DIRECT VERSUS BRIDGING MECHANICAL THROMBECTOMY IN ISCHEMIC STROKES OF UNKNOWN ONSET: A MULTICENTER STUDY IN THE NORTH OF SPAIN (NORDICTUS)

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BACKGROUND and OBJECTIVE

NORDICTUS is a research network of stroke centers in Northern Spain serving an area of 11.5 M people. In 46% of these hospitals, endovascular treatment of unknown-onset strokes (UOS) is routinely performed after administration of off-label intravenous thrombolysis (bridging therapy). The aim of this study is to examine the safety and efficacy of bridging thrombolysis (BT) compared with mechanical thrombectomy alone (MTa) in the treatment of UOS.

METHODS

This is a retrospective analysis of the prospective registry in NORDICTUS. We included consecutive patients with an UOS, with a large-vessel occlusion of the anterior circulation, treated with mechanical thrombectomy in thirteen NORDICTUS stroke centers from January 2015 to December 2016. Common demographic, clinical, radiological and prognostic variables were recorded during admission. Radiological and clinical outcomes at 90 days were compared in patients receiving MTa with those receiving BT using multivariate logistic regression analysis. Symptomatic hemorrhagic transformation was considered our primary safety-outcome variable, whereas mortality and a three-months mRS $\leq$ 2 were our primary efficacy-outcome variables. Our secondary safety and efficacy outcome variables were other types of hemorrhagic transformation and a reperfusion classification of mTICI 2b-3 and 3 respectively.

RESULTS

Table 1. Baseline Characteristics of the Study Patients

	Bridging thrombolysis (117)	Primary mechanical thrombectomy (81)	p
Baseline characteristics			
Male, n (%)	70 (59.9)	46 (56.8)	0.65
Age in years, median (IQR)	72 (60.5-80)	69 (59.5-79)	0.48
NIHSS at admission, median (IQR)	17 (12-21)	16 (12.5-21.5)	0.64
ASPECTS, median (IQR)	9 (8-10)	8 (7-10)	0.004
Vascular risk factors			
Hypertension, n (%)	61 (52.1)	52 (64.2)	0.09
Diabetes mellitus, n (%)	22 (18.8)	11 (13.6)	0.33
Hypercholesterolemia, n (%)	42 (35.9)	33 (40.7)	0.49
Current smoking, n (%)	30 (28.8)	19 (23.5)	0.41
Enolism, n (%)	18 (17.8)	15 (18.5)	0.97
Atrial fibrillation, n (%)	39 (33.3)	34 (42)	0.21
Coronary heart disease, n (%)	14 (12.1)	13 (16)	0.42
Previous stroke, n (%)	12 (10.3)	13 (16)	0.22
Pathogenesis (TOAST), n (%)			
Large artery atherosclerosis	25 (21.4)	25 (30.9)	0.13
Cardioembolism	63 (53.8)	37 (45.7)	0.25
Other determined pathogenesis	1 (0.9)	2 (2.5)	0.56
Undetermined pathogenesis	28 (23.9)	13 (16)	0.17
Vessel occlusion site, n (%)			
ICA-terminus	21 (17.9)	22 (27.2)	0.12
MCA1	60 (51.3)	39 (48.1)	0.66
MCA2	18 (15.4)	10 (12.3)	0.67
ACA	0 (0)	1 (1.2)	0.40
Tandem occlusion	18 (15.4)	9 (11.1)	0.38

Table 2. Multivariate Analyses^a

	Bridging thrombolysis (117)	Primary mechanical thrombectomy (81)	OR (95% CI)	p
Reperfusion classification (mTICI), n (%)				
mTICI 2b-3	90 (77.6)	69 (85.2)	0.65 (0.29-1.49)	0.31
mTICI 3	60 (51.7)	59 (72.8)	0.42 (0.22-0.82)	0.01
Bleeding complications, n (%)				
sICH	11 (9.4)	6 (7.5)	1.23 (0.4-3.8)	0.72
PH2	12 (10.3)	5 (6.3)	1.74 (0.55-5.51)	0.35
PH1	15 (12.8)	11 (13.8)	0.9 (0.36-2.23)	0.82
HI2	9 (7.7)	7 (8.8)	0.63 (0.18-2.17)	0.46
HI1	6 (5.1)	8 (10)	0.79 (0.19-3.26)	0.75
Clinical outcome at three months, n (%)				
mRS 0-2	56 (49.1)	39 (53.4)	0.99 (0.51-1.94)	0.98
Mortality	16 (14)	6 (8.2)	1.34 (0.46-3.88)	0.59

Abbreviations: mTICI, modified Thrombolysis in Cerebral Infarction; sICH, symptomatic intracranial hemorrhage; PH2, parenchymal hematoma type 2; PH1, parenchymal hematoma type 1; HI2, hemorrhagic infarction type 2; HI1, hemorrhagic infarction type 1; mRS, modified Rankin Scale; OR, odds ratio.

^a Adjusted for age, sex, National Institutes of Health Stroke Scale (NIHSS) score, Alberta Stroke Program Early CT Score (ASPECTS), location of occlusion, and hypertension

Abbreviations: NIHSS, National Institutes of Health Stroke Scale; ASPECTS, Alberta Stroke Program Early CT Score; TOAST, Trial of Org 10172 in Acute Stroke Treatment classification ;ICA, internal carotid artery; MCA, middle cerebral artery; ACA, anterior cerebral artery; IQR, interquartile range

CONCLUSIONS

Off-label BT in UOS appears to be safe although not associated with improved outcomes. This observation may be of interest in the drip & ship context, especially when a primary stroke center is far from a endovascular-capable hospital.