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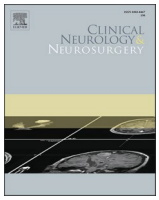

Full length article

# Endovascular versus medical management of posterior cerebral artery occlusion stroke

Isil Kalyoncu Aslan [a,1], Leyla Ramazanoglu [a,*,2], Aysegul Enginyurt [a,3], Murat Velioglu [b,4], Eren Gozke [a,5]

[a] University of Health Sciences Fatih Sultan Mehmet Training and Research Hospital, Department of Neurology, Istanbul, Turkey
[b] University of Health Sciences Fatih Sultan Mehmet Training and Research Hospital, Department of Radiology, Istanbul, Turkey

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ABSTRACT

*Purpose:* Endovascular treatment (EVT) of posterior cerebral artery (PCA) strokes is uncertain. We present our single-center experience with acute ischemic strokes (AIS) caused by PCA occlusion.
*Methods:* This study included consecutive patients with PCA occlusion presenting within 24 hours of time last well-known from January 2017 to June 2024. Patients treated with EVT, or medical management (MM) were compared with multivariable logistic regression and inverse probability of treatment weighting. The primary outcome was the 90-day modified Rankin Scale (mRS) score. The safety outcomes were symptomatic intracranial hemorrhage (sICH) and mortality.
*Results:* Overall, 53 patients were treated with MM and 16 with EVT. The 90-day mRS score of 0–2 was seen in 43.8 % of the EVT and 67.3 % in the MM group ($p = 0.90$). There was a higher rate of early decrease in NIHSS score $\geq 2$ points was observed in the EVT group, but this was not statistically significant. Vision recovery was similar between groups. One patient had symptomatic ICH, and one patient underwent decompression due to edema. The proportion of patients with non-symptomatic ICH was higher in the EVT group ($p = 0.025$). Admission NIHSS $> 6$ was significantly associated with poor prognosis and mortality($p < 0.001$).
*Conclusion:* Our results show no difference in functional outcome at 90 day between EVT and MM groups. We could not demonstrate a significant difference in sICH and mortality. EVT can be safe in PCA occlusion especially with admission NIHSS $> 6$.

## 1. Introduction

Posterior cerebral artery (PCA) occlusions account for 5–10 % of all acute ischemic stroke (AIS) patients [1]. Visual field defects, cognitive impairment, motor and/or sensory loss, and changes in level of consciousness can be seen in patients with PCA strokes [2,3]. They result in low National Institute of Health Stroke Scale (NIHSS) scores, but strategic infarcts can severely affect functional independence [4].

Endovascular therapy (EVT) for PCA occlusions is increasingly reported. Studies declared no significant difference between clinical and safety outcomes of EVT and medical management (MM) groups [4,5]. On the contrary, there were studies arguing that EVT may be beneficial in selected patients [6].

We aimed to evaluate outcomes of EVT with or without intravenous thrombolysis (IVT) for PCA strokes and compare them with the outcomes of MM with or without IVT.

## 2. Methods

### 2.1. Ethics

The study was approved by the ethics committee date: 03/10/2024

* Corresponding author.
*E-mail address:* afleylaak@hotmail.com (L. Ramazanoglu).
[1] 0000–0003-2344–2728
[2] 0000–0001-6406–1687
[3] 0009–0006-6879–3117
[4] 0000–0001-9384–2378
[5] 0000–0001-6175–0647

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### 2.2. Study population

This was a single-center, retrospective study of consecutive patients aged ≥ 18 years with isolated PCA occlusion between January 2017 and June 2024. Patients were divided according to receiving EVT or MM with or without IVT.

The inclusion criteria were as follows: 1) diagnosis of an AIS attributed to an isolated PCA occlusion of the P1, P2, P3, or bilateral PCA segments of the artery 2) admission within 24 hours of symptom onset 3) patients underwent EVT or MM with or without IVT. Patients with fetal PCA, concomitant with vertebral or basilar artery occlusion or multiple vessel occlusion other than PCA were excluded.

For each subject, the baseline characteristics (age, sex, comorbidities), time of onset, modified Rankin scale (mRS) score before onset, NIHSS score at admission and at 24 hours after reperfusion, the site of major arterial occlusion, the posterior circulation Acute Stroke Prognosis Early CT Score (pc-ASPECTS), bridging intravenous t-PA, type of MT, procedural complications, degree of reperfusion, and etiology of cerebral infarction were recorded. The first hour of admission was accepted as the golden hour, beyond 270 minutes was not considered for IVT candidacy. There were no restrictions on the interventional technique, such as the use of the direct aspiration first-pass technique (ADAPT), stent retrievers (SRs) or balloon angioplasty/stenting. There were no restrictions on the use of bridging intravenous t-PA, anesthesia methods or pre- and post-operative care and final medical therapy. All patients underwent a computed tomography (CT) scan 24 hours after treatment to assess for hemorrhagic complications.

### 2.3. Outcomes

The primary outcome was the distribution of mRS at 90 day. The safety outcomes were symptomatic intracranial hemorrhage (sICH) and mortality. Reperfusion was assessed via the modified Thrombolysis in Cerebral Infarction (mTICI) score, and successful reperfusion was defined as an mTICI score of 2c-3. The European Cooperative Acute Stroke Study (ECASS) II criteria were used to define intracranial hemorrhage. Symptomatic intracerebral hemorrhage (sICH) was defined as any hemorrhage associated with a worsening of the NIHSS score by ≥ 4 points within 24 hours. Follow-up outcomes were ascertained via telephone interviews and/or outpatient clinic visits. A modified Rankin scale (mRS) score ≤ 2 was considered to indicate a good clinical outcome whereas 3 ≤ mRS score ≤ 5 was poor prognosis and mRS score = 6 was mortality.

### 2.4. Statistical analysis

The suitability of the continuous variables in the study to normal distribution was evaluated graphically and with the Shapiro-Wilks test. Mean±SD (standard deviation) and Median (Minimum-Maximum) values were given to display the descriptive statistics of the variables.

Cross tables were created to compare categorical variables according to the MM-EVT grouping and NIHSS Admission classification, and number (n), percentage (%) and chi-square test statistics were given.

According to the MM-EVT grouping and NIHSS Admission classification, the Independent Sample T test was used for parameters that showed normal distribution, and the Mann-Whitney *U* test was used for parameters that did not show normal distribution.

Potential risk factors associated with the MM-EVT grouping and NIHSS Admission classification were examined with univariate and multivariate logistic regression analyses. Results are given as odds ratio (OR) and 95 % confidence interval.

Logistic regression analyzes were repeated using the propensity score-based IPTW method as an alternative model adjusting for the same covariates. Using a multivariable logistic regression model, we first estimated the probability of EVT assignment (propensity score) conditional on the above covariates. For IPTW, the EVT group received a weight of 1/orientation score, while MM received a weight of 1/(1-orientation score). These weights were then used in generalized estimating equation (GEE) regression. IBM SPSS Statistics 21.0 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) and MS-Excel 2007 programs were used for statistical analyzes and calculations. Statistical significance level was accepted as $p < 0.05$.

## 3. Results

Of 262 patients with PCA territory strokes 193 did not meet the study inclusion criteria due to missing data, fetal PCA, distal PCA, concomitant basilar or vertebral occlusion, multiple vessel occlusion, and admission time longer than 24 hour and 69 patients included in this study. The median age of the study group was 78.0 (35–97), and 50.7 % were women. Overall, 53 patients were treated with MM and 16 with EVT. There was no difference in diabetes, hypertension, atrial fibrillation, hyperlipidemia, coronary artery disease, current smoking, previous stroke or transient ischemic attack, peripheral artery disease, oral anticoagulant and statin. There was no difference in time to admission. Median NIHSS score was 5 points higher in the EVT than in the MM group (11 versus 6 points, respectively; $p = 0.002$). A baseline visual field deficit was similar between groups. The median score of pc-ASPECTS and site of occlusion was similar.

### 3.1. Procedural results

Of patients receiving EVT, the first-line technique was stent retriever concomitant with aspiration in 87.5 %. One patient was treated with contact aspiration, and spontaneous lysis was seen in one patient during intervention. One patient received intracranial stent at the PCA occlusion. The median number of passes was 2 [1,2]. Successful recanalization was seen in 93.8 % of cases. Four patients had interventional complication and three of them were distal emboli.

### 3.2. Clinical and safety outcomes

The 90-day mRS score of 0–2 was seen in 43.8 % of the EVT and 67.3 % in the MM group ($p = 0.90$). There was a higher rate of early decrease in NIHSS score ≥ 2 points was observed in the EVT group, but this was not statistically significant. Vision recovery was similar between groups. One patient had symptomatic ICH, and one patient underwent decompression due to edema. The proportion of patients with non-symptomatic ICH was higher in the EVT group ($p = 0.025$) (Table 1).

In an adjusted analysis for both MV and IPTW models, there was no difference in mRS score, mortality and a ≥ 2-point decrease in NIHSS in the EVT versus the MM group (Table 2).

Analyses of patients with admission NIHSS score > 6 was compared with those with NIHSS score ≤ 6. A ≥ 2-point decrease in NIHSS in the admission NIHSS score > 6 was observed (33.3 % versus 7.7 %, respectively; $p = 0.010$). Admission NIHSS score> 6 was associated with poor prognosis and mortality ($p < 0.001$, $p = 0.001$) (Table 3).

## 4. Discussion

Significant difference was not observed in functional outcome and mortality at 90 day as evaluated by mRS scores in patients treated with EVT or MM for PCA occlusion in this study. There are several studies evaluating PCA and distal vessel occlusions. The studies did not detect significant difference in outcomes of patients between EVT and MM [2–6]. On contrary, there are studies that recommend EVT as an alternative treatment strategy for PCA strokes [7–11]. In a recently published distal vessel trial reported that all cause of mortality rates were similar

**Table 1**
Baseline Characteristics, Metrics, and Outcomes of Patients With PCA Occlusion Treated With MM Versus EVT.

| | | Overall (n = 69) | MM (n = 53) | EVT (n = 16) | Test Statistics | |
|---|---|---|---|---|---|---|
| | | | | | t; z; $\chi^2$ | p |
| **Age** | **Avr±SD** | 74.25 ± 12.69 | 73.72 ± 12.99 | 76 ± 11.89 | z = 0.683 | 0.494 |
| | **Median** | 78.0 (35–97) | 75.0 (35–97) | 79.0 (50–91] | | |
| | **(Min-Max)** | | | | | |
| **Sex, n (%)** | | | | | | |
| Female | | 35 (50.7) | 25 (47.2) | 10 (62.5) | $\chi$2= 1.156 | 0.282 |
| Male | | 34 (49.3) | 28 (52.8) | 6 (37.5) | | |
| **Risk factors, n (%)** | | | | | | |
| DM | | 28 (40.6) | 21 (39.6) | 7 (43.8) | $\chi$2= 0.087 | 0.768 |
| HT | | 58 (84.1) | 44 (83.0) | 14 (87.5) | - | 0.504 * |
| AF | | 26 (37.7) | 19 (35.8) | 7 (43.8) | $\chi$2= 0.327 | 0.568 |
| HL | | 19 (27.5) | 14 (26.4) | 5 (31.3) | - | 0.466 * |
| CAD | | 13 (18.8) | 10 (18.9) | 3 (18.8) | - | 0.651 * |
| Smoking | | 32 (46.4) | 27 (50.9) | 5 (31.3) | $\chi$2= 1.917 | 0.166 |
| Previous Stroke TIA | | 12 (17.4) | 11 (20.8) | 1 (6.3) | - | 0.169 * |
| PAD | | 1 (1.4) | 1 (1.9) | 0 (0.0) | - | 0.768 * |
| Anticoagulant | | 8 (11.6) | 6 (11.3) | 2 (12.5) | - | 0.599 * |
| Anti lipid | | 8 (11.6) | 6 (11.3) | 2 (12.5) | - | 0.599 * |
| **Time to Admission, n (%)** | | | | | | |
| < 4.5 Hour | | 38 (55.1) | 27 (50.9) | 11 (68.7) | $\chi$2= 1.575 | 0.209 |
| > 4.5 Hour | | 31 (44.9) | 26 (49.1) | 5 (31.3) | | |
| **Wake Up, n (%)** | | 9 (13.2) | 7 (13.2) | 2 (13.3) | - | 0.640 * |
| **Door To Needle** | **Avr±SD** | 171.43 ± 55.64 | 187.00 ± 52.06 | 153.46 ± 56.14 | t = 1.640 | 0.113 |
| | **Median** | 175.0 (45−260) | 180.0 (90−260) | 170.0 (45−220) | | |
| | **(Min-Max)** | | | | | |
| **mRS Admission, n (%)** | | | | | | |
| 0 | | 38 (55.1) | 27 (50.9) | 11 (68.7) | $\chi$2= 6.512 | 0.164 |
| 1 | | 20 (29.1) | 15 (28.3) | 5 (31.3) | | |
| 2 | | 5 (7.2) | 5 (9.4) | 0 (0.0) | | |
| 3 | | 3 (4.3) | 3 (5.7) | 0 (0.0) | | |
| 4 | | 3 (4.3) | 3 (5.7) | 0 (0.0) | | |
| **NIHSS Admission** | **Avr±SD** | 7.59 ± 4.77 | 6.64 ± 4.33 | 10.75 ± 4.93 | z = 3.096 | **0.002** |
| | **Median** | 6.0 (1–20) | 6.0 (1–20) | 11.0 (5–20) | | |
| | **(Min-Max)** | | | | | |
| **Visual symptoms, n (%)** | | 33 (47.8) | 24 (47.8) | 9 (56.3) | $\chi$2= 0.592 | 0.441 |
| **pc- ASPECT** | **Avr±SD** | 9.52 ± 0.78 | 9.45 ± 0.82 | 9.75 ± 0.58 | z = 1.554 | 0.120 |
| | **Median** | 10.0 (6–10) | 10.0 (6−10) | 10.0 (8−10) | | |
| | **(Min-Max)** | | | | | |
| **PCA Stent, n (%)** | | 1 (1.4) | 0 (0.0) | 1 (6.3) | - | 0.232 * |
| **Site Of Occlusion, n (%)** | | | | | | |
| P1 | | 21 (30.4) | 14 (26.4) | 7 (43.8) | $\chi$2= 3.359 | 0.340 |
| P2 | | 36 (52.2) | 28 (52.8) | 8 (50.0) | | |
| P3 | | 10 (14.5) | 9 (17.0) | 1 (6.3) | | |
| Bilateral | | 2 (2.9) | 2 (3.8) | 0 (0.0) | | |
| **Aspiration, n (%)** | | 1 (6.3) | - | 1 (6.3) | - | - |
| **Combine SR, n (%)** | | 14 (87.5) | - | 14 (87.5) | - | - |
| **First Pass, n (%)** | | | | | | |
| | | 7 (43.8) | - | 7 (43.8) | | |
| **Number of Pass** | **Avr±SD** | 1.53 ± 0.52 | - | 1.53 ± 0.52 | - | - |
| | **Median** | 2.0 (1−2) | - | 2.0 (1−2) | | |
| | **(Min-Max)** | | | | | |
| **Duration of MT** | **Avr±SD** | 34.13 ± 15.69 | - | 34.13 ± 15.69 | - | - |
| | **Median** | 33.0 (11−58) | - | 33.0 (11−58) | | |
| | **(Min-Max)** | | | | | |
| **TICI, n (%)** | | | | | | |
| 0 | | 1 (6.3) | - | 1 (6.3) | - | - |
| 2b | | 2 (12.5) | - | 2 (12.5) | | |
| 2c | | 3 (18.8) | - | 3 (18.8) | | |
| 3 | | 10 (62.5) | - | 10 (62.5) | | |
| **NIHSS at 24 hour** | **Avr±SD** | 7.45 ± 5.55 | 6.71 ± 5.07 | 10.21 ± 6.55 | z = 1.919 | 0.055 |
| | **Median** | 6.0 (0−21) | 6.0 (0−21) | 6.0 (4−20) | | |
| | **(Min-Max)** | | | | | |
| **Symptomatic ICH, n (%)** | | 1 (1.4) | 0 (0.0) | 1 (6.3) | - | 0.232 * |
| **Non-Symptomatic ICH, n (%)** | | 12 (17.4) | 6 (11.3) | 6 (37.5) | - | **0.025** * |
| **Distal Emboli, n (%)** | | 3 (4.3) | 0 (0.0) | 3 (18.8) | - | **0.011** * |
| **Interventional complication, n (%)** | | 1 (1.4) | 0 (0.0) | 1 (6.3) | - | 0.232 * |
| **Decompression, n (%)** | | 1 (1.4) | 0 (0.0) | 1 (6.3) | - | 0.232 * |
| **mRS 90 day** | **Avr±SD** | 2.34 ± 1.97 | 2.10 ± 1.84 | 3.13 ± 2.22 | z = 1.669 | 0.095 |
| | **Median** | 2.0 (0−6) | 2.0 (0−6) | 3.5 (0−6) | | |
| | **(Min-Max)** | | | | | |
| **mRS 90 day, n (%)** | | | | | | |
| 0–1 | | 27 (39.7) | 23 (44.2) | 4 (25.0) | $\chi$2= 1.890 | 0.169 |
| 0–2 | | 42 (61.8) | 35 (67.3) | 7 (43.8) | $\chi$2= 2.875 | 0.090 |
| Mortality | | 8 (11.8) | 4 (7.7) | 4 (25.0) | - | 0.081 * |

(*continued on next page*)

**Table 1** (*continued*)

| | Overall (n = 69) | MM (n = 53) | EVT (n = 16) | Test Statistics | |
|---|---|---|---|---|---|
| | | | | t; z; $\chi^2$ | p |
| **Vision Recovery, n (%)** | | | | | |
| Same | 53 (89.8) | 44 (89.8) | 9 (90.0) | $\chi$2= 1.588 | 0.452 |
| Better | 3 (5.1) | 3 (6.1) | 0 (0.0) | | |
| Worse | 3 (5.1) | 2 (4.1) | 1 (10.0) | | |
| **Decrease in the NIHSS score by ≥ 2 point, n (%)** | 12 (18.2) | 7 (13.5) | 5 (35.7) | - | 0.069 * |

t:Independent Sample T Test, z:Mann Whitney U Testi, $\chi^2$:Ki kare Test, *Fisher Exact test

**Table 2**
Univariable and Multivariable Logistic Regression and IPTW Evaluation of Outcomes After EVT Versus MM of PCA Occlusion.

| | Univariable Model | | Multivariable Model | | IPTW model | |
|---|---|---|---|---|---|---|
| | OR (95 % CI) | p | OR (95 % CI) | p | OR (95 % CI) | p |
| mRS | 1.302 (0.977–1.736) | 0.072 | 1.397 (0.906–2.155) | 0.131 | 0.601 (0.192–1.879) | 0.382 |
| Excellent outcome | 0.420 (0.120–1.477) | 0.177 | 0.375 (0.068–2.074) | 0.261 | 0.499 (0.107–2.326) | 0.376 |
| Good outcome | 0.378 (0.120–1.187) | 0.096 | 0.287 (0.061–1.358) | 0.115 | 0.516 (0.130–2.045) | 0.346 |
| Mortality | 4.000 (0.872–18.352) | 0.075 | 5.121 (0.423–61.970) | 0.199 | 1.629 (0.256–10.389) | 0.606 |
| Decrease in the NIHSS score by ≥ 2 point | 3.571 (0.924–13.811) | 0.065 | 1.036 (0.163–6.579) | 0.970 | 1.210 (0.270–5.420) | 0.803 |

OR:Odds Ratio, CI:Confidence Interval
In the multivariate logistic regression model, age, gender, NIHSS admission, Time to admission, PC ASPECT, mRS Admission, HT, DM, AF variables were taken as independent variables.

between EVT and MM groups [12]. The additional value of IVT was also unknown [13,14]

sICH is the safety outcome of EVT for both anterior and posterior circulation strokes. In PLATO studies [2,5], they found a 3-fold higher risk of sICH in the EVT group. On the other side, no difference was reported in sICH between EVT and MM groups [3,4]. MT with IVT can also be a risk factor for sICH [13]. Meyer et al. [3] reported that other complications included new distal emboli even decreased compared to previous studies. First pass effect (FPE) and perforation can be independent predictors for prognosis of MT [15,16]. In our study, one patient had sICH and one patient underwent decompression due to edema and both of two patients were in the EVT group. The proportion of patients with non-symptomatic ICH was significantly higher in the EVT group. Distal emboli rate was statistically significant in the EVT group in our study. No perforation was seen in the study groups. FPE were similar in our study.

The NIHSS score of patients in EVT groups are usually higher in most studies [3,4,12]. In our study, the NIHSS scores of the EVT group was significantly higher than the MM group. The NIHSS score is weighted toward motor deficits and the absence of clear guideline recommendations, interventionalists tend to prefer higher NIHSS scores for EVT. However, visual field defects could be a potential disability for patients despite lower NIHSS scores and in PLATO study [2], they reported greater likelihood of complete vision recovery in the EVT group. In our study we did not find any difference in vision recovery between groups.

In our study, we compared outcome of patients by grouping according to admission NIHSS score 0–6 and above 6. We found that patients with baseline NIHSS score above 6 were associated with poor prognosis and mortality. Yedavalli et al. [17] reported that higher NIHSS scores were associated with poor prognosis. Because of the small sample size, we could not analyze the difference between EVT and MM groups. Meyer et al. [3] and Strambo et al. [18] mentioned that baseline NIHSS score was more important and had a significant treatment effect of EVT in patients with higher NIHSS score. Kühn et al. [19] found no superiority of MT on IVT in patients with low NIHSS score.

Early neurological impairment or a decrease in the NIHSS score by≥ 2 point is also mentioned in PCA studies. Especially vision recovery can impact NIHSS score by 2 points or above and the functional outcome and the mRS score of the patients can improve [2,5,18]. There was a higher rate of early decrease in NIHSS score ≥ 2 points was observed in the EVT group, but this was not statistically significant in our study.

There are limitations in our study. First, the design was retrospective, and the sample size was small. The control data of vision recovery were missing. We analyzed the available data because vision recovery is important in PCA occlusion. We did not compare IVT in subgroup analysis due to small sample. We could not evaluate cognitive status of patients. As mentioned in TOPMOST study [3], the number of patients were decreased as many PCA strokes admitted in the late window period due to various clinics.

## 5. Conclusion

We could not demonstrate a significant difference in functional outcomes at 90 days between EVT and MM groups. Higher rate of early neurological improvement was found in the EVT group and sICH was not statistically significant. EVT can be safe in PCA occlusion especially with baseline NIHSS > 6. More randomized clinical trials are needed.

## CRediT authorship contribution statement

**Eren Gozke:** Supervision. **Murat Velioglu:** Supervision. **Aysegul Enginyurt:** Data curation. **Leyla Ramazanoglu:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Isil Kalyoncu Aslan:** Writing – original draft, Visualization, Supervision, Methodology, Investigation, Data curation, Conceptualization.

## Ethical Approval

This study was approved by Umraniye Training and Research Hospital Ethics Committee with the Approval No. date: 03/10/2024, no: 256080231

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This study received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

**Table 3**
Comparison of Demographic and Clinical Characteristics of Individuals According to Admission NIHSS.

| | | Overall (n = 69) | NIHSS Admission (0−6) (n = 39) | NIHSS Admission (>6) (n = 30) | Test Statistics | |
|---|---|---|---|---|---|---|
| | | | | | t; z; $\chi^2$ | p |
| **Age** | **Avr±SD** | 74.25 ± 12.69 | 72.41 ± 13.61 | 76.63 ± 11.17 | z = 1.006 | 0.315 |
| | **Median (Min-Max)** | 78.0 (35−97) | 75.0 (35−90) | 79.0 (50−97) | | |
| **Sex, n (%)** | | | | | | |
| Female | | 35 (50.7) | 17 (43.6) | 18 (60.0) | $\chi$2= 1.827 | 0.176 |
| Male | | 34 (49.3) | 22 (56.4) | 12 (40.0) | | |
| **Risk Factors, n (%)** | | | | | | |
| DM | | 28 (40.6) | 14 (35.9) | 14 (46.7) | $\chi$2= 0.816 | 0.366 |
| HT | | 58 (84.1) | 32 (82.1) | 26 (86.7) | - | 0.430 * |
| AF | | 26 (37.7) | 16 (41.0) | 10 (33.3) | $\chi$2= 0.427 | 0.513 |
| HL | | 19 (27.5) | 10 (25.6) | 9 (30.0) | $\chi$2= 0.161 | 0.688 |
| CAD | | 13 (18.8) | 7 (17.9) | 6 (20.0) | $\chi$2= 0.047 | 0.829 |
| Smoking | | 32 (46.4) | 20 (51.3) | 12 (40.0) | $\chi$2= 0.868 | 0.352 |
| Previous Stroke TIA | | 12 (17.4) | 5 (12.8) | 7 (23.3) | $\chi$2= 1.304 | 0.253 |
| PAD | | 1 (1.4) | 0 (0.0) | 1 (3.3) | - | 0.435 * |
| Anticoagulant | | 8 (11.6) | 6 (15.4) | 2 (6.7) | - | 0.232 * |
| Anti lipid | | 8 (11.6) | 6 (15.4) | 2 (6.7) | - | 0.232 * |
| **Time to Admission, n (%)** | | | | | | |
| < 4.5 Hour | | 38 (55.1) | 19 (48.7) | 19 (63.3) | $\chi$2= 1.464 | 0.226 |
| > 4.5 Hour | | 31 (44.9) | 20 (51.3) | 11 (36.7) | | |
| **Wake Up, n (%)** | | 9 (13.2) | 6 (15.8) | 3 (10.0) | - | 0.372 * |
| **Door To Needle** | **Avr±SD** | 171.43 ± 55.64 | 197.00 ± 57.69 | 157.22 ± 50.56 | t = 1.898 | 0.069 |
| | **Median (Min-Max)** | 175.0 (45−260) | 215.0 (90−260) | 150.0 (45−240) | | |
| **mRS Admission, n (%)** | | | | | | |
| 0 | | 38 (55.1) | 23 (59.0) | 15 (50.0) | $\chi$2= 6.025 | 0.197 |
| 1 | | 20 (29.1) | 12 (30.8) | 8 (26.7) | | |
| 2 | | 5 (7.2) | 2 (5.1) | 3 (10.0) | | |
| 3 | | 3 (4.3) | 2 (5.1) | 1 (3.3) | | |
| 4 | | 3 (4.3) | 0 (0.0) | 3 (10.0) | | |
| **Visual symptoms, n (%)** | | 33 (47.8) | 13 (33.3) | 20 (66.7) | $\chi$2= 7.551 | **0.006** |
| **pc- ASPECT** | **Avr±SD** | 9.52 ± 0.78 | 9.59 ± 0.59 | 9.43 ± 0.97 | z = 0.236 | 0.813 |
| | **Median (Min-Max)** | 10.0 (6−10) | 10.0 (8−10) | 10.0 (6−10) | | |
| **PCA Stent, n (%)** | | 1 (1.4) | 1 (2.6) | 0 (0.0) | - | 0.565 * |
| **Site Of Occlusion, n (%)** | | | | | | |
| P1 | | 21 (30.4) | 11 (28.2) | 10 (33.3) | $\chi$2= 6.232 | 0.101 |
| P2 | | 36 (52.2) | 18 (46.1) | 18 (60.1) | | |
| P3 | | 10 (14.5) | 9 (23.1) | 1 (3.3) | | |
| Bilateral | | 2 (2.9) | 1 (2.6) | 1 (3.3) | | |
| **Aspiration, n (%)** | | 1 (6.3) | 0 (0.0) | 1 (10.0) | - | 0.625 * |
| **Combine SR, n (%)** | | 14 (87.5) | 6 (100.0) | 8 (80.0) | - | 0.375 * |
| **First Pass, n (%)** | | | | | | |
| | | | | | - | 0.549 * |
| | | 7 (43.8) | 3 (50.0) | 4 (40.0) | | |
| **Number of Pass** | **Avr±SD** | 1.53 ± 0.52 | 1.50 ± 0.55 | 1.56 ± 0.53 | z = 0.204 | 0.864 |
| | **Median (Min-Max)** | 2.0 (1−2) | 1.5 (1−2) | 2.0 (1−2) | | |
| **Duration of MT** | **Avr±SD** | 34.13 ± 15.69 | 35.33 ± 14.43 | 33.40 ± 17.12 | z = 0.871 | 0.875 |
| | **MedIan (Min-Max)** | 33.0 (11−58) | 36.5 (14−57) | 29.5 (11−58) | | |
| **TICI, n (%)** | | | | | | |
| 0 | | 1 (6.3) | 0 (0.0) | 1 (10.0) | $\chi$2= 7.040 | 0.071 |
| 2b | | 2 (12.5) | 0 (0.0) | 2 (20.0) | | |
| 2c | | 3 (18.8) | 3 (50.0) | 0 (0.0) | | |
| 3 | | 10 (62.5) | 3 (50.0) | 7 (70.0) | | |
| **NIHSS at 24 hour** | **Avr±SD** | 7.45 ± 5.55 | 4.33 ± 2.24 | 11.96 ± 5.83 | z = 5.758 | **< 0.001** |
| | **Median (Min-Max)** | 6.0 (0−21) | 4.0 (0−12) | 10.0 (0−21) | | |
| **Symptomatic ICH, n (%)** | | 1 (1.4) | 0 (0.0) | 1 (3.3) | - | 0.435 * |
| **Non-Symptomatic ICH, n (%)** | | 12 (17.4) | 4 (10.3) | 8 (26.7) | - | 0.072 * |
| **Distal Emboli, n (%)** | | 3 (4.3) | 1 (2.6) | 2 (6.7) | - | 0.401 * |
| **Interventional complication, n (%)** | | 1 (1.4) | 0 (0.0) | 1 (3.3) | - | 0.435 * |
| **Decompression, n (%)** | | 1 (1.4) | 0 (0.0) | 1 (3.3) | - | 0.435 * |
| **mRS 90 day** | **Avr±SD** | 2.34 ± 1.97 | 1.46 ± 1.39 | 3.52 ± 2.03 | z = 4.098 | **< 0.001** |
| | **Median (Min-Max)** | 2.0 (0−6) | 1.0 (0−4) | 4.0 (0−6) | | |
| **mRS 90 day, n (%)** | | | | | | |
| 0–1 | | 27 (39.7) | 23 (59.0) | 4 (13.8) | $\chi$2= 14.182 | **< 0.001** |
| 0–2 | | 42 (61.8) | 31 (79.5) | 11 (37.9) | $\chi$2= 12.162 | **< 0.001** |
| Mortality | | 8 (11.8) | 0 (0.0) | 8 (27.6) | - | **0.001** * |
| **Vision Recovery, n (%)** | | | | | | |
| Same | | 53 (89.8) | 32 (88.8) | 21 (91.4) | $\chi$2= 0.091 | 0.955 |

(*continued on next page*)

**Table 3** (*continued*)

| | Overall (n = 69) | NIHSS Admission (0−6) (n = 39) | NIHSS Admission (>6) (n = 30) | Test Statistics | |
|---|---|---|---|---|---|
| | | | | t; z; $\chi^2$ | p |
| Better | 3 (5.1) | 2 (5.6) | 1 (4.3) | | |
| Worse | 3 (5.1) | 2 (5.6) | 1 (4.3) | | |
| **Decrease in the NIHSS score by ≥ 2 point, n (%)** | 12 (18.2) | 3 (7.7) | 9 (33.3) | - | **0.010** * |
| **Group, n (%)** | | | | | |
| MM | 53 (76.8) | 33 (84.6) | 20 (66.7) | $\chi$2= 3.067 | 0.080 |
| EVT | 16 (23.2) | 6 (15.4) | 10 (33.3) | | |

t:Independent Sample T Test, z:Mann Whitney U Testi, $\chi^2$:Ki kare Test, *Fisher Exact test

## Declaration of Competing Interest

The authors declare that they have no potential conflict of interest regarding the investigation, authorship, and/or publication of this article.

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