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A Reduction in Time with Electronic Monitoring In Stroke (ARTEMIS): a randomized multicenter trial

Background

For intravenous thrombolysis (IVT) and intra-arterial thrombectomy (IAT) time is the most crucial factor limiting efficacy. The time between alarming the Emergency Medical Services (EMS) dispatch office and initiation of reperfusion therapy, the *'total system delay'* (TSD), depends on logistics and team effort in the chain of acute stroke care.
A promising method to reduce the TSD is to provide real-time visual feedback to caregivers[1-3], but this was never investigated in a randomized trial.

We aim to investigate if real-time visual feedback on TSD to IVT/IAT to caregivers reduces the median TSD to IVT/IAT.

Results

Expected enrolment first patient June 2017.

Conclusions

We will investigate if real-time visual feedback on actual treatment delays provided to caregivers in the acute stroke care chain will reduce TSD to IAT/IVT.

We expect a reduction in pre- and in-hospital treatment delays and consequently more efficacy of IVT/IAT and a larger proportion of acute ischemic stroke patients ultimately treated with IVT/IAT. In addition we expect that electronic recording of treatment delays helps (stroke) physicians to manage increasing administrative burdens.

Methods

The 'A Reduction in Time with Electronic Monitoring In Stroke' (ARTEMIS) trial is a randomized open end-point trial conducted within three Dutch EMS regions.

Consecutive patients considered eligible for IVT/IAT by the EMS dispatch office or EMS personnel on-site will receive a Bluetooth wristband for electronic tracking. Real-time visual feedback will be randomized per patient and consists in providing visual feedback on actual treatment delays to caregivers involved on pre-mounted handhelds in both the ambulance and on tablets in hospitals en route to IVT/IAT.

Primary study endpoints are TSD to IAT and TSD to IVT.
By including 150 IAT- and 450 IVT-patients we will be able to demonstrate a 20-minute reduction on TSD to IAT and a 10-minute reduction on TSD to IVT (p = 0.05 and power = 0.8).
Secondary outcomes include proportion of IVT/IAT treated patients, clinical outcome / modified Rankin Scale (mRS) after three months, feasibility and cost-effectiveness.

Predefined subgroup analyses will be performed for IAT patients with- or without prior IVT. To adjust for EMS region and location of treatment we will use linear regression analysis.

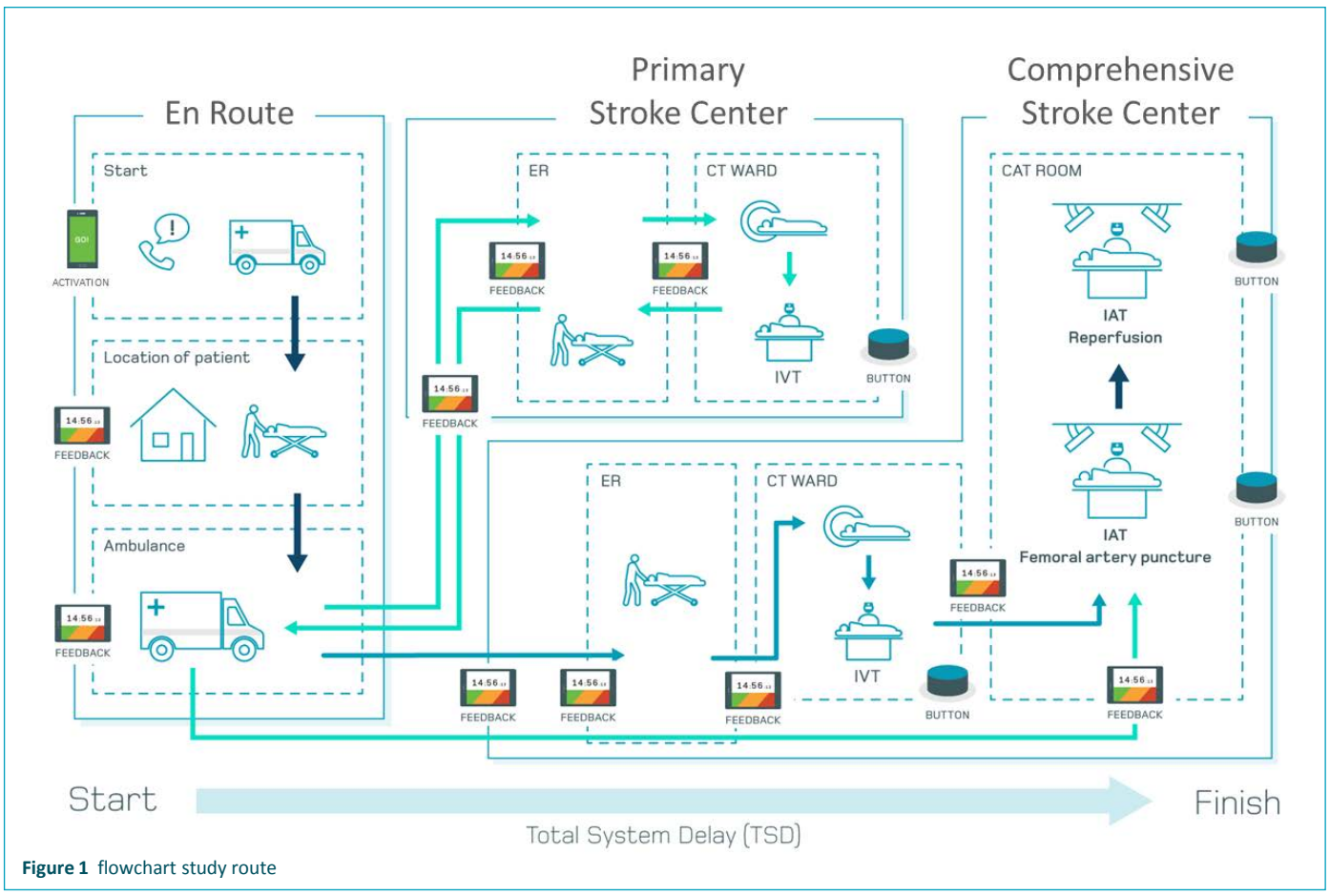

Figure 1 flowchart study route

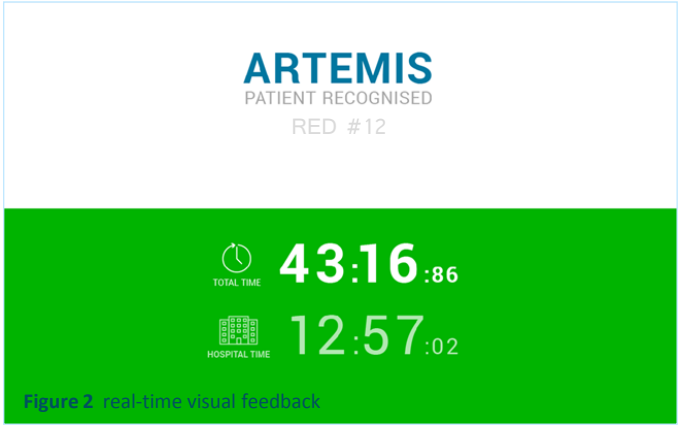

Figure 2 real-time visual feedback

Real-time visual feedback

Real-time visual feedback will be provided to caregivers through an electronic tracking system, using patient-specific Bluetooth wristbands and pre-mounted handhelds and tablets throughout the entire IVT/IAT treatment trajectory (e.g. in the ambulance, at the entry/exit of the ER, CT ward, neuro-care unit and catheterization room), providing accurate, straightforward and automatic data on the TSD and its various sub trajectories.

Real-time visual feedback consists of:

- **Information on actual TSD of the patient concerned**
- **A color coding (green/orange/red), which indicates whether or not a predetermined median treatment time is exceeded.**

At the first moment of initiation of treatment (administration of bolus alteplase in case of IVT / groin puncture in case of IAT) a push button will be pressed by the clinician, after which time registration automatically stops.

References

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