Julena Foglia
Neuro-Anesthesia Question of the month

The ASPECTS Score

The Alberta Stroke Program Early CT Score (ASPECTS) is a composite grading score of early ischemic changes in acute stroke on CT imaging designed to give clinicians an easily communicable tool for the extent of ischemic changes after stroke (1). The calculation of the score is based on any early ischemic changes noted in 10 areas of the brain including 7 in the Middle Cerebral Artery (MCA) cortex (insular ribbon, M1, M2, M3, M4, M5, and M6), the caudate, the internal capsule, and the lentiform nucleus (1). These are identified by CT cuts at the level of the thalamus and basal ganglion, or at the superior margin of the ganglion structures (2). A normal CT would be given a score of 10 and then any area of early ischemic changes such as parenchymal hypoattenuation or focal swelling would be deducted from the total score (2). Initially, the ASPECTS score was validated to identify the subgroup of patients who would benefit most from intravenous thrombolysis therapy with a score of <7 being high risk (3).

However, with evolution of acute stroke management and utilization of thrombectomy, the ASPECT score has become an important tool for clinicians and also enrolling patients in clinical trials. The ASPECT score has also shown to be a predictor of functional outcome after thrombectomy (3). As in IV thrombolysis, an ASPECT score < 7 correlates with poorer functional outcome post thrombectomy (3).

Clinical limitations are important to understand about the ASPECT score. The two largest limitations discussed in the literature are the inter-user variability and also the territory grading system (3,4). First, since the early ischemic changes are up to interpretation of the reading clinician, the score may differ depending on who reads the CT scan (4). This would ultimately impact the patients baseline risk and could change management of the patient (thrombectomy vs no thrombectomy). Secondly, the score grades the MCA territory which is the anterior circulation. This leaves patients who suffer a posterior circulation ischemic stroke or combination to be left out of this scoring system overlooking the posterior circulation changes.

The ASPECT score is important to understand for anesthesiologists because of our role with endovascular thrombectomies in acute care centers. There have been ongoing studies comparing general anesthesia to local with sedation techniques (5-6). The studies use the ASPECT score as a method of stratifying baseline risks of patients. For anesthesiologists, it would be important to understand this risk when evaluating the studies themselves. Additionally, I feel it important to understand the patients risk clinically when providing anesthetic care to acute stroke patients for thrombectomy. This may help guide decision making for higher risk patients who require general anesthesia with post-operative high acuity care if their baseline risk is significantly elevated.

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References:

1. Barber PA, Demchuk AM, Zhang J, Buchan AM. Validity and reli- ability of a quantitative computed tomography score in predicting outcome of hyperacute stroke before thrombolytic therapy. ASPECTS Study Group. Alberta Stroke Programme Early CT Score. *Lancet*. 2000;355:1670–1674
2. Pexman JHW, Barber PA, Hill MD, et al. Use of the Alberta Stroke Program Early CT Score (ASPECTS) for assessing CT scans in patients with acute stroke. *Am J Neuroradiol*. 2001;22(8):1534-1542.
3. Schröder J, Thomalla G. A critical review of Alberta stroke program early CT score for evaluation of acute stroke imaging. *Front Neurol*. 2017;7(JAN):1-7. doi:10.3389/fneur.2016.00245.
4. Coutts SB, Demchuk AM, Barber PA. Interobserver Variation of ASPECTS in real time. Stroke. 2004; 35 (5); e103-5.
5. Davis MJ, Menon BK, Baghirzada LB, et al. Anesthetic management and outcome in patients during endovascular therapy for acute stroke. *Anesthesiology*. 2012;116(2):396-405. doi:10.1097/ALN.0b013e318242a5d2.
6. Li X, Hu Z, Li Q, et al. Anesthesia for endovascular treatment in anterior circulation stroke: A systematic review and meta-analysis. *Brain Behav*. 2019;9(1):1-10. doi:10.1002/brb3.1178.