Intravenous thrombolysis with t-PA and cortical involvement increase the risk of early post-stroke seizures: results of a case-control study

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Objectives:

Aim of this study was to identify risk factors for early post-stroke seizures (PSS) in patients with acute ischemic stroke. We undertook a case-control study at one single stroke center.

Methods:

Patients with seizures occurring during the first 7 days following ischemic stroke who were admitted from 2010 to 2016 were retrospectively identified and matched with controls (stroke patients without early PSS) for age and sex.

Results:

- We included 79 PSS patients and 158 controls. Clinical characteristics of included patients are reported in detail in table 1.
- Details on stroke characteristics are reported in table 2.
- Details on Reperfusion therapies are reported in table 3.
- Both groups differed significantly in these parameters, analyzed by univariate logistic regression: blood sugar levels on admission (OR: 1.005; 95% CI: 1.000-1.009; p=0.044), stroke localization (lacunar stroke: OR: 0.237; 95% CI: 0.098-0.568; p=0.001), NIHSS (OR: 1.034; 95%CI: 1.008-1.061; p=0.010), and Rankin score (OR: 1.242; 95% CI: 1.028-1.500; p=0.025), and i.v. thrombolysis with rtPA (OR: 2.350; 95% CI: 1.247-4.430; p=0.008).
- Multiple logistic regression after forward and backward variable selection identified cortical stroke localization (OR: 2.49; 95% CI: 1.35-4.59; p=0.003) and i.v. thrombolysis (OR:2.26; 95% CI: 1.16-4.43; p=0.017) as variables independently associated with occurrence of early post-stroke seizures.

Table 1: Clinical characteristics of participants			
	Cases Mean±SD	Controls Mean±SD	Statistical significance (p value)
Age (years)	72.94 ± 9	72.557 ± 13	0.816
Male gender	55.7%	55.7%	1
Prior ischemic stroke	28 (35.4%)	45 (28.5%)	0.274
Concomitant therapies			
Statins	26 (32.9%)	52 (33.1%)	0.974
Antiplatelets	36 (45.6%)	60 (38%)	0.262
Anticoagulants	13 (16.5%)	28 (17.7%)	0.808
Alcoholism	8 (10.1%)	10 (6.3%)	0.298
Hypertension	69 (87.3%)	135 (85.4%)	0.691
Systolic blood pressure at admission	151 ± 29	148 ± 30	0.317
Diabetes mellitus			
Insulin dependent	11 (13.9%)	30 (19%)	0.395
Not insulin dependent	19 (24.1%)	28 (17.7%)	
Blood sugar at admission (mg/dL)	Median 134 [IQR: 109-172]	Median 123 [IQR: 103-160]	0.048
Sodium levels at admission (mmol/L)	141 ± 11	140 ± 4	0.612
Total cholesterol levels (mg/dL)	173 ± 45	178 ± 46	0.660

Table 2: Stroke characteristics			
TOAST classification	Cases N (%)	Controls N (%)	Statistical significance (p value)
Large artery disease	22 (27.8%)	34 (21.5)	0.087
Cardiac embolism	31 (39.2%)	63 (39.9)	
Small vessel disease	1 (1.3%)	14 (8.9)	
Other determined etiology	1 (1.3%)	8 (5.1)	
Undetermined etiology (cryptogenic)	23 (29.1%)	39 (24.7)	
Unavailable information	1 (1.3%)	0 (0%)	
Total	79 (100%)	158 (100%)	
Stroke localisation			
Cortical	54 (68.4%)	73 (46.2%)	0.002
Subcortical	18 (22.8%)	42 (26.6%)	
Lacunar	7 (8.9%)	40 (25.3%)	
Stroke severity			
NIHSS	Median 7 [IQR: 3-16]	Median 4 [IQR: 2-8]	0.010
Rankin-Score	Median 4 [IQR: 2-5]	Median 3 [IQR: 2-4]	0.007

Table 3: Reperfusion therapies				
Recanalization therapy		Cases N (%)	Controls N (%)	Statistical significance (p value)
Intravenous thrombolysis		25 (31.6%)	26 (16.5%)	0.007
Intraarterial thrombolysis		7 (8.9%)	5 (3.2%)	0.059
Mech. thrombectomy	Sucessful	16 (20.3%)	25 15.8%)	0.327
	Not successful	5 (6.3%)	5 (3.2%)	

Discussion and Conclusions:

- The principal finding of this study is that cortical involvement and i.v. thrombolysis are independent risk factors and associated with the occurrence of early PSS.
- Further studies (adequately powered prospective studies or high-quality case-control studies) are required to draw definite conclusions on the relationship between different reperfusion therapies (particularly mechanical thrombectomy) and the occurrence of early post-stroke seizures and post-stroke epilepsy.