal vertebral, basilar, posterior cerebral artery (PCA) P1). Stroke severity was assessed using the National Institutes of Health Stroke Scale (NIHSS), and collateral circulation was graded with the TAN score for MCA occlusions. The modified Rankin Scale (mRS) score at 3 months was recorded in patients achieving successful recanalization (modified Thrombolysis in Cerebral Infarction (mTICI) 2b–3). Independent predictors of mRS were analyzed.

Results: Among 140 patients (57.9% male; median age, 69.5 years), successful recanalization was achieved in 85%. Poor outcome (mRS ≥3) was associated with older age, higher baseline NIHSS, elevated glucose, and higher 24-hour hemorrhage rates. Good outcome (mRS ≤2) correlated with higher mTICI and TAN scores.

Conclusion: Baseline and 24-hour NIHSS scores, collateral circulation, glucose level, and early intracranial hemorrhage are independent predictors of clinical outcome following MT in acute ischemic stroke.

Keywords: ischemic stroke, mechanical thrombectomy, clinical outcomes

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INTRODUCTION

Stroke ranks second among the leading causes of death worldwide and is the most common cause of disability (1). Cerebral angiography performed immediately after the onset of stroke shows arterial occlusions in 80% of acute infarcts (2,3). In a meta-analysis conducted by Goyal and colleagues, evaluating five randomized controlled trials, it was reported that clinical outcomes were better in patients with acute ischemic stroke (AIS) who underwent mechanical thrombectomy (4). According to the DAWN study, the rate of functional independence, defined by a score of 0 to 2 on the mRS at 90 days, was higher in the thrombectomy group compared to the control group (5). There is compelling evidence that good clinical outcomes are strongly associated with successful recanalization (6). In the Hermes meta-analysis, 71% of patients were successfully recanalized after mechanical thrombectomy (MT), but only 46% achieved good clinical outcomes (4). This discrepancy has led to investigations into factors influencing MT success. Studies have found that the absence of a history of diabetes, younger age, successful recanalization, a shorter time from symptom onset to recanalization, fewer passes with a stent retriever, and the absence of symptomatic hemorrhage are associated with good clinical outcomes (7). In our study, we examined the factors affecting clinical outcomes in patients who underwent mechanical thrombectomy.

METHODS

The medical records of patients who were treated with mechanical thrombectomy (MT) and/or intravenous (IV) tissue plasminogen activator (tPA) at the stroke center between 2022 and 2023 were retrospectively reviewed. Demographic data, cerebral angiography results, hospital admission and imaging times, medical history, medication use, and neurological examination findings at admission, 24 hours, and at 3 months were obtained from the hospital information management system (HIMS). Large vessel occlusions were examined in three groups: the first group included the middle cerebral artery (MCA) M1 and M2 segments and the anterior cerebral artery (ACA) A1 segment; the second group included the internal carotid artery (ICA) cervical segment, distal segment, and tandem occlusions; the third group included distal vertebral artery, basilar artery, and posterior cerebral artery (PCA) P1 occlusions. Patients who achieved successful recanalization (modified treatment in cerebral infarction (TICI) score: 2b-3) were evaluated using the modified Rankin Scale (mRS) at 3 months and divided into three groups for functional independence (0-II, III-V, and VI). TAN scoring was assessed only in patients with MCA occlusions.

This study was approved by the Clinical Research Ethics Committee of the University of Health Sciences, Sultangazi Haseki Training and Research Hospital (Decision no: 259-2023) and was conducted in accordance with the ethical standards of the Helsinki Declaration. All patients were evaluated by an interventional neurologist and a stroke neurologist. All patients underwent non-contrast brain computed tomography (CT) and contrast-enhanced cervical + brain CT angiography (CTA). Early infarct signs on brain CT were evaluated using the Alberta Stroke Program Early Computed Tomography (ASPECT) score. Alteplase at a dose of 0.9 mg/kg was administered in the emergency department to patients who presented within 4.5 hours after symptom onset, or who presented within 16 hours and had no ischemic lesion on FLAIR sequence in magnetic resonance imaging (MRI) and had no contraindications. These patients were then taken to the angiography unit for MT. MT was performed on patients aged ≥18 years, with a pre-stroke mRS score of 0 or 1, with MCA M1-M2 and ACA A1 occlusions, ICA cervical, tandem, distal ICA T, L, or I occlusions, vertebral artery, basilar artery, or PCA P1 occlusions, with an NIHSS score of ≥6 points, and an ASPECT score of ≥6 within 16 hours of symptom onset (8).

Endovascular treatment

Mechanical thrombectomy was performed on a monoplane angiography device under conscious sedation or general anesthesia. The femoral artery was used as the entry site for the procedure. A 6 French (F)

guiding catheter (Destination, Terumo, Tokyo, Japan) was then placed in the subclavian artery, vertebral artery, common carotid artery, or cervical segment of the internal carotid artery. A distal access catheter (Catalist 5F-6F, Stryker, Kalamazoo, Michigan), microcatheter (Rebar, Medtronic, Minneapolis, USA), and 0.014-inch microguidewire (Syncroo, Stryker) were used. Mechanical thrombectomy was performed using one of the stent-retriever thrombectomy techniques (isolated stent retriever, ARTS, SAVE, Solumbra) or aspiration (ADAPT). For stent-retriever MT, appropriately sized stent retrievers (Trevo, Stryker, Kalamazoo, Michigan, USA; Thrombite, Zylox-Tonbridge, Hangzhou, China; Solitaire X, Medtronic, Minneapolis, USA) were deployed in the occluded segment. If the procedure failed after two attempts, a technical change was made. If success could not be achieved after seven thrombectomy attempts, the procedure was terminated. In tandem occlusions, direct aspiration was performed first, and if unsuccessful, balloon angioplasty was performed on the internal carotid artery (ICA) origin. If reocclusion of the ICA origin occurred despite balloon angioplasty, carotid artery stenting was performed following a loading dose of 300 mg acetylsalicylic acid and 300 mg clopidogrel. Patients who underwent MT were monitored in the intensive care unit post-procedure. Blood pressure and neurological examination were monitored every 30 minutes for the first 2 hours and then every hour thereafter. A brain CT scan was performed 24 hours after MT. If no hemorrhage was detected on brain CT, antiplatelet or anticoagulant therapy was initiated based on the underlying etiology.

Clinical evaluation and outcome measures

The severity of the initial clinical findings was assessed using the National Institutes of Health Stroke Scale (NIHSS) score. Early infarct signs of AIS on brain CT were evaluated using the ASPECT score. Collateral levels on CTA in MCA occlusions were assessed according to the Tan scale. The level of recanalization was classified using the modified Treatment in Cerebral Ischemia (mTICI) classification (9). According to the classification: mTICI 0 was defined as no antegrade flow or perfusion beyond the occlusion; mTICI 1 as penetration beyond the occlusion but no perfusion; mTICI 2a as perfusion with less than 50% distal branch filling of the MCA territory; mTICI 2b as perfusion with more than 50% distal branch filling of the MCA territory; mTICI 2c as near-complete perfusion except for slow flow or small distal cortical emboli in a few distal cortical vessels; and mTICI 3 as full perfusion of the MCA territory.

Statistical analysis

In the descriptive statistics of the data, mean, standard deviation, median, minimum, maximum, frequency, and ratio values were used. The distribution of variables was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. For the analysis of independent quantitative data, ANOVA (Tukey test), Kruskal-Wallis, and Mann-Whitney U tests were used. For the analysis of independent qualitative data, the Chi-square test was used, and when the conditions for the Chi-square test were not met, the Fisher's test was applied. The analyses were performed using the SPSS 28.0 program.

RESULTS

A total of 140 patients were treated with mechanical thrombectomy (MT) for acute ischemic stroke. Of these, 57.9% were male and 42.1% were female, with a median age of 69.5 years (range: 21–96). Successful recanalization (mTICI 2b–3) was achieved in 119 patients (85%). Intravenous thrombolysis (IV tPA) was administered to 60% of patients. Among the cohort, 39.3% were smokers, 57.9% had hypertension (HT), 45.7% had atrial fibrillation (AF), 40% had coronary artery disease (CAD), 25.7% had diabetes mellitus (DM), and 24.3% were obese. Anticoagulant use was noted in 7.1% (warfarin) and 11.4% (NOAC). A previous history of stroke was present in 17.1%.

The median ASPECTS score at presentation was 9 (range: 6–10), and the median baseline NIHSS score was 9 (range: 3–22). Occlusion sites included MCA-M1 (49.3%), MCA-M2 (14.3%), ICA (19.3%), tandem lesions (7.1%), and posterior circulation (PCA/basilar artery, 10%) (Table 1).

Table 1. Demographic data and clinical characteristics								
		Min-Max			**Median**	**Mean±sd/n-%**		
Age		21.0	-	96.0	69.5	67.6	±	14.7
Sex	Women					81		57.9%
	Man					59		42.1%
Cigarette Usage	(-)					85		60.7%
	(+)					55		39.3%
Comorbid Disease								
Hypertension						81		57.9%
Atrial Fibrillation						64		45.7%
Coronary artery disease						56		40.0%
Diabetes mellitus						36		25.7%
Obesity						34		24.3%
Stroke History	(-)					116		82.9%
	(+)					24		17.1%
Application Aspect Score		6.0	-	10.0	9.0	9.1	±	1.1
Occluded Vessel	MCA M1					69		49.3%
	MCA M2					20		14.3%
	ICA DISTAL					27		19.3%
	ICA TANDEM					10		7.1%
	BA,VA,PCA P1					14		10.0%
Warfarin Usage	(-)					130		92.9%
	(+)					10		7.1%
NOAK Usage	(-)					124		88.6%
	(+)					16		11.4%
IV TPA	(-)					56		40.0%
	(+)					84		60.0%
Symptom Puncture Duration		15.0	-	795.0	180.0	250.6	±	174.3
Symptom Recanalisation Time		75.0	-	815.0	237.5	308.3	±	181.2
Puncture Recanalisation		10.0	-	190.0	55.0	56.8	±	24.0
Door Imaging		2.0	-	120.0	15.0	19.0	±	15.8
Door TPA		20.0	-	120.0	45.0	51.2	±	20.9
Door Puncture		15.0	-	110.0	60.0	56.5	±	17.5
TICI	0					13		9.3%
	2A					8		5.7%
	2B					35		25.0%
	2C					22		15.7%
	3					62		44.3%
Application NIHSS		3.0	-	22.0	9.0	9.7	±	3.5
24th Hour NIHSS		0.0	-	25.0	5.0	6.2	±	4.9
3rd Month MRS		0.0	-	6.0	2.0	2.4	±	2.0
Glucose		76.0	-	608.0	125.0	148.8	±	75.7
HB		5.1	-	16.9	12.5	12.4	±	2.3
PLT		61.0	-	996.0	225.0	248.4	±	104.3
Lymphocyte		0.3	-	7.0	2.0	2.2	±	1.2
Leukocyte		4.3	-	32.0	8.5	9.3	±	3.4
RDW		4.1	-	28.9	14.0	14.5	±	2.2

MCA: Middle cerebral artery; ACA: Anterior cerebral artery; ICA: Internal carotid artery; BA: Basilar artery; VA: Vertebral artery; PCA: Posterior cerebral artery; HT: Hypertension; AF: Atrial fibrillation; CAD: Coronary artery disease; DM: Diabetes mellitus; NOAC: Novel oral anticoagulant; IV tPA: Intravenous tissue plasminogen activator; ASPECTS: Alberta Stroke Program Early CT Score; NIHSS: National Institutes of Health Stroke Scale; TICI: Thrombolysis in Cerebral Infarction; mTICI: Modified Thrombolysis in Cerebral Infarction; mRS: Modified Rankin Scale; Hb: Hemoglobin; PLT: Platelet; RDW: Red cell distribution width.

Table 1. Continued

		Min-Max			Median	Mean±sd/n-%		
First Pass Recanalisation	First Pass					99	-	70,7%
	Repeating					41	-	29.3%
Use of Stent Retriver	(-)					38	-	27.1%
	(+)					102	-	72.9%
Distal Embolism	(-)					75	-	53.6%
	(+)					65		46.4%
Bleeding in 24 hours	(-)					97		69.3%
	(+)					43		30.7%
Antiaggregant Therapy	(-)					82		58.6%
	(+)					58		41.4%
Rescue Therapy	(-)					116		82.9%
	(+)					24		17.1%

MCA: Middle cerebral artery; ACA: Anterior cerebral artery; ICA: Internal carotid artery; BA: Basilar artery; VA: Vertebral artery; PCA: Posterior cerebral artery; HT: Hypertension; AF: Atrial fibrillation; CAD: Coronary artery disease; DM: Diabetes mellitus; NOAC: Novel oral anticoagulant; IV tPA: Intravenous tissue plasminogen activator; ASPECTS: Alberta Stroke Program Early CT Score; NIHSS: National Institutes of Health Stroke Scale; TICI: Thrombolysis in Cerebral Infarction; mTICI: Modified Thrombolysis in Cerebral Infarction; mRS: Modified Rankin Scale; Hb: Hemoglobin; PLT: Platelet; RDW: Red cell distribution width.

Patients with MCA/ACA occlusions had significantly higher age (p=0.039), AF prevalence (p=0.003), and NIHSS scores at presentation (p=0.001) compared to those with ICA and tandem occlusions. Door-to-imaging time was significantly longer in posterior circulation strokes (p=0.015), and rescue therapy was more frequently required in PCA/basilar artery occlusions than in MCA/ACA occlusions (p<0.05) (Table 2).

Clinical outcome groups

At three months, patients were categorized into three clinical outcome groups according to the modified Rankin Scale (mRS):

- Good clinical outcome group: mRS 0–2
- Dependent clinical outcome group: mRS 3–5
- Mortality group: mRS 6

Good clinical outcome group (mRS 0–2)

Patients with good clinical outcomes (mRS 0–2) were younger (p = 0.025) and had significantly higher mTICI and TAN collateral scores (p < 0.05), along with lower NIHSS scores at presentation and at 24 hours (both p < 0.001). Glucose levels were lower (p = 0.026), and the rate of intracranial hemorrhage within 24 hours was reduced compared to other outcome groups (p = 0.006).

Dependent clinical outcome group (mRS 3–5)

In the dependent clinical outcome group (mRS 3–5), patients were older (p = 0.025) and had higher NIHSS scores at presentation and at 24 hours compared to those with good outcomes (both p < 0.001). This group also exhibited higher glucose levels (p = 0.026) and an increased rate of intracranial hemorrhage within the first 24 hours (p = 0.006).

Mortality group (mRS 6)

Patients in the mortality group (mRS 6) demonstrated the highest NIHSS scores at presentation and at 24 hours (both p < 0.001), significantly elevated platelet counts (p = 0.018), and the highest frequency of intracranial hemorrhage. TAN collateral scores were significantly lower in this group than in both the good and dependent outcome groups (p < 0.05) (Table 3).

DISCUSSION

In this study, we retrospectively evaluated 140 patients who underwent mechanical thrombectomy (MT) for acute ischemic stroke due to large vessel occlusion (LVO). Successful recanalization (mTICI 2b–3) was achieved in 85% of patients. Based on 3-month outcomes, patients were stratified into three categories: good clinical outcome (mRS 0–2), dependent clinical outcome (mRS 3–5), and mortality (mRS 6). Favorable outcomes were associated with

Table 2. Comparison of patients according to vessel occlusion sites

			[2] Group-I (MCA M1-M2, ACA A1)	[3] Group-II (ICA ve Tandem)	[4] Group-III (BA, VA, PCA P1)	p	
Age	Mean±sd		69.5 ± 16.7	63.4 ± 12.5	65.6 ± 8.8	**0.039**	K
	Median		75	65.0 [2]	64.5		
Sex							
Women		n-%	55 - 61.8%	20 - 54.10%	6 - 42.90%	0.16	X^2
Man		n-%	34 - 38.2%	17 - 45.90%	8 - 57.10%		
Cigarette Use	(-)	n-%	60 - 67.4%	18 - 48.60%	7 - 50.00%	0.056	X^2
	(+)	n-%	29 - 32.60%	19 - 51.40%	7 - 50.00%		
Comorbid Disease				-	-		
Hypertension		n-%	56 - 62.90%	18 - 48.60%	7 - 50.00%	0.456	X^2
Atrial Fibrillation		n-%	48 - 53.90%	9 [2] - 24.30%	7 - 50.00%	**0.003**	X^2
Coronary artery disease		n-%	35 - 39.30%	14 - 37.80%	7 - 50.00%	0.759	X^2
Diabetes mellitus		n-%	19 - 21.30%	11 - 29.70%	6 - 42.90%	0.173	X^2
Obesity		n-%	24 - 27.00%	7 - 18.90%	3 - 21.40%	0.655	X^2
Stroke History	(-)	n-%	77 - 86.50%	29 - 78.40%	10 - 71.40%	0.217	X^2
	(+)	n-%	12 - 13.50%	8 - 21.60%	4 - 28.60%		
Warfarin Usage	(-)	n-%	83 - 93.30%	36 - 97.30%	11 - 78.60%	**p<0.05**	X^2
	(+)	n-%	6 - 6.70%	1 - 2.70%	3 - 21.40%		
NOAK Usage	(-)	n-%	78 - 87.60%	33 - 89.20%	13 - 92.90%	p>0.05	X^2
	(+)	n-%	11 - 12.40%	4 - 10.80%	1 - 7.10%		
IV TPA	(-)	n-%	52 - 58.40%	21 - 56.80%	11 - 78.60%	**0.000**	X^2
	(+)	n-%	37 [1] - 41.60%	16 [1] - 43.20%	3 [1] - 21.40%		
Symptom Puncture Duration	Mean±sd		248.9 ± 166.6	235.5 ± 167.3	304.9 ± 239.9	0.886	K
	Median		202.5	170	180		
Symptom Recanalisation Time	Mean±sd		303.1 ± 171.8	297.1 ± 176.1	375.2 ± 249.5	0.876	K
	Median		252.5	220	265		
Puncture Recanalisation	Mean±sd		53.3±17.9	61.3 ± 26.9	67.9 ± 42.6	0.192	K
	Median		50	60	60		
Door Imaging	Mean±sd		18.8±16.6	16.2 ± 9.1	32.4 ± 24.1	**0.015**	K
	Median		15.0 [4]	15.0 [4]	26		
Door TPA	Mean±sd		48.7±20.7	49.8 ± 20.3	58.8 ± 23.2	0.646	A
	Median		45	42.5	62.5		
Door Puncture	Mean±sd		55.4±17	57.1 ± 17.8	61.5 ± 20	0.56	K
	Median		56	60	70		
TICI	0	n-%	6 - 6.70%	5 - 13.20%	2 - 15.40%	p>0.05	X^2
	2A	n-%	4 - 4.50%	4 - 10.50%	0 - 0.00%		
	2B	n-%	25 - 28.10%	9 - 23.70%	1 - 7.70%		
	2C	n-%	15 - 16.90%	5 - 13.20%	2 - 15.40%		
	3	n-%	39 - 43.80%	15 - 39.40%	8 - 61.50%		
Application NIHSS	Mean±sd		10.4±3.3	9.4 ± 3.6	10.1 ± 4.9	**0.001**	K
	Median		10	8.0 [2]	10.5		
24th Hour NIHSS	Mean±sd		6.2±5	6.4 ± 4.8	6.9 ± 6.1	0.934	K
	Median		4	6	5		
3rd Month MRS	Mean±sd		2.2±2.1	2.3 ± 2	2.3 ±2	0.16	K
	Median		2	2	1.5		
Glucose	Mean±sd		134.5±54.9	160.6 ± 102.7	162.2 ± 75.2	**0.049**	K
	Median		119.0 [1]	125	143		
HB	Mean±sd		12.2±2.1	12.5 ± 2.5	12.2 ± 2.2	0.395	K
	Median		12.2	12.7	12.9		
First Pass Recanalisation		n-%	59 - 66.30%	31 - 81.60%	9 - 69.20%	p>0.05	X^2
Repeating		n-%	30 - 33.70%	7 - 18.40%	4 - 30.80%		
Use of Stent Retriver	(-)	n-%	27 - 30.30%	8 - 21.10%	3 - 23.10%	p>0.05	X^2
	(+)	n-%	62 - 69.70%	30 - 78.90%	10 - 76.90%		
Distal Embolism	(-)	n-%	51 - 57.30%	15 - 39.50%	9 - 69.20%	p>0.05	X^2
	(+)	n-%	38 - 42.70%	23 - 60.50%	4 - 30.80%		
Bleeding in 24 hours	(-)	n-%	62 - 69.70%	24 - 63.20%	11 - 84.60%	0.08	X^2
	(+)	n-%	27 - 30.30%	14 - 36.80%	2 - 15.40%		
Antiaggregant Therapy	(-)	n-%	54 - 60.70%	22 - 57.90%	6 - 46.20%	0.703	X^2
	(+)	n-%	35 - 39.30%	16 - 42.10%	7 - 53.80%		
Rescue Therapy	(-)	n-%	81 - 91.00%	27 - 71.10%	8 - 61.50%	**p<0.05**	X^2
	(+)	n-%	8 - 9.00%	11 - 28.90%	5 - 38.50%		

[A] ANOVA / K Kruskal-wallis (Mann-whitney u test) / X^2 Chi-square test (Fischer test).
[1] Difference with Group I p<0.05, [2] Difference with Group II p<0.05, [3] Difference with Group III p<0.05,[4] Difference with Group-IV p<0.05.
MCA – Middle cerebral artery; ACA – Anterior cerebral artery; ICA – Internal carotid artery; BA – Basilar artery; VA – Vertebral artery; PCA – Posterior cerebral artery; AF – Atrial fibrillation; CAD – Coronary artery disease; DM – Diabetes mellitus; NOAC – Novel oral anticoagulant; IV tPA – Intravenous tissue plasminogen activator; NIHSS – National Institutes of Health Stroke Scale; TICI – Thrombolysis in Cerebral Infarction; mRS – Modified Rankin Scale; Hb – Hemoglobin; PLT – Platelet; DAPT – Dual antiplatelet therapy.

Table 3. Comparison of MRS groups

			[1] 3rd Month MRS Score 0-I-II	[2] 3rd Month MRS Score III-IV-V	[3] 3rd Month MRS Score VI	p	
Age	Mean±sd		66.3 ± 14.7	76.5 ± 12	71.6 ± 13.7	**0.025**	A
	Median		66.5	79.0 [1]	76.5		
Sex	Women	n-%	46 - 52.30%	9 - 60.00%	12 - 75.00%	0.23	X^2
	Man	n-%	42 - 47.70%	6 - 40.00%	4 - 25.00%		
Cigarette Use	(-)	n-%	47 - 53.40%	11 - 73.30%	12 - 75.00%	0.129	X^2
	(+)	n-%	41 - 46.60%	4 - 26.70%	4 - 25.00%		
Comorbid Disease							
Hypertension		n-%	48 - 54.50%	10 - 66.70%	11 - 68.80%	0.438	X^2
Atrial Fibrillation		n-%	36 - 40.90%	8 - 53.30%	11 - 68.80%	0.102	X^2
Coronary artery disease		n-%	39 - 44.30%	3 - 20.00%	7 - 43.80%	0.204	X^2
Diabetes mellitus		n-%	25 - 28.40%	2 - 13.30%	3 - 18.80%	0.376	X^2
Obesity		n-%	23 - 26.10%	4 - 26.70%	3 - 18.80%	0.814	X^2
Stroke History	(-)	n-%	78 - 88.60%	10 - 66.70%	11 - 68.80%	**0.028**	X^2
	(+)	n-%	10[23] - 11.40%	5 - 33.30%	5 - 31.30%		
Application Aspect	Mean±sd		9.3 ± 0.8	9.1 ± 1.1	8.6 ± 1.5	0.155	K
	Median		10	9	9		
LVO	(-)	n-%	1 - 1.10%	0 - 0.00%	0 - 0.00%	p>0.05	X^2
	(+)	n-%	87 - 98.90%	15 - 100.00%	16 - 100.00%		
IV TPA	(-)	n-%	52 - 59.10%	10 - 66.70%	10 - 62.50%	0.844	X^2
	(+)	n-%	36 - 40.90%	5 - 33.30%	6 - 37.50%		
Symptom Puncture Duration	Mean±sd		254.4 ± 182.3	232 ± 168.7	220.3 ± 160.4	0.85	K
	Median		180	180	167.5		
Symptom Recanalisation Time	Mean±sd		308.7 ± 186.5	296.5 ± 176.7	277.2 ± 185.1	0.876	K
	Median		220	220	225		
Puncture Recanalisation	Mean±sd		54 ± 18.8	64.5 ± 29.6	51.3 ± 19.5	0.299	K
	Median		51	60	45		
Door Imaging	Mean±sd		19.9 ± 18.3	19.5 ± 14.2	16.9 ± 13.6	0.761	K
	Median		15	15	14.5		
Door TPA	Mean±sd		49.2 ± 20.2	65.8 ± 14.3	30 ± 8.4	**0.004**	K
	Median		45	70.0 [1]	30.0 [12]		
Door Puncture	Mean±sd		54.7 ± 16.7	63.8 ± 14.4	55.3 ± 17.5	0.16	K
	Median		57	60	50		
TICI	2B	n-%	22 - 25.00%	6 - 40.00%	7 - 43.80%	**0.01**	X^2
	2C	n-%	12 - 13.60%	6 - 40.00%	4 - 25.00%		
	3	n-%	54 - 61.40%	3 [1] - 20.00%	5 - 31.30%		
NIHSS Score							
Application	Mean±sd		9.1 ± 2.9	13.2 ± 3.9	13.7 ± 2.7	**0**	K
	Median		9.0 [23]	14	13		
24th hour	Mean±sd		3.4 ± 2.2	10.9 ± 3.6	13.8 ± 2.9	**0**	K
	Median		3.0 [23]	10.0 [3]	13.5		
Glucose	Mean±sd		138.3 ± 78.9	146.4 ± 35.3	164.6 ± 82.6	**0.026**	K
	Median		115.0 [2]	145	148		
HB	Mean±sd		12.2 ± 2.3	13.2 ± 1.9	12.1 ± 2	0.214	A
	Median		12.4	13.2	11.7		
PLT	Mean±sd		246.9 ± 91.9	207.1 ± 63.9	320.5 ± 194.5	**0.018**	K
	Median		224.5 [3]	211.0 [3]	302.5		
Lymphocyte	Mean±sd		2.29 ± 1.2	2.02 ± 1.12	2.44 ± 1.9	0.615	K
	Median		2.03	1.71	1.52		
Leukocyte	Mean±sd		9 ± 3	8.9 ± 3.8	10.2 ± 3.2	0.249	K
	Median		8.4	7.9	10.1		
RDW	Mean±sd		14.6 ± 1.8	13.9 ± 1	15 ± 2.3	0.511	K
	Median		14	14	14.2		
First Pass Recanalisation	First Pass	n-%	57 - 64.80%	14 - 93.30%	11 - 68.80%	0.087	X^2
	Repeating	n-%	31 - 35.20%	1 - 6.70%	5 - 31.30%		
Use of Stent Retriver	(-)	n-%	25 - 28.40%	2 - 13.30%	4 - 25.00%	0.467	X^2
	(+)	n-%	63 - 71.60%	13 - 86.70%	12 - 75.00%		
Distal Embolism	(-)	n-%	53 - 60.20%	7 - 46.70%	8 - 50.00%	0.51	X^2
	(+)	n-%	35 - 39.80%	8 - 53.30%	8 - 50.00%		
Bleeding in 24 hours	(-)	n-%	69 - 78.40%	8 - 53.30%	7 - 43.80%	**0.006**	X^2
	(+)	n-%	19 [23] - 21.60%	7 - 46.70%	9 - 56.30%		
TAN Score	0	n-%	7 - 11.30%	4 - 33.30%	10[1] - 66.60%	**p<0.05**	X^2
	1	n-%	16 - 25.80%	6 - 50.00%	3 - 20.00%		
	2	n-%	28 - 45.20%	2 - 16.70%	1 - 6.70%		
	3	n-%	11 - 17.70%	0 - 0.00%	1 - 6.70%		
Rescue Therapy	(-)	n-%	78 - 88.60%	13 - 86.70%	11 - 68.80%	0.112	X^2
	(+)	n-%	10 - 11.40%	2 - 13.30%	5 - 31.30%		

[A] ANOVA / K Kruskal-wallis (Mann-whitney u test) / X^2 Chi-square test (Fischer test).

[1] 3rd Month MRS Score difference with 0-I-II group<0.05, [2] 3rd Month MRS Score difference with III-IV-V group p<0.05, [3] 3rd Month MRS Score difference with VI group p<0.05.

mRS – Modified Rankin Scale; MCA – Middle cerebral artery; ACA – Anterior cerebral artery; ICA – Internal carotid artery; PCA – Posterior cerebral artery; NIHSS – National Institutes of Health Stroke Scale; TICI – Thrombolysis in Cerebral Infarction; TAN – Tan collateral grading score; Hb – Hemoglobin; PLT – Platelet; RDW – Red cell distribution width; IV tPA – Intravenous tissue plasminogen activator; DAPT – Dual antiplatelet therapy.

younger age, higher mTICI and TAN collateral scores, and lower NIHSS and glucose levels. Conversely, poor outcomes were associated with older age, higher baseline and 24-hour NIHSS scores, elevated glucose levels, intracranial hemorrhage, and lower TAN scores. Increased platelet levels were associated with mortality. Posterior circulation strokes had longer door-to-imaging times and higher rates of rescue therapy compared to anterior circulation strokes.

Mechanical thrombectomy is the standard therapeutic approach for acute ischemic stroke caused by LVO (10,11). The DAWN and DEFUSE-3 trials expanded the treatment window to 24 hours and highlighted the importance of imaging-based selection (5,12). The 2019 AHA/ASA and European Stroke Organization guidelines support thrombectomy for selected LVOs within 24 hours of last known well time (10). Consistent with prior findings, our study demonstrated longer door-to-imaging times in posterior circulation strokes and higher NIHSS scores in MCA/ACA infarctions (13).

Patients with underlying intracranial atherosclerosis have been shown to experience longer procedural times, lower recanalization rates, and higher reocclusion rates (14,15). In such cases, rescue strategies such as dual antiplatelet therapy (DAPT), intra-arterial glycoprotein IIb/IIIa inhibitors, angioplasty, and stenting may improve outcomes (16-18). In our cohort, rescue therapy was more frequently applied in posterior circulation strokes.

Multiple studies have identified age, baseline NIHSS, glucose level, and collateral circulation as independent predictors of outcome after MT (6,19-23). Our findings confirm these associations. Higher NIHSS scores at admission and at 24 hours predicted worse outcomes, while successful recanalization was significantly associated with good clinical outcomes, in agreement with Yoo et al. and others (6,21-23).

Hyperglycemia at admission is a known indicator of disease severity and has been linked to worse neurological recovery (24,25). In our study, elevated glucose levels were associated with poor functional outcomes, supporting this relationship.

Elevated platelet counts have been linked to increased mortality and recurrent stroke (26); our study similarly found an association between higher platelet levels and mortality. Intracranial hemorrhage (ICH) remains a major determinant of poor outcomes after MT, often related to arterial injury or reperfusion damage (27,28). In our cohort, ICH was associated with higher mRS scores, consistent with prior literature.

Finally, collateral circulation plays a pivotal role in post-thrombectomy prognosis. The TAN collateral score, which reflects the adequacy of leptomeningeal collaterals in MCA occlusions, has been validated as a prognostic tool in MT candidates beyond the 6-hour window (29,30). In agreement with these studies, higher TAN scores were observed in patients with good clinical outcomes, highlighting the prognostic significance of collateral status in achieving favorable recovery after MT.

Study limitations

The first limitation of our study is its retrospective nature. When grouping large vessels in the study, MCA M1, MCA M2, and ACA were grouped together; all segments of the ICA and ICA tandem occlusions were grouped together; and basilar, PCA, and vertebral arteries were grouped together. This resulted in a lack of vessel-specific analysis. Although the table evaluating factors affecting mRS scores included only patients who achieved successful recanalization, which does not provide data on the impact of unsuccessful recanalizations on mRS scores, it is thought to provide more specific data on the evaluation of other variables. Another limitation is the small sample size, due to the stroke center being in its first year of operation. Different results may be obtained with larger study groups.

CONCLUSION

Although numerous independent factors influence the clinical outcome of acute cerebral infarction, the NIHSS score at admission and at 24 hours, the collateral circulation score, glucose level, and the presence of intracranial hemorrhage are particularly significant predictors of functional outcomes following mechanical thrombectomy. Future studies involving

larger cohorts are warranted to evaluate these independent variables individually and to better delineate their specific contributions within distinct patient subgroups.

Ethical approval

This study has been approved by the Clinical Research Ethics Committee of the University of Health Sciences, Sultangazi Haseki Training and Research Hospital (approval date 27/12/2023, number 259-2023).

Author contribution

Surgical and Medical Practices: ZM, Bİ; Concept: ZM, Bİ; Design: ZM, Bİ; Data Collection or Processing: ZM, Bİ; Analysis or Interpretation: ZM, Bİ; Literature Search: ZM, Bİ; Writing: ZM, Bİ. All authors reviewed the results and approved the final version of the article.

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Conflict of interest

The authors declare that there is no conflict of interest.

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