

Thrombolytic therapy for acute ischemic stroke: an observational nationwide study involving more than 25,000 patients

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Introduction

In acute ischemic stroke, alteplase given within 4.5 hours of symptom onset is currently considered the standard of care. Risks and benefits of this treatment need to be assessed, particularly in a real-world setting. The aim of our study was to identify the main factors that, in a large cohort of real-world patients, can influence mortality, independence, and intracranial hemorrhage after thrombolysis.

Methods

Data were extracted from the Italian SITS-ISTR registry (Safe Implementation of Thrombolysis in Stroke-International Stroke Thrombolysis Register). Outcomes were 3-month independence (mRS0-2), 3-month mortality, and symptomatic intracerebral hemorrhage (SICH) within 22-36 hours defined according to SITSMOST definition. Covariates included demographic characteristics, risk factors and variables related to in-hospital drug treatment. These variables were assessed by univariate statistics and multivariate logistic regression.

Results

SITS-ISTR included 25,811 consecutive patients with acute ischemic stroke treated with intravenous thrombolysis at 189 sites in Italy from January 2001 to December 2015. At 90 days after stroke onset, 60.2% of patients had mRS 0-2. Death at 90 days occurred in 9.2% of patients. About 1.2% of patients experienced SICH within 24 hours after alteplase administration. Stroke severity was the variable more closely related to mortality (risk ratio [RR] 3.84, 95% CI 3.42-4.31) and showed also a strong impact on independence at 3 months (RR 0.15, 95% CI 0.14-0.17). In multivariate analyses focused on SICH, an interval of >3 hours between stroke onset and treatment was the main risk factor (RR 1.80, 95% CI 1.37-2.36).

Table 1. Characteristics of the 25,811 patients with AIS.

BASELINE CHARACTERISTICS	Mean [Median(IQR)] Or n/N	% or SD
Age (years)	68.9 [72(16)] N= 25765	12.65
Age > 80 years	3643/25765	14.1%
Height (cm)	168.1 [168(14)] N=6708	8.67
Female	11383/25811	44.1%
Weight (kg)	74.1 [74(15)] N=24491	14.08
Body mass index>30	1193/6706	17.2%
Blood glucose (mg/dl)	131.4 [119(41)] N=21944	47.10
Blood glucose>125 mg/dl	8974/21938	40.9%
Systolic blood pressure (mmHg)	149.7 [150(30)] N=23941	22.88
Diastolic blood pressure (mmHg)	81.5 [80(18)] N=23932	12.98
Diastolic blood pressure>100 mmHg	1219/23930	5.1%
Stroke onset to treatment time (h)	2.7 N=21230	0.81
Stroke severity (according to NIHSS)	12.1 [11(10)] N=23973	6.43
0-4	2368/23973	9.9%
5-9	7622/23973	31.8%
10-14	5281/23973	22.0%
15-19	5084/23973	21.2%
20+	3618/23973	15.1%
Antiplatelet drugs	7711/24636	31.3%
Heparin treatment	498/24700	2.0%
RISK FACTORS		
Atrial fibrillation	3633/23545	15.4%
Diabetes	4209/24689	17.1%
Hypertension	16325/24668	66.2%
Previous stroke	3705/24670	15.0%
Hyperlipidemia	6849/24012	28.5%
Smoking (previous)	3657/21516	17.0%
Smoking (current)	4437/24096	18.4%
HOSPITAL TREATMENT		
Antihypertensive treatment	10431/18422	56.6%
Stroke onset to treatment time > 3h	6008/21188	28.4%
TPA dose < 0.9 mg/kg	1068/14814	7.2%
Door to needle time>40 min	19776/21544	91.8%
OUTCOME		
Independence (mRS 0-2) at 3 months	10321/17141	60.2%
SICH within 24 hours	285/23394	1.2%
Mortality at 3 months	2385/25811	9.2%

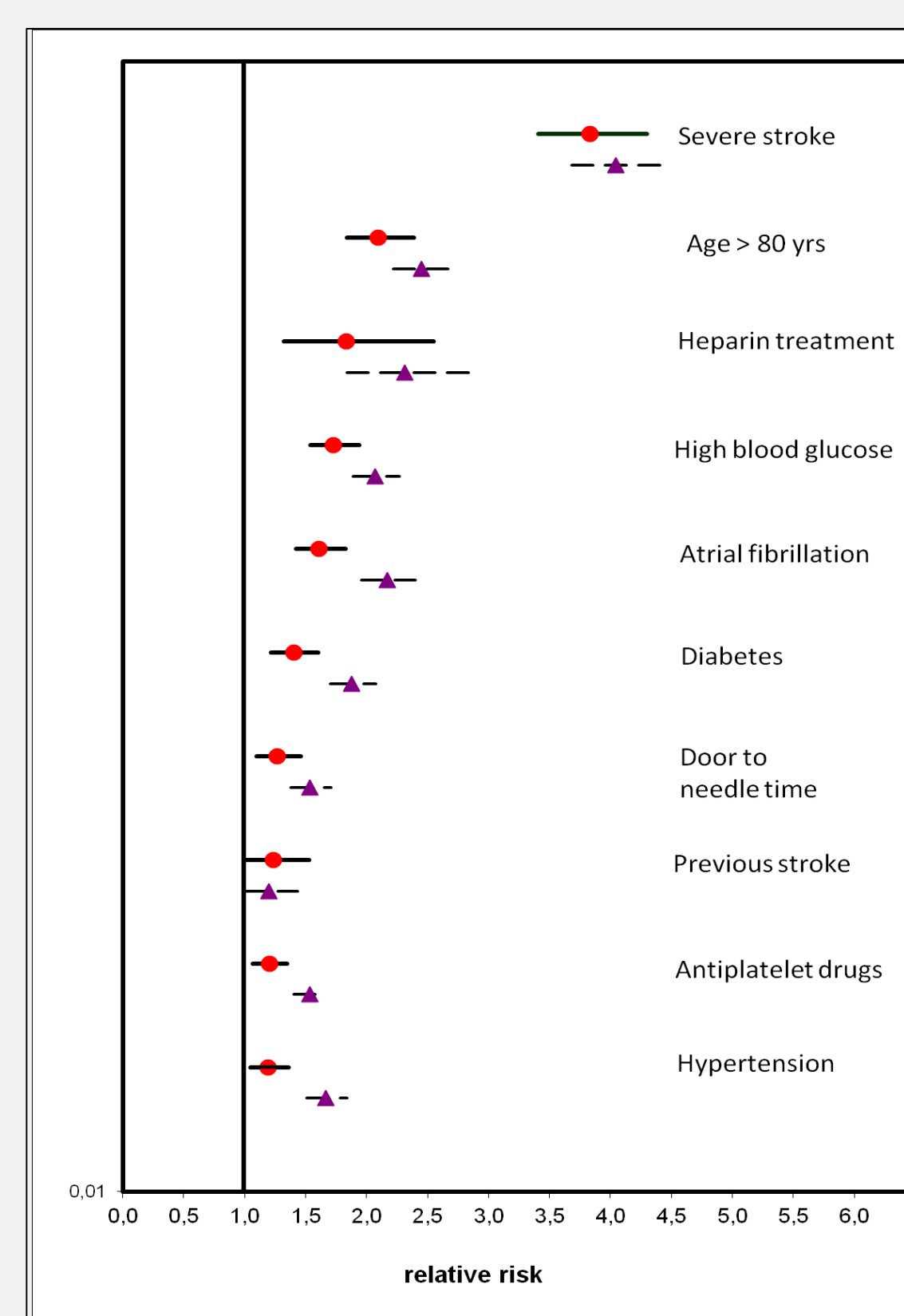


Figure 1. Factors influencing the outcome of all-cause mortality at three months: for each factor, the values of relative risk with 95% confidence interval are shown according to univariate analysis (triangles in purple with dashed horizontal lines in black) and multivariate analysis (circles in red with solid horizontal lines in black).

Conclusions

The real-world information on IV thrombolysis in acute ischemic stroke generated by our analyses represents an important advancement in the knowledge on the disease condition and on the factors influencing the effectiveness and safety of thrombolysis.