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Measurement of Intracerebral Hemorrhage Volume.

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Introduction: Intracerebral hemorrhage (ICH) is a devastating form of stroke. The volume of ICH is an important biological marker that has been the focus of recent trials. The current study compared two methods of measuring ICH, and also examined some less studied correlates of ICH volume. **Methods:** Charts and images were reviewed for 475 consecutive patients with ICH from a single institution between 10/2001 and 6/2007. Of these, 193 with a secondary cause of ICH, such as tumor, were excluded, leaving 282 patients with primary ICH. The volume of ICH, excluding intraventricular blood, was measured in two ways, by a single examiner. The first method measured maximum diameter in each of the 3 dimensions, as described previously (ABC/2 method). Second, ICH was outlined by hand to determine volume. The correlations that ICH volume had with 7 variables of established value were compared across these two methods, at alpha=0.007; correlations with 2 less studied variables of potential interest, Asian ethnicity and choice of antiplatelet Rx, were also evaluated. **Results:** For the 282 patients, age averaged 64 yrs. The ABC/2 method was performed more rapidly. Using the hand-drawn method, ICH volume ranged from 0.25–246 cc, with mean (54.7±53.2 cc, mean±SD) not significantly different from that found using the ABC/2 method (55.1±59.4 cc). Overall, volumes across the two methods correlated closely (r2=0.96, p<0.0001). This correlation was consistent across ICH sites, e.g., r2=0.96 for basal ganglia ICH (n=94) vs. r2=0.95 for thalamic ICH (n=60). However, correlation between methods varied in relation to ICH volume, e.g., r2=0.86 in the top quartile (82–246 cc) of ICH volumes vs. r2=0.63 in the third quartile (35–81 cc). Correlations were examined between 7 variables of established value and ICH volume measured using each method. The 2 methods were concordant, each finding significance for 4 (ICH location, age, first serum glucose and WBC) but not 3 other (first INR, platelet count, and PTT) variables, with r2 higher for the hand-drawn method in 3 of 4 instances. The effect that Asian ethnicity (n=89) had, as vs. Caucasian (n=170), was not significant with either method. Although prior use of aspirin (n=30) did not significantly modify ICH volume by either method, prior use of clopidogrel (n=5) did, more significantly with the hand-drawn method (109±38 cc for clopidogrel users vs. 49±49 cc for no anti-platelet, p=0.007). DISCUSSION: Accurate measurement of ICH volume is critical to the evaluation of this condition. The 2 methods examined each have distinct advantages. The ABC/2 method is more rapid and has been standardized in the literature. The hand-drawn method is more precise, particularly at submaximal ICH volumes, and thus often provides stronger correlations. Clopidogrel might be associated with larger ICH volume. These results might be useful to future clinical trials of ICH therapies.