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A primer for a Tuscany stroke registry: looking back to go straight to the target

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Background: Intravenous thrombolysis with tissue plasminogen activator (Alteplase, tPA) is the current standard treatment for ischemic stroke within 4.5 h of symptom onset. A treatment delay decrease benefits and increase risks. Systematic thrombolysis protocols are currently used in stroke centers around the world to reduce the treatment delay. These models were designed and most applied in tertiary hospitals with wide availability of neurology physicians. We appliaed the American Heart Association/American Stroke Association (AHA/ASA) "Target: Stroke" initiative guidelines in a first-level Emergency Department (ED), where acute stroke are entirely managed by Emergency Physicians (EPs) and radiology consultants.

Patients & Methods: A prospective, quality improvement, observational registry was started in 2018, collecting every patient with an exit diagnosis from the Santa Maria Nuova Emergency Department (ED) of acute ischaemic stroke. The registry is daily updated by Emergency Physicians (EP), Radiologist and Internists, and it contains basic demographic, clinical and throughput informations. National Institutes of Health Stroke Scale (NIHSS), modified Rankin Score (mRs) were available in most patients and retrospectively calculated for patients missing this variable.

Data collection: The registry collects a number of time metrics, including symptom onset time, hospital arrival time, time of imaging, and eventually Alteplase (tPA) administration time. For inpatient strokes, the time of onset was used as the arrival time. Door to needle (DTN) time was, defined as the time taken in minutes from recorded arrival time in ED to the recorded time of tPA bolus administration, door to computed tomography (DTCT) time, defined as time taken in minutes from arrival time in ED to the time of non-contrast CT images answer, and door-to-blood test (DTBT) time, defined as the time taken in minutes from recorded arrival time in ED to blood test result time, were calculated. A 3-months electronic follow-up was performed for every patient to assess mortality, hospital readmission, haemorragic complications and mRs. A telephonic follow-up was performed when needed to complete the registry.

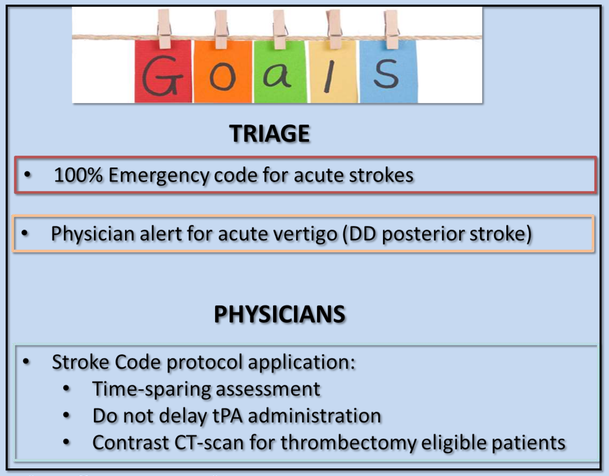
TRIAGE	<4,5 h (n=93, 47%)	Unknown onset (n=40, 20%)	4,5-12 h (n=12, 6%)	>12 h (n=52, 26%)
Emergency	72 (77%)	7 (18%)	4 (33%)	4 (8%)
Urgency	14 (15%)	24 (60%)	3 (25%)	30 (58%)
Delayable	7 (8%)	8 (20%)	5 (42%)	18 (35%)
Minor	0 (0%)	1 (2%)	0 (0%)	0 (0%)

Figure 1: Triage class according to time of onset of patient with acute ischaemic stroke

Acute onset (<4,5h)	tPA n=63 (44%)	NO tPA n=137 (56%)	p
Age	76±15 anni	81±15 anni	**0,019**
mRS	0,51±1,0	1,0±1,4	**0,03**
mRS at 90 days	1,2±1,8	3,0±2,0	**<0,001**
Complete recovery	37 (59%)	26 (41%)	**0,002**
↓ NIHSS in ED	30 (70%)	13 (30%)	**<0,001**
Haemorragy	3 (6%)	0?	ns
Death	3 (6%)	11 (18%)	ns
Re-entry	1 (2%), not neurological	4 (6%)	ns

Figure 2: Outcome of patient admitted for acute onset (<4.5 hours) ischemic stroke

Results & Discussion: In 2018 we registered 198 patients with acute ischaemic stroke: 95 (48%) arrived before 4.5 hours from symptoms onset. Sixty-four patients received tPA and 8 were transferred to the hub centre for urgent thrombectomy. Patient who received sistemic or local thrombolysis were more likely to experience a complete neurological recovery (59% treated vs 41% non-treated, p=0.002). Three (6%) patient had haemorragic complications, but no one had permanent sequaele (mRs 0, 0 and 1, respectively). Patient managed with a code-ictus protocol received tPA significantly earlier (25±9 minutes in code ictus vs 64±42 non code ictus, p<0.001). The delays in tPA treatment were mainly due to Triage failure to recognize the acute neurological deficit resulting in a posticipated EP visit, EP non-diagnosis (posterior stroke), and the treatment delay after the contrast-CT scan.



Conclusion & perspectives :
A stroke registry is an usefool tool to monitor time-dependent patient management and it can be used to find pitfalls and delays, in order to allow EP to improve their troughput patient management and outcome.