Is time brain in recanalization therapies of stroke?

A recent editorial in Neuroradiology asked a question: "is time brain."[1] Due to the fast development of functional neuroimaging techniques, the question is appropriate. The statement "time is brain" is not always correct although for most ischemic stroke patients it is. The fact remains that the faster the recanalization therapies are administered after the onset, the higher is the likelihood of the good outcome. Therefore, a well-functioning chain of recovery is of utmost importance. The emergency call center (ECC) launches a chain of recovery after getting a call of a suspected stroke. To encourage laypeople to make this call immediately asks for education. Everyone should recognize the stroke symptoms, i.e., face, arm, speech, and time, and know how to react if someone suffers an acute stroke, i.e., immediately call ECC. To ensure that the chain works effectively, every part of it must be properly educated, and then trained on ongoing basis. ECC personnel must be educated to recognize a possible stroke patient and call the nearest ambulance using Code STROKE. Paramedics must be trained to recognize acute stroke, evaluate the patient fast, and start transportation to the nearest emergency room (ER) capable of high-quality acute stroke care. During the transportation, the paramedics should give a prenotification to the admitting ER so that the stroke team is prepared for the arriving patient. They should also ensure the patient's airways, breathing and circulation, insert an IV line for thrombolysis and if necessary, lower high blood glucose with short acting insulin. When they arrive at the admitting ER, they should transfer the patient directly to the computed tomography (CT) or magnetic resonance imaging (MRI) table. A laboratory technician should draw blood tests including point-of-care international normalized ratio. A stroke physician should make a fast neurological evaluation of the patient on the CT or MRI table, then read the CT or MRI, consult a neuroradiologist if needed, and administer a recombinant tissue plasminogen activator bolus when appropriate. If there is a major artery occlusion, the stroke physician should warn an interventional neuroradiologist and transfer the patient fast to the cat laboratory where the radiologist and his/her team should be waiting for the patient. When appropriate, the interventional neuroradiologist performs thrombectomy.

The key to success is to do as much as possible during the transportation of the patient and only as little as possible after the patient's arrival.[2] Feedback to the members of the chain of recovery motivates them to do their very best. When the chain of recovery works well, it is possible to shorten the door to needle time to under 20 min and door to puncture time to under 60 min.[2]

Each stroke patient has individual stroke pathophysiology. It means that hypoperfusion does not progress into infarction equally fast in every patient.[3] Blood flow capacity of leptomeningeal collaterals differ, and so does the progression of ischemic penumbra to infraction. DEFUSE 3 trial revealed that there were slow progressors among control patients who were not treated with thrombectomy.[4] DEFUSE 3 trial gave information on how to find these patients with minimal infarction growth and a long time window for recanalization therapies. Majority of DEFUSE 3 trial's control patients who had a low hypoperfusion intensity ratio had minimal infarction growth.[5] In daily clinical practice, this means that one should not exclude ischemic stroke patients from recanalization therapies based only on time from the onset, but one should use modern imaging techniques to find whether a patient still has a small infarction and large ischemic penumbra to be saved, who therefore could benefit from late recanalization therapies. Accordingly, the question of the editorial in Neuroradiology is appropriate. Each ischemic stroke patient has to be studied properly with modern functional imaging techniques irrespective of the time of the stroke onset, as it may be much longer than the current guidelines recommend. Furthermore, patients whose time of the onset of symptoms is not known need proper functional imaging because they may be slow progressors and thus benefit from recanalization therapies.

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