Endovascular Thrombectomy in 47 Patients with Isolated M2 Occlusions: Clinical and Reperfusion Outcomes

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Background

- Endovascular thrombectomy (EVT) in patients with acute ischaemic stroke and large vessel occlusion (LVO) in the anterior circulation is safe and improves functional outcome (class 1; level of evidence A)¹.
- A solitary occlusion at the M2 segment of the middle cerebral artery (MCA) occurs in 16-41% of MCA infarctions².
- Randomized controlled trials provide limited data on whether benefits of EVT in acute ischemic stroke extend to occlusions involving the M2 segment of the MCA³.
- It was previously thought that since the M2 is smaller, technically more difficult to treat with limited endangered territory, that M2 occlusions may not warrant the risks of EVT.

Aim

- To evaluate the functional outcomes and reperfusion rates in acute ischaemic stroke patients with isolated M2 occlusions who undergo EVT

Methods

- This study is a prospective audit of AIS patients with isolated M2 occlusion undergoing EVT at 2 Australian comprehensive stroke centres between January 2016 and October 2017.
- The study commenced following approval by the Human Research Ethics Committees at both centres.
- We evaluated factors associated with functional outcomes, mortality and reperfusion rates.
- Data was analysed using SPSS statistical analysis software.
- Outcomes were compared to recent studies in EVT with M2 segment occlusion.

Table 1: Participant characteristics	
Age (mean±SD)	72.2 ±12.5
Male gender (%)	62 %
Admission NIHSS, median (IQR)	12 (10-14)
IV t-PA (%)	27%
Risk factors	
Hypertension (%)	74%
Current smoker (%)	27%
Hypercholesterolaemia (%)	61%
Diabetes (%)	46%
Ischaemic heart disease (%)	29%
Atrial fibrillation (%)	42%
Complications	
ICH (%)	7%
Onset to reperfusion time in hours, median (IQR)	5 (4-6.3)

Case Study

- Mr BD, an 81 years old male, previously independently living at home, is one of the patients included in the present study.
- His comorbidities included: hypertension, hypercholesterolemia, osteoarthritis, depression and benign prostatic hypertrophy.
- He was last seen well at 13:10 on the day of presentation.
- He presented to Liverpool Hospital at 14:20, FAST positive, aphasic, gaze preference to left, right visual neglect, right sided hemiplegia and NIHSS = 24 suggesting large deficit.

Figure 1: Hyperdense MCA sign on Non-contrast CT Brain

Figure 2: CT Angiogram

Figure 3: CT Perfusion – Core = 18.5ml (15%), Penumbra = 104.6ml (85%)

- IV-tPA commenced at 15:10
- Entered DSA suite at 16:30
- Groin access at 16:35
- mTICI-3 reperfusion achieved at 17:15
- Door to puncture time = 2hrs 15mins
- Door to reperfusion time = 2hrs 55mins
- Modified Rankin Scale at discharge = 0
- Modified Rankin Scale at 90 days = 0

Figure 4: DSA showing proximal superior division M2 occlusion - pre and post EVT

Figure 5: MRI Day 3 – Limited left MCA stroke

Results

- Forty-seven patients (age 72.2±12.5 years, 62% male) with median NIHSS 12 (IQR=10-14) underwent EVT for isolated M2 segment occlusions with stent retrievers and/or aspiration.
- Thirteen (27%) patients received thrombolysis.
- Angiographically, M2 occlusion locations were identified as proximal (68%), middle (13%) or distal (19%).
- Good reperfusion (mTICI 2b/3) was achieved in 100% of the patients.
- At 90-days, good (mRS 0–2) or excellent (mRS 0–1) functional outcomes were achieved in 33 (70%) and 27 (57%) patients respectively.
- Mortality occurred in 7 (14%) patients.
- Admission NIHSS strongly predicted functional outcome (p<0.001).
- Time to reperfusion did not correlate with 90-day functional outcomes.

Table 2: Comparison of current results with recent studies in EVT with M2 occlusions

	Bhogal et al., 2017 ⁴ (n=106)	Mokin et al., 2017 ⁵ (n=117)	Current study (n=47)
Age (mean±SD)	68±13	67±15	72±12
NIHSS (median)	14	15	12
TICI 2b/3 (%)	90%	85%	100%
mRS 0-2 at 90days	54%	56%	70%
Mortality at 90days	14%	18%	14%

Conclusion

- This study shows a high proportion of excellent functional outcomes and relatively low mortality in patients with isolated M2 occlusions treated with EVT.
- Our patient group showed non-inferior functional outcomes and mortality rates compared to recent M2 EVT studies^{4,5}.
- These findings are in line with previous studies demonstrating the safety and efficacy of EVT in selected M2 occlusion strokes^{4,5}

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