Wake up stroke

Patients who go to sleep normal and awaken with stroke symptoms, a phenomenon known as “wake-up stroke,” present a management dilemma for acute stroke providers. Sometimes the period of sleep is short and a patient can still be eligible for tPA based on standard time-based criteria; however, when the time at which the patient was last known to be normal is the night prior to a morning presentation, which is often the case, the acute stroke provider is left without the key time-based data by which one typically makes safe therapeutic decisions for tPA candidacy. This makes for a diagnostic and therapeutic “gray area” in acute stroke practice.

Current guidelines for the treatment of acute ischemic stroke are mainly based on the time between symptom onset and initiation of treatment. This time is unknown in patients with wake-up stroke (WUS). We investigated clinical and multimodality CT imaging characteristics on admission in patients with WUS and in patients with a stroke with a known onset time.

All patients were selected from a large prospective cohort study (Dutch acute stroke study). WUS patients last seen well > 4.5 and ≤4.5 h were separately compared to patients with a known onset time ≤4.5 h. In addition, WUS patients with a proximal occlusion of the anterior circulation last seen well > 6 and ≤6 h were separately compared to patients with a known onset time ≤6 h and a proximal occlusion. National Institute of Health Stroke Score, age, gender, history of atrial fibrillation, non-contrast CT (NCCT) Alberta Stroke Program Early CT Score (ASPECTS), CT-perfusion abnormalities, proximal occlusions, and collateral filling on CT angiography were compared between groups using the Mann-Whitney U test and Fisher's exact test.

WUS occurred in 149/1,393 (10.7%) patients. Admission clinical and imaging characteristics of WUS patients last seen well > 4.5 h (n = 81) were not different from WUS patients last seen well ≤4.5 h (n = 68). Although WUS patients last seen well > 4.5 h had a significantly lower NCCT ASPECTS than patients with a known time of stroke symptom onset of ≤4.5 h (n = 1,026), 85.2% had an NCCT ASPECTS > 7 and 75% had a combination of favorable ASPECTS > 7 and good collateral filling. There were no statistically significant differences between the admission clinical and imaging characteristics of WUS patients with proximal occlusions last seen well > 6 h (n = 23), last seen well ≤6 h (n = 40), and patients with a known time to stroke symptom onset ≤6 h (n = 399). Of all WUS patients with proximal occlusions last seen well > 6 h, only 4.3% had severe ischemia (ASPECTS < 5), 13 (56.5%) had ASPECTS > 7 and good collateral filling.

There are only minor differences between clinical and imaging characteristics of WUS patients and patients who arrive in the hospital within the time criteria for intravenous or endovascular treatment. Therefore, CT imaging may help to identify WUS patients who would benefit from treatment and rule out those patients with severe ischemia and poor collaterals [1].

1)
Dankbaar JW, Bienfait HP, van den Berg C, Bennink E, Horsch AD, van Seeters T, van der Schaaf IC, Kappelle LJ, Velthuis BK; on behalf of the DUST investigators. Wake-Up Stroke versus Stroke with Known Onset Time: Clinical and Multimodality CT Imaging Characteristics. Cerebrovasc Dis. 2018 May 17;45(5-6):236-244. doi: 10.1159/000489566. [Epub ahead of print] PubMed PMID: 29772576.