



DEBATE

Perfusion imaging mismatch: the redemption of penumbral imaging

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Abstract

Salvage of the ischemic penumbra has been the target of all acute ischemic stroke therapies. Although at the population level there is a time dependence for beneficial intervention, recent trials have been able to identify patients who benefit despite prolonged, or potentially independent of, time from onset. Using multi-modal imaging, the ischemic penumbra can be detected using the perfusion imaging mismatch. An alternate approach for selecting patients has been to use the mismatch between the severity clinical deficits and the size of the core infarct. Generally, a large imaging mismatch identifies patients who would benefit the most from reperfusion of the ischemic penumbra. However, in the DAWN trial, a larger clinical mismatch was associated with worse outcome. This calls into question how interchangeable these measures may be. The DAWN trial demonstrated that the clinical mismatch can be used to identify a population that benefits from intervention. However, the DAWN trial

relied on an extreme clinical mismatch, including only those with a very small core and a substantial clinical deficit. The DEFUSE 3 trial, on the other hand, used a continuous measure of imaging mismatch that included 60% more patients than DAWN. Despite more inclusive selection criteria in DEFUSE 3, the benefit of treatment was essentially the same between the trials. Subgroup analysis of the patients in the DEFUSE 3 trial who would not have been eligible for the DAWN trial found a significant benefit to intervention. According to the recently presented results, patients selected according to the DEFUSE 3 criteria did not exhibit a time dependence on outcome. In summary, the perfusion imaging mismatch, when used to identify a target profile (that was developed through an elegant series of observational studies), has now been shown to be the most successful methodology for identifying patients who will benefit from endovascular therapy.

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