

Predictors of lesion cavitation after recent small subcortical stroke

Running title: Predictors of lacunar cavitation

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Inter-observer reliability of the T1-weighted cavity at one year follow-up

To recreate a practical scenario, two observers with different levels of experience delineated the boundaries of the recent small subcortical infarct (RSSI) on the same structural imaging modalities (i.e. T1-weighted MRI sequences) but pre-processed differently as **Table 1** shows. Observer 1, an experienced neurologist, used the software Mango (<http://ric.uthscsa.edu/mango/>) to generate the reference binary masks, while Observer 2 used the Region of Interest Tool in Analyze 12.0 (<https://analyzedirect.com/analyze-12-0/>). To evaluate the validity of the results obtained and limits of agreement, inter-observer reliability was assessed using Bland Altman plots [1].

Table 1. Image processing details of the ROIs used in the inter-observer agreement analyses

	ROIs generated by Observer 1 (stroke neurologist)	ROIs generated by Observer 2 (image analyst)
MRI sequence(s) used in the delineation of the cavity at 1-year follow-up	Original T1-weighted guided by DWI, FLAIR and T2-weighted	Original T1-weighted, guided by DWI and neuro-radiological reports
Method for delineating the ROIs	Manual boundary delineation	Semi-automatic by thresholding combined with a region-growing algorithm
Software used for delineating the ROIs	Mango	Analyze 12.0
Criteria followed for delineating the ROIs	DWI appearance, FLAIR and T1 signal and neuroradiological knowledge	DWI appearance, FLAIR/T1W signal, connected-component analyses, symmetry with the contralateral hemisphere, neuroradiological assessment notes, and T2 signal.

Results of the inter-observer agreement analyses

The volumetric difference of the cavity volume at 1 year was 2% between observers 1 and 2 albeit differences in the software, image space and methods used.

Table 2. Results of the inter-observer agreement analysis. Observer 1 measurements were considered as reference.

Parameters	Mean difference [95%CI]	% mean difference in average measure (SD)
1-year follow-up cavity volume	-2.25 [-39.85 35.35] mm ³	-2.40 (20.09) %

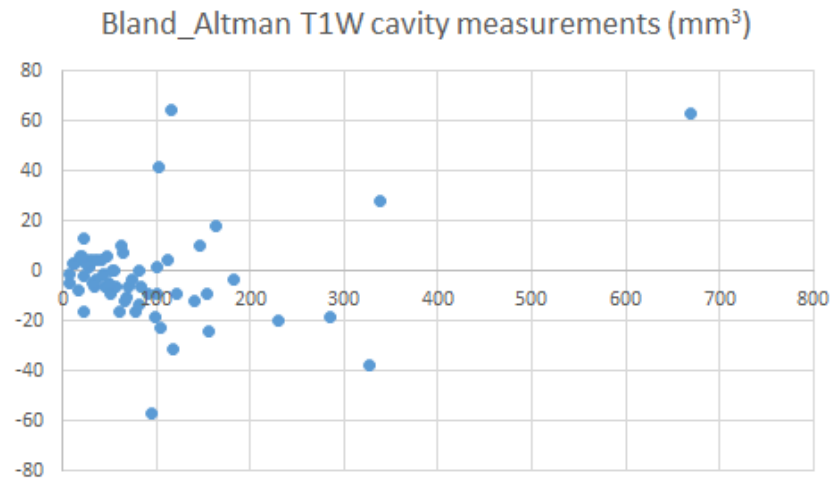


Figure 1. Bland-Altman analyses of the inter-observer volumetric differences in the delineation of the T1 cavitation at follow-up. Volumes (i.e. in both axes) are in mm³.

References

- [1] Bland JM, Altman DG. Statistical methods for assessing agreement between two methods of clinical measurement. *Lancet*. 1986 Feb 8;1(8476):307-10.