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Aspiration Thrombectomy in Patients with Large Vessel Occlusion and Mild Stroke: A Single-Center Experience

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Background: The purpose of this study was to evaluate outcomes of patients with mild stroke, defined by National Institutes of Health Stroke Scale (NIHSS) score <6, caused by large vessel occlusion treated with aspiration thrombectomy.





Material/Methods: Data from the endovascular stroke registry of our center were retrospectively analyzed. Anterior or posterior circulation strokes with NIHSS score <6 upon admission were analyzed. The assessment of a good clinical outcome (modified Rankin scale score 0-2) at day 90 was the primary endpoint. Symptomatic intracranial hemorrhage, defined in European Cooperative Acute Stroke Study grade III, and mortality at day 90 were the safety measures. A successful endovascular procedure was defined as a Thrombolysis in Cerebral Infarction (TICI) score of 2b or 3.

Results: We included 27 patients treated with immediate mechanical thrombectomy, 19 (70.4%) in the anterior circulation and 8 (29.6%) in the posterior circulation. The mean age was 69.8±12.3 years and 40.7% were male. Thirteen patients (48.1%) received bridging intravenous thrombolysis before endovascular thrombectomy. Twenty-five patients (92.6%) underwent the direct aspiration first-pass technique "ADAPT" as the first choice of endovascular procedure. Successful recanalization was achieved in 25 patients (92.6%). Twenty-one patients (77.8%) had a good functional outcome at the 3-month follow-up, 1 (3.7%) symptomatic intracranial hemorrhage was observed, and 2 patients (7.4%) died.

Conclusions: Immediate aspiration thrombectomy may be a safe and feasible first-line treatment option in patients suffering from mild stroke due to large vessel occlusion in the anterior and posterior circulation.

Keywords: **Cerebrovascular Disorders • Patient Outcome Assessment • Stroke • Suction • Thrombectomy**

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Background

The endovascular approach is recommended nowadays for the treatment of patients suffering from acute ischemic stroke (AIS) due to intracranial large vessel occlusion (LVO). According to the AHA/ASA 2018 guidelines, mechanical thrombectomy using stent retrievers is recommended for AIS patients when procedure initiation is within 6 h of symptoms onset. Patients should also have pre-stroke modified Rankin scale (mRs) score <1, Alberta Stroke Program Early Computed Tomography score >6, or National Institutes of Health Stroke Scale (NIHSS) score >6, and causative occlusion of the internal carotid artery or proximal middle cerebral artery (MCA) [1]. Treatment of ischemic stroke due to LVO and mild stroke with NIHSS score <6 represents a particular challenge, since the potential risk of thrombectomy must be weighed against the potential disability caused by neurological deterioration. Few studies have reported outcomes of patients with NIHSS scores <6 treated with mechanical thrombectomy [2-6]. In the ESO-ESMINT 2019 Guidelines on Mechanical Thrombectomy in Acute Ischemic Stroke, most experts (9/11) suggested that, for patients with low NIHSS scores (0-5) who are not eligible for a dedicated randomized controlled trial, treatment with mechanical thrombectomy in addition to intravenous thrombolysis (or alone in cases where intravenous thrombolysis is contraindicated) may be reasonable if the patient has clearly disabling deficits (eg, significant motor deficits, aphasia, or hemianopia) at presentation, or if clinical symptoms worsen despite intravenous thrombolysis [7]. The purpose of this study was to evaluate immediate aspiration thrombectomy in patients suffering from mild strokes, defined by an NIHSS score <6, caused by LVO.

Material and Methods

A retrospective analysis of the registry of mechanical thrombectomies for AIS with intracranial LVO was performed in a single comprehensive stroke center from January 2014 to December 2019. The severity of AIS was quantified by NIHSS score upon admission. Inclusion criteria included anterior or posterior circulation ischemic stroke patients with large vessel occlusion and NIHSS scores <6 upon admission, together with disabling clinical symptoms (eg, aphasia, hemianopia or significant motor deficits); patients who did not present with disabling symptoms (eg, aphasia, hemianopia or significant motor deficits) were excluded from the study.

On admission, all of the patients underwent non-enhanced computed tomography (NCCT) with complimentary CT angiography (CTA) imaging to locate the occluded target vessel before endovascular treatment. Magnetic resonance imaging and magnetic resonance angiography were not used to select patients for endovascular treatment. CT perfusion was carried

out in cases of wake-up stroke and when the time of onset of symptoms was not known.

Patients were treated under conscious sedation with local anesthesia and CT was performed within 24 h of the endovascular procedure. Baseline characteristics, risk factors, and relevant concomitant medications, including antiplatelet agents and anticoagulants, were collected and reviewed. The TOAST (Trial of Org 10172 in Acute Stroke Treatment) classification was used for stroke etiology and the ECASS (European Cooperative Acute Stroke Study) III definition was used for symptomatic intracranial hemorrhage. Related endovascular procedures were performed by a qualified interventional radiologist. All procedures were performed via femoral access. Diagnostic digital subtraction angiography (DSA) was performed to confirm the occlusion site and collateral supply. Two endovascular approaches were used in the management of patients with tandem occlusions (TAO). The preferred approach was retrograde with aspiration thrombectomy of the intracranial occlusion utilizing ADAPT technique first with an aspiration catheter (5 MAX, ACE 60, ACE 64, ACE 68 or 4MAX catheter, Penumbra), followed by treatment of the cervical ICA occlusion (balloon angioplasty with or without stent placement). In the case of difficult crossing of the proximal ICA lesion, the antegrade approach was used, with balloon angioplasty of the cervical lesion first, with or without stent placement, followed by intracranial aspiration thrombectomy. In the case of M2 occlusion, aspiration thrombectomy with an aspiration catheter (4 MAX, ACE 60, or ACE 64, Penumbra) was performed. In posterior circulation stroke, depending on the vessel diameter, an aspiration catheter (5 MAX, ACE 60, ACE 64, ACE 68, or 4 MAX, Penumbra) was used for aspiration thrombectomy.

Details of the treatment procedures, choice of endovascular approach, localization of the artery occlusion site, angiographic runs with number of passes, timing of the procedures, onset-to-treatment time, periprocedural complications, collaterals status, thrombus characteristics, and patient's functional outcome at 90 days after the treatment were analyzed. The definition of a successful endovascular procedure was Thrombolysis in Cerebral Infarction (TICI) score of 2b or 3. A good functional outcome was defined as mRs 0-2 at 90 days and an excellent functional outcome was mRs 0-1. The local ethics committee of the institution approved the study.

Statistical analysis

Continuous variables were calculated as median (interquartile range, IQR) or as mean±standard deviation (SD). Categorical variables are reported as proportions. P-values were calculated using Fisher's exact test for categorical variables, the Mann-Whitney U test (Wilcoxon rank-sum test) for non-normally distributed continuous variables and Welch's *t* test for normally distributed continuous variables.

Table 1. Baseline clinical characteristics of patients.

	All patients, n=27	Anterior circulation, n=19	Posterior circulation, n=8	P value
Age, y, mean±SD	69.8±12.3	70.8±13.1	67.4±10.4	0.52
Male, n (%)	11 (40.7)	7 (36.8)	4 (50)	0.53
Hypertension, n (%)	21 (77.8)	16 (84.2)	5 (62.5)	0.22
CAD, n (%)	5 (18.5)	4 (21.1)	1 (12.5)	0.61
Atrial fibrillation, n (%)	12 (44.4)	8 (42.1)	4 (50)	0.71
Diabetes mellitus, n (%)	7 (25.9)	5 (26.3)	2 (25)	0.94
Dyslipidemia, n (%)	21 (77.8)	15 (78.9)	6 (75)	0.83
History of stroke, n (%)	2 (7.4)	0 (0)	2 (25)	0.03*
Malignity, n (%)	1 (3.7)	1 (5.3)	0 (0)	0.51
Smoking, n (%)	4 (14.8)	3 (15.8)	1 (12.5)	0.83
Alcohol abuse, n (%)	2 (7.4)	1 (5.3)	1 (12.5)	0.52
Antithrombotics, n (%)	7 (25.9)	4 (21.1)	4 (50)	0.14
Anticoagulants, n (%)	1 (3.7)	1 (5.3)	0 (0)	0.51
Pre-stroke mRs 0-1, n (%)	25 (92.6)	17 (89.5)	8 (100)	0.35
Pre-stroke mRs >2, n (%)	2 (7.4)	2 (10.5)	0 (0)	0.35
Baseline NIHSS score, median (min–max)	4 (2-5)	4 (2-5)	3.5 (2-5)	
Baseline blood sugar, median (min–max)	6.5 (5.6-22.5)	6.5 (5.6-22.5)	6.7 (5.64-14.0)	
Baseline systolic blood pressure, mean±SD	150.8±13.5	150.3±14	152±13	0.77
Baseline diastolic blood pressure, mean±SD	81.6±9.8	80.7±10.4	83.6±8.6	0.49
Large atherothrombotic, n (%)	12 (44.4)	9 (47.4)	3 (37.5)	0.64
Cardioembolic, n (%)	12 (44.4)	8 (42.1)	4 (50)	0.71
Lacunar, n (%)	0 (0)	0 (0)	0 (0)	NA
Other, n (%)	0 (0)	0 (0)	0 (0)	NA
Unknown, n (%)	3 (11.1)	2 (10.5)	1 (12.5)	0.88

CAD – coronary artery disease; TOAST – Trial of Org 10172 in Acute Stroke Treatment; SD – standard deviation; NIHSS – National Institutes of Health Stroke Scale; mRs – modified Ranking scale.

Results

We identified 27 patients with NIHSS scores <6 who underwent endovascular thrombectomy and were included in the analysis. The mean age was 69.8±12.3 years and 40.7% were male. Twenty-five patients (92.6%) had a pre-stroke mRs score 0-1 and 2 patients (7.4%) had an mRs score >2. The median baseline NIHSS score was 4 (2-5). Seven patients (25.9%) were taking antithrombotics and 1 patient (3.7%) was receiving anticoagulation therapy before the stroke onset. Seventeen patients (63%) were treated in the vicinity of the endovascular

center (the “motherhip” concept) and 10 patients (37%) came from primary stroke centers (the “drip-and-ship” concept). The risk factors for stroke and etiology are presented in **Table 1**. Radiological findings, logistics, and outcome measures are summarized in **Tables 2 and 3**. In patients with anterior stroke, 9 patients (33.3%) had M2 MCA occlusion, 6 patients (22.2%) had M1 MCA occlusion, 3 patients (11.1%) had tandem occlusions, and 1 patient (3.7%) had a carotid T occlusion. Eight patients (29.6%) suffered from posterior stroke, 3 patients (11.1%) had occlusions localized in the basilar artery, and 5 patients (18.5%) had occlusions in the posterior

Table 2. Radiological findings, logistics, outcome measures.

	All patients, n=27	Anterior circulation, n=19	Posterior circulation, n=8	P value
Occlusion site, n (%)				
Carotid T, distal ICA	1 (3.7)	1 (3.7)		
Tandem ICA+MCA	3 (11.1)	3 (11.1)		
M1 MCA	6 (22.2)	6 (22.2)		
M2 MCA	9 (33.3)	9 (33.3)		
PCA	5 (18.5)		5 (18.5)	
Basilar	3 (11.1)		3 (11.1)	
Intravenous tPA, n (%)	13 (48.1)	8 (42.1)	5 (62.5)	0.34
Door-to-needle time, min, mean±SD	61.7±36.4	51.4±38	82.25±25.5	0.047*
Door-to-image time, min, mean±SD	20.9±26.2	24.2±29.4	10.8±6.7	0.22
Door-to-groin puncture time, min, mean±SD	137±82.3	129.8±84.4	154.7±82.6	0.49
Groin-to-recanalization time, min, mean±SD	20.6±10.1	19.8±8.7	22.4±13.1	0.55
Mothership, n (%)	17 (63)	13 (68.4)	4 (50)	0.38
Drip-and-ship, n (%)	10 (37)	6 (31.6)	4 (50)	0.38
TICI 2b-3 recanalization, n (%)	25 (92.6)	17 (89.5)	8 (100)	0.35
sICH - ECASS 3, n (%)	1 (3.7)	0 (0)	1 (12.5)	0.12
ADAPT, n (%)	25 (92.6)	18 (94.7)	7 (87.5)	0.52
Rescue stentumbra, n (%)	2 (7.4)	1 (5.3)	1 (12.5)	0.52
PTA periprocedural, n (%)	1 (3.7)	1 (5.3)	0 (0)	0.51
No. of attempts, mean±SD	1.4±0.6	1.3±0.6	1.5±0.53	0.42
Periprocedural stenting, n (%)	2 (7.4)	2 (10.5)	0 (0)	0.35
Good outcome (mRs score 0-2), n (%)	21 (77.8)	15 (78.9)	6 (75)	0.83
Excellent outcome (mRs score 0-1), n (%)	18 (66.7)	14 (73.7)	4 (50)	0.24
Mortality, n (%)	2 (7.4)	1 (5.3)	1 (12.5)	0.52

ICA – internal carotid artery; MCA – middle cerebral artery; M1 MCA – M1 segment of the middle cerebral artery; M2 MCA – M2 segment of the middle cerebral artery; PCA – posterior cerebral artery; tPA – tissue plasminogen activator; SD – standard deviation; TICI – thrombolysis in cerebral infarction; sICH – symptomatic intracranial hemorrhage; ECASS 3 – European Cooperative Acute Stroke Study grade III; ADAPT – a direct aspiration first pass technique; PTA – percutaneous transluminal angioplasty; mRs – modified Ranking scale.

cerebral artery. Immediate direct aspiration “ADAPT” was used in 25 patients (92.6%) and rescue therapy aspiration together with stent-retriever thrombectomy was necessary in 2 patients (7.4%). Periprocedural extracranial carotid artery stenting was performed in 2 patients (7.4%). None of the patients suffered early reocclusion of the treated vessel or stroke in other vascular territory within 7 days. The mean number of catheter maneuvers in the target vessel was 1.4±0.6. TICI recanalization scores of 2b or 3 were reached in 25 patients (92.6%); no

periprocedural complications were observed either at the site of approach or intracranially. Sixteen patients (59.3%) had TICI recanalization scores of 2b or 3 following a single first pass in the target vessel using ADAPT. At 3-month follow-up, 21 patients (77.8%) had a good functional outcome, with an mRs score of 0-2, and 18 patients (66.7%) had an excellent clinical outcome, with an mRs score of 0-1. Only 1 patient (3.7%) had a symptomatic intracranial hemorrhage, as defined by the ECASS 3 criteria. Two patients (7.4%) died.

Table 3. Occlusion characteristics on CT/CT angiography.

	Anterior circulation, n=19	Posterior circulation, n=8	P value
Collateral score (TAN 0-3), mean±SD	2.3±0.9 (n=19)	NA	NA
Thrombus density NCCT (HU), mean±SD	51.2±11.2 (n=18)	47.6±9.8 (n=7)	0.46
Thrombus density CTA (HU), mean±SD	57.5±12.2 (n=19)	58.5±13.7 (n=8)	0.85
Clot burden score, mean±SD	7.4±2.2 (n=18)	NA	NA
Thrombus length (mm), mean±SD	11.1±4 (n=14)	9.3±6.3 (n=7)	0.43
Dense sign, n (%)	8/19 (42.1%)	4/7 (57.1%)	0.50

CT – computed tomography; NCCT – non-enhanced computed tomography; CTA – computed tomography angiography; SD – standard deviation; NA – not applicable.

Nineteen occlusions (70.4%) were localized in the anterior circulation and 8 (29.6%) were localized in the posterior circulation. There were no statistically significant differences in observed parameters, except for a history of stroke in the group with posterior circulation stroke, and a shorter “door-to-needle” time in strokes involving the anterior circulation. Characteristics of occlusions in the anterior and posterior circulation are summarized in **Table 3**. Positive dense artery signs were observed in 8 out of 19 anterior circulation patients (42.1%) and in 4 out of 7 (57.1%) posterior circulation patients. No statistically significant differences in thrombus density were detected by non-contrast CT and no differences in thrombus length were detected by CTA in the anterior and posterior vasculature. Good functional outcomes (mRs 0-2) were achieved in 78.9% of the subgroup of patients with anterior circulation stroke and in 75% of patients with posterior stroke. Overall, 73.7% of patients with AIS in the anterior circulation and 50% of patients in the posterior stroke group had an excellent clinical outcome (mRs 0-1) at 90-day follow-up.

All patients underwent an immediate thrombectomy approach. Thirteen patients (48.1%) received bridging IVT before the endovascular thrombectomy (EVT), 8 patients with anterior circulation stroke and 5 patients with posterior circulation stroke. None of the patients receiving IVT before the EVT reached successful recanalization of the target vessel after the administration of tissue plasminogen activator (tPA).

Three patients suffered from tandem artery occlusion in the anterior circulation, affecting the internal carotid artery (ICA) and the M2 segment of the MCA. In 2 patients, the antero-grade approach was necessary with angioplasty of the proximal ICA and aspiration thrombectomy of the MCA afterwards, and 1 patient had periprocedural carotid artery stenting because tight stenosis with plaque ulcerations persisted after the percutaneous transluminal angioplasty (PTA). One patient had the retrograde approach, with periprocedural angioplasty of the proximal ICA and delayed internal carotid artery stenting 6 days after thrombectomy. All of the patients with TAO

received dual antiplatelet therapy with acetylsalicylic acid (ASA) and clopidogrel per protocol. The patient with periprocedural stenting of the ICA during thrombectomy had immediate initiation of secondary stroke prevention with a loading dose of ASA (300 mg) and clopidogrel (300 mg), as no IVT was given in this case.

Discussion

Two treatment strategies have been used for the endovascular treatment of patients with LVO and low NIHSS scores. The first is immediate mechanical thrombectomy together with IVT; the second strategy is IVT and rescue mechanical thrombectomy, in the case of neurological deterioration. An analysis by Kim et al confirmed that 24.5% of 119 patients with low NIHSS score and LVO developed early neurologic deterioration and that symptomatic arterial occlusion was an independent predictor of this [8]. In a study by Saleem et al, 19.7% of patients suffered acute neurological deterioration, defined as a ≥ 4 points increase in NIHSS score, at a median interval of 3.6 h following presentation with minor stroke [9]. More than half (54%) of the patients received rescue thrombectomy, which was associated with improved clinical outcomes. In a multicenter matched analysis of patients with LVO and low NIHSS scores, Nagel et al found that immediate thrombectomy appeared to be safe and had the potential to improve outcomes compared to the best medical treatment combined with rescue thrombectomy after worsening of stroke symptoms [2]. In an international cross-sectional survey among stroke physicians performed by Ospel et al, in the scenario of a 76-year-old stroke patient with an admission NIHSS score of 2 and large vessel occlusion, most physicians in this survey favored an endovascular treatment approach [10]. In our study, we used immediate thrombectomy including IVT, although only 13 patients received bridging IVT before EVT.

Safety is one of the major concerns when performing thrombectomy in patients suffering from LVO and mild AIS. In an

analysis of 75 patients with mild stroke and LVO who underwent EVT, Goldhoorn et al found that 4% of the patients suffered from symptomatic intracranial hemorrhage (sICH). The majority of the patients (75%) had a good functional outcome at 90-day follow-up and 6% of the patients died [6]. Wolman et al showed that EVT may have an unfavorable risk-benefit profile compared with medical management for EVT-eligible AIS patients with mild symptoms [11]. In our study, 3.7% of patients suffered sICH and 7.4% died.

Most studies evaluating EVT in patients with low NIHSS scores used stent retrievers as the endovascular strategy [2]. In a meta-analysis carried out by Nagel et al, stent retrievers were used in 86% of cases of immediate thrombectomy and in 88% of rescue thrombectomies [2]. The results of the COMPASS and ASTER trial showed non-inferiority regarding the successful recanalization, clinical outcome, and safety, when comparing the ADAPT technique to stent retrievers as the first-line endovascular approach in anterior circulation ischemic stroke due to LVO [12,13]. Twenty-five patients (92.6%) in our study were initially treated using ADAPT, for both anterior and posterior AIS; in 2 patients, a combined approach of contact aspiration and stent-thrombectomy was needed. Successful recanalization (TICI score of 2b or 3) was achieved in 25 patients (92.6%); 16 patients (59.3%) had a score of 2b or 3 after a single first pass in the target vessel using ADAPT. In the prospective study of 100 patients treated with mechanical thrombectomy due to basilar artery occlusion, 46 patients were treated using ADAPT and 54 patients were treated primarily with stent retrievers. ADAPT achieved a significantly higher complete reperfusion (OR 2.59, 95% CI 1.14–5.86, $P=0.021$), with shorter mean procedure times (median 45 min, IQR 34–62 min vs median 56 min, IQR 40–90 min; $P=0.05$). Periprocedural complications were also lower with ADAPT (4.3% vs 25.9%, $P=0.003$) [14]. The use of stent retrievers during mechanical thrombectomy can lead to endothelial damage [15] whereas ADAPT thrombectomy has been shown to lead to significantly higher numbers of distal emboli than the use of stent retrievers [16]. The possibility of neurological deterioration from distal embolization or as a result of endothelial damage is questionable in mild stroke patients with NIHSS score <6 and LVO, undergoing EVT. Our results, although in a small patient sample, suggest that aspiration is safe and is not associated with periprocedural complications.

So far, there are no results from randomized clinical trials comparing the best medical therapy with EVT in AIS patients due to LVO and NIHSS score <6 . The meta-analysis of 5 studies performed by Griessenauer et al, which focused on mechanical thrombectomy, either as a standalone treatment or with intravenous tPA, found that mechanical thrombectomy together with intravenous tPA led to better 90-day functional outcomes [3]. Following analysis of an international multicenter

study, which assessed the clinical outcomes in mild-deficits LVO patients treated with EVT vs best medical management, Goyal et al showed that the asymptomatic ICH rate was lower in the best medical treatment group (4.6% vs 17.5%; $P=0.002$), whereas 3-month functional improvement (after adding missing follow-up evaluations) was lower in patients treated with mechanical thrombectomy (77.4% vs 88.5%; $P=0.02$) [17]. Another study, comparing mechanical thrombectomy with medical management in patients presenting with minimal stroke symptoms (NIHSS score ≤ 5) and LVO, found that mechanical thrombectomy was associated with a favorable shift in NIHSS score at discharge, as well as higher rates of independence at discharge and long-term follow-up [18]. On the other hand, an analysis of a retrospective multicenter cohort study, carried out by Sarraj et al, found no improvement in functional outcomes, but found increased rates of sICH, in patients with mild strokes (NIHSS score <6) who underwent thrombectomy, irrespective of thrombus location [19]. Our study did not compare the best medical therapy with thrombectomy.

Thin-section non-enhanced CT images and CTAs can be used to measure hyperdense thrombus length in AIS. In a meta-analysis performed by Emberson et al, thrombolysis improved the overall odds for a good outcome (mRS score 0–1) in patients with mild strokes (NIHSS score 0–4) [20]. Nevertheless, rates of successful recanalization using tPA alone in arterial occlusions where the thrombus length exceeds 8 mm are low, favoring EVT [20]. Recanalization using intravenous tPA is very unlikely to be successful if the length of the clot exceeds 8 mm and, in this case, a bridging intra-arterial approach may be better [21]. Yoo and colleagues reported that ischemic stroke patients with longer symptomatic thrombi (≥ 8 mm) had worse 90-day clinical outcomes but may benefit more than patients with shorter thrombi from combining aspiration thrombectomy with recombinant tPA [22]. In patients with low NIHSS scores undergoing mechanical thrombectomy, Bhogal et al found that all clots were longer than 4 mm, with the shortest clot measuring 4.6 mm [5]. In our cohort, thrombus length was assessed in 21 patients. In 15 patients (71.4%), the thrombus length exceeded 7 mm, thus favoring an immediate endovascular approach. In the 14 anterior circulation patients, the mean thrombus length was 11.1 ± 4 mm and, in the 7 posterior AIS patients, the mean length was 9.3 ± 6.3 mm.

In posterior circulation strokes, there is no evidence from randomized trials that EVT with stent retrievers or with aspiration thrombectomy is better than the best medical therapy in patients with NIHSS scores <6 . In patients with anterior AIS, the ongoing ENDOLOW (Endovascular Therapy for Low NIHSS Ischemic Strokes) and MOSTE (Minor Stroke Therapy Evaluation) randomized clinical trials may provide much-needed data on the best treatment strategy in patients with mild strokes with NIHSS scores <6 [23,24]. In posterior circulation strokes, the

BASICS (Basilar Artery International Collaboration Study) randomized clinical trial of endovascular therapy in acute basilar artery occlusion showed no significant benefit within 6 h of symptoms onset, when compared to the best medical management alone [25]. In contrast, a non-randomized cohort study (registry) of the EVT for Acute Basilar Artery Occlusion Study (BASILAR) performed in China showed significant treatment benefit in BAO with combination of the best medical therapy and EVT (stent retrievers or ADAPT), when treated within 24 h of symptom onset. Nevertheless, the median baseline NIHSS score was 27 in the EVT group, precluding patients with minor symptoms from evaluation [26]. Patients with mild AIS NIHSS scores and posterior circulation stroke thus pose an even more significant challenge, with different clinical scenarios according to the site of the occlusion. There is insufficient knowledge about outcomes of patients with mild stroke in the posterior AIS who undergo endovascular therapy. Patients suffering from posterior LVO can either be stabilized or can deteriorate very quickly. The only study evaluating patients with low NIHSS scores and mechanical thrombectomy in the posterior circulation was performed by Nagel et al, who found 12 patients suffering from basilar artery occlusion, half of whom underwent immediate thrombectomy and half had rescue thrombectomy [2]. In our group of patients with NIHSS scores <6 with posterior LVO who were treated with aspiration thrombectomy, 5 patients with low NIHSS scores and posterior cerebral artery (PCA) occlusion and 3 patients with basilar artery occlusion had good clinical outcomes (75% of patients) and 12.5% of the patients died. Caution should, however, be exercised when considering thrombectomy in these patients since the potential risk of deteriorating clinical status in the case of a wrong maneuver may be higher in these patients than in those with anterior circulation stroke.

Limitations of the study

Our study has significant limitations, most of them due to its retrospective observational nature, non-controlled design, and small cohort of patients. The limitations also include the potential for selection bias, as well as treatment procedures in different vascular territories without a matched cohort.

Conclusions

In conclusion, aspiration thrombectomy with ADAPT in LVO patients with low NIHSS scores may be safe and feasible. Our results support the use of mechanical thrombectomy in this group of patients, but randomized clinical trials are needed to establish the optimal management approach for this challenging patient population.

Department and Institution Where Work Was Done

The research was performed at the Department of Neurology and Department of Radiology, Faculty Hospital Trnava, Trnava, Slovakia.

Conflicts of interest

None.

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