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Direct Aspiration (ADAPT) and Primary Stent Retriever Thrombectomy for Acute Ischemic Stroke: A Systematic Review of Radiographic and Clinical Outcomes in 10,291 Patients

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## Introduction

Endovascular stroke therapy has been revolutionized by the advent of modern devices for thrombectomy. It remains to be determined what is the most safe and effective way to perform stroke thrombectomy. The two most common approaches to thrombectomy currently include: direct aspiration first pass technique (ADAPT) or primary stent retriever thrombectomy. We aimed to compare radiographic and clinical outcomes in patients with acute stroke from large vessel occlusion (LVO) treated with these two approaches.

Recently, there has been increased research in this area comparing aspiration vs. stent retriever efficacy and outcomes. Latest data including a randomized, multicenter study demonstrated similar efficacy and safety in patients with acute ischemic stroke1. We undertook a systematic review of the latest mechanical thrombectomy devices for stent-retrievers and direct aspiration to further elucidate the optimal treatment of acute ischemic stroke.

## **Methods**

Using the PubMed database, we searched for studies that included patients with acute ischemic stroke from LVO treated with direct aspiration (ADAPT) or primary stent retriever thrombectomy. The literature search included 925 studies, which was further separated by inclusion criteria into 253 manuscripts. Statistical analysis was performed on 66 publications with a total of 7005 patients that underwent thrombectomy using a stent retriever device and 32 publications with a total of 2947 patients that underwent thrombectomy using ADAPT. We compared the proportions of patients with successful recanalization, favorable functional outcomes, symptomatic intracranial hemorrhage (sICH), and occurrence of distal embolization in the two treatment groups by calculating chi2 and confidence intervals for odds ratios.

#### References

1. Lapergue B, Blanc R, Gory B, et al. Effect of Endovascular Contact Aspiration vs Stent Retriever on Revascularization in Patients With Acute Ischemic Stroke and Large Vessel Occlusion: The ASTER Randomized Clinical Trial. JAMA. 2017;318(5):443-452. doi:10.1001/jama.2017.9644.

# Results

	Stent retriever (n=7005)	ADAPT (n=2947)	p-value
Age- yr	67.15 ± 4.9	68.79 ± 3.9	0.1057
NHISS on admission- mean	17 ± 3.1	16.82 ± 1.8	0.3821
IV tPA on admission- no. (%)	2,978 (42.5)	1,392 (47.2)	0.1695
Vessel occluded- no. (%)			0.8303
ICA	1,547 (22.1)	806 (27.3)	
MCA	4,725 (67.5)	1,806 (61.3)	
Posterior circulation	657 (9.4)	139 (4.7)	
sICH- no. (%)	(n=6364) 479 (7.5)	(n=830) 31 (3.7)	0.0030
TICI 2b/3- no. (%)	(n=7011) 5,508 (78.6)	(n=2493) 1,625 (65.2)	<0.001
mRS 0-2 at 3 months- no. (%)	(n=6277) 2,937 (46.8)	(n= 983)474 (48.2)	0.6817
90-day mortality- no. (%)	(n=5525) 1,079 (19.5)	(n=2083) 341 (16.4)	0.0228

9,952 patients from 98 publications were included in the results. There was no significant difference observed at baseline between the two groups studied. Mean age was 67.15 and 68.79 for the stent retriever and ADAPT groups, respectively. NIHSS on admission, proportion of patient who received IV tPA, and vessel occluded (ICA, MCA, posterior circulation) were similar for both groups and are listed in Table 1.

There was a significant difference in rates of successful recanalization TICI 2b/3 (65.2% with ADAPT, 78.6% with primary stent retriever, 87.5% with combined ADAPT/stent retriever; p < 0.0001; F (2, 114) = 15.3). There was no difference in good clinical outcome at 3 months between the three groups based on one-way ANOVA (p=0.5995; F (2, 96) = 0.5144). There was a significant difference in sICH between ADAPT and combined ADAPT/Stent group vs. primary stent retriever; however, there was no significant difference between ADAPT vs. all group (3.7% with ADAPT, 7.5% with primary stent retriever, 5.2% with ADAPT/stent retriever). Lastly, mortality was significantly different between two groups (16.4% ADAPT vs. 19.5% stent retriever)

# Conclusions

According to our systematic review, endovascular treatment with direct aspiration (ADAPT) and primary stent retriever thrombectomy approaches results in different recanalization rates; however, similar clinical outcomes in patients with acute stroke from LVO. Further research is warranted to elucidate optimal treatment for patients undergoing endovascular stroke therapy.

# **Patient Characteristics**

## ADAPT vs. Stent Retriever:

Comparable mean age, median NIHSS, number of patients given IV-tPA, and location of infarct by internal carotid artery (ICA), middle cerebral artery (MCA), or posterior cerebral artery (PCA)

Manuscript selection based on inclusion criteria: - Mechanical thrombectomy performed with newer retriever/aspiration devices (2014-2017)



# Learning Objectives

Ability to compare recanalization rates and functional outcomes between the two most common approaches to thrombectomy in the setting of acute ischemic stroke.