Outcome of Stent Deployment in patients with Mechanical Thrombectomy Failure: a Single-center Retrospective Review

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Introduction

Endovascular mechanical thrombectomy is the standard treatment for large vessel occlusion (LVO) stroke. 10-15% of cases are refractory to mainstream thrombectomy strategies such as aspiration or stent-retriever, especially in patients with underlying intracranial atherosclerosis-related occlusion (ICAS). Stent deployment is a bail-out strategy in such cases.

This study aims to review the technical and clinical outcomes of refractory LVO stroke rescued with stent deployment.

Materials and Methods

Study Design

This was a single-center retrospective analysis of LVO patients with thrombectomy done in Queen Mary Hospital, from January 2016 to September 2019. Patients with unsuccessful thrombectomy rescued with intracranial stent deployment were included. The angiographic and clinical outcome were reported and compared against the remaining LVO thrombectomy cohort.

Patient population

In total 115 ischaemic stroke patients who received endovascular mechanical treatment were recruited, 7 patients in stenting group and 108 in non-stenting group. Patients with carotid stenting were not included in the stenting rescue group. All statistical analysis were performed with IBM SPSS Statistics version 23.

Results

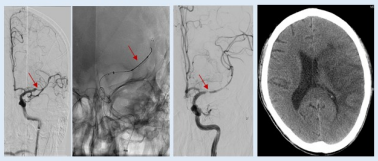
Table 1. Clinical Features and Risk Factors

	Stenting (n=7)	Non-Stenting (n=108)	p-value
Baseline demographics			
Age, mean (SD)	66.6 (11.5)	67.9 (15.5)	0.823
Men, No./total (%)	5/7 (71.4%)	60/108 (55.6%)	0.412
Etiology of stroke, No./total (%)			
Cardioembolism	3/7 (42.9%)	78/108 (72.2%)	0.099
Intracranial stenosis	2/7 (28.6)	12/108 (11.1%)	0.171
Extracranial stenosis	0/7 (0%)	4/108 (3.7%)	0.604
Dissection	0/7 (0%)	3/108 (2.8%)	0.655
Neurointervention complication	0/7 (0%)	1/108 (0.9%)	0.798
Others or Undetermined	2/7 (28.6)	10/108 (9.3%)	0.105
Medical history, No./total (%)			
Hypertension	5/7 (71.4%)	72/108 (66.7%)	0.795
Diabetes mellitus	0/7 (0%)	30/108 (27.8%)	0.105
Hyperlipidaemia	1/7 (14.3%)	35/108 (32.4%)	0.316
Atrial Fibrillation	4/7 (57.1%)	42/108 (38.9%)	0.350
Current smoking	2/7 (28.6)	16/108 (14.8%)	0.332
Previous ischaemic stroke	1/7 (14.3%)	19/108 (17.6%)	0.823
Current stroke event			
Initial NIHSS, mean (SD)	21 (6.3)	21 (6.7)	0.989
CT Aspects, median	8	9	0.291
Site of occlusion, No./total (%)			
ICA occlusion	1/7 (14.3%)	31/108 (28.7%)	0.409
MCA occlusion	6/7 (85.7%)	68/108 (63.0%)	0.223
Use of IV thrombolysis, No./total (%)	3/7 (42.9%)	52/108 (48.1%)	0.786
No. of thrombectomy attempt, median	5	2	0.001

Table 2. Clinical Outcomes of Thrombectomy

	Stenting (n=7)	Non-Stenting (n=108)	p-value
Complication, No./total (%)	3/7 (42.9%)	14/106 (13.2%)	0.034
Symptomatic intracranial hemorrhage, No./total (%)	1/7 (14.3%)	6/106 (5.7%)	0.359
Final mTICI 2b/3, No./total (%)	5/7 (71.4%)	97/108 (89.8%)	0.202
3 month mRS 0-2, median	5 (0%)	3 (38.9%)	0.012
Mean and mean difference (95% CI)			
Onset-to-groin (min)	309.3	256.4	0.295
Groin-to-perfusion (min)	142.6	73.3	0.004

Three patients in stenting group (table 2) has developed intra-op complications including vessel perforation contrast extravasation, and 1 underwent decompressive craniectomy. CT angiogram was performed after stent-deployment to confirm stent patency in all patients in the stenting group. All these patients was put on antiplatelet immediately after the surgical procedure (5 patients on aspirin and 2 patients has received dual anti-platelet therapy (DAPT) to avoid stent thrombosis.



Illustrative case:

A 74-year-old man with left M1 occlusion. After an initially successful Stent-retriever thrombectomy, the vessel quickly reocclude again. Similar results were obtained after the 2nd and 3rd attempt. At last, a Solitaire 6mm stent was deployed at M1-2 followed by balloon angioplasty, obtaining TICI 2a reperfusion. CT brain scan at 24-hours showed established left MCA territory infarct. The 3-month mRS was 3.

Discussion

Our early experience with rescue stenting for LVO stroke patients refractory to thrombectomy showed that while stenting can achieve a satisfactory angiographic results (71% TICI 2b/3), the clinical outcome of these patients was poor. This is likely related to the much longer groin-to-perfusion time, which was double the time required for the non-stenting cohort. In addition, the complication rate of these rescue-stenting patients were high due to the multiple thrombectomy attempts and early antiplatelet use.

Recent studies suggest that if reperfusion can be established early, the clinical outcome of ICAS-LVO patients can be similarly good compared to non-ICAS-LVO patients. Other groups had advocated the use of Glycoprotein IIb/IIIa inhibitor to avoid re-occlusion after thrombectomy in ICAS patients. This highlighted the importance of early-recognition intra-procedurally for refractory occlusions, and the timely decision of thrombolytic infusion or stent deployment; instead of prolonging the procedure with repeated thrombectomy attempts which will likely be futile.

Conclusion

Stent-deployment rescue is technical feasible for failed thrombectomy cases, with satisfactory angiographic reperfusion results. Early recognition and decision of salvage stent-deployment, instead of prolonging the procedure with repeated unsuccessful thrombectomy attempts may need to improve clinical outcome in these patients.

References

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