



LECTURE

Neuroimaging in acute ischaemic stroke

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Abstract

Imaging studies are essential in the setting of an acute stroke. They need to be targeted towards the assessment of the four Ps described by Rowley – Parenchyma, Pipes, Perfusion and Penumbra. This systematic approach enables the detection of intracranial haemorrhage, differentiation of infarcted tissue from salvageable tissue, identification of an intravascular thrombus and accurate selection of patients for the appropriate treatment.

Selection for treatment, be it mechanical thrombectomy and/or intravenous thrombolysis, should be done based on three different factors taken together, i.e. neurological evaluation (NIHSS), the local of vessel occlusion and the infarct core (Fig. 1). Both Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) can be used to distinguish between brain tissue that is irreversibly infarcted and that which is potentially salvageable. In current practice, MRI is not always available, ergo CT (with CT Angiography) is the most effective, widespread available technique in the emergency context.

According to the latest American Guidelines (2018), CT provides the necessary information to make decisions about acute management of patients with acute strokes. Imaging of the extracranial carotid and vertebral arteries, in addition to the intracranial circulation, is also recommended to provide information on patient eligibility for treatment and for endovascular procedural planning. Additional imaging beyond CT and CT Angiography, such as perfusion studies, for selecting patients for mechanical thrombectomy in the 6-hour window from symptom onset is not recommended.

With the publication of the randomized trials DAWN and DEFUSE 3, the extension of the treatment window beyond 6

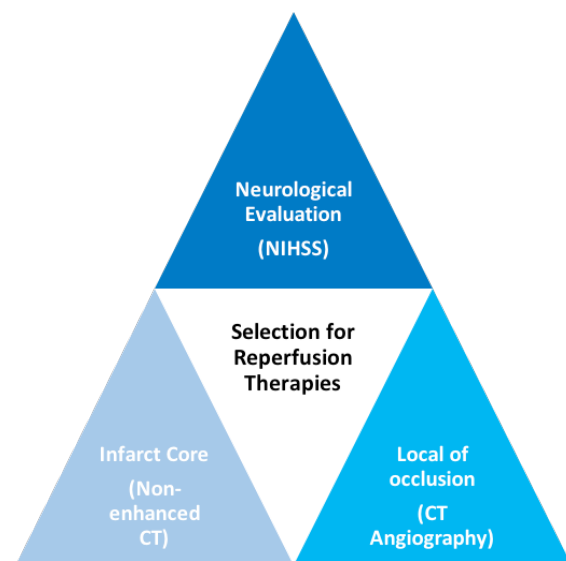


Figure 1. Selection of Patients for Reperfusion Therapies.

hours has been widely accepted. Based on these trials, current guidelines for imaging in patients presenting after the 6-hour window from symptom onset or with wake-up strokes are more restrictive, with recommendations for the use of perfusion studies to help in the decision-making process.

In general, imaging techniques have advanced rapidly in the past decade and currently they must be used to identify and select patients that benefit from reperfusion therapies in the acute phase. Fast and effective imaging techniques are needed for a quicker diagnosis and early treatment planning.

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