

# Inter-observer and inter-MRI sequence differences in the assessment of cortical strokes: Do they matter in research?

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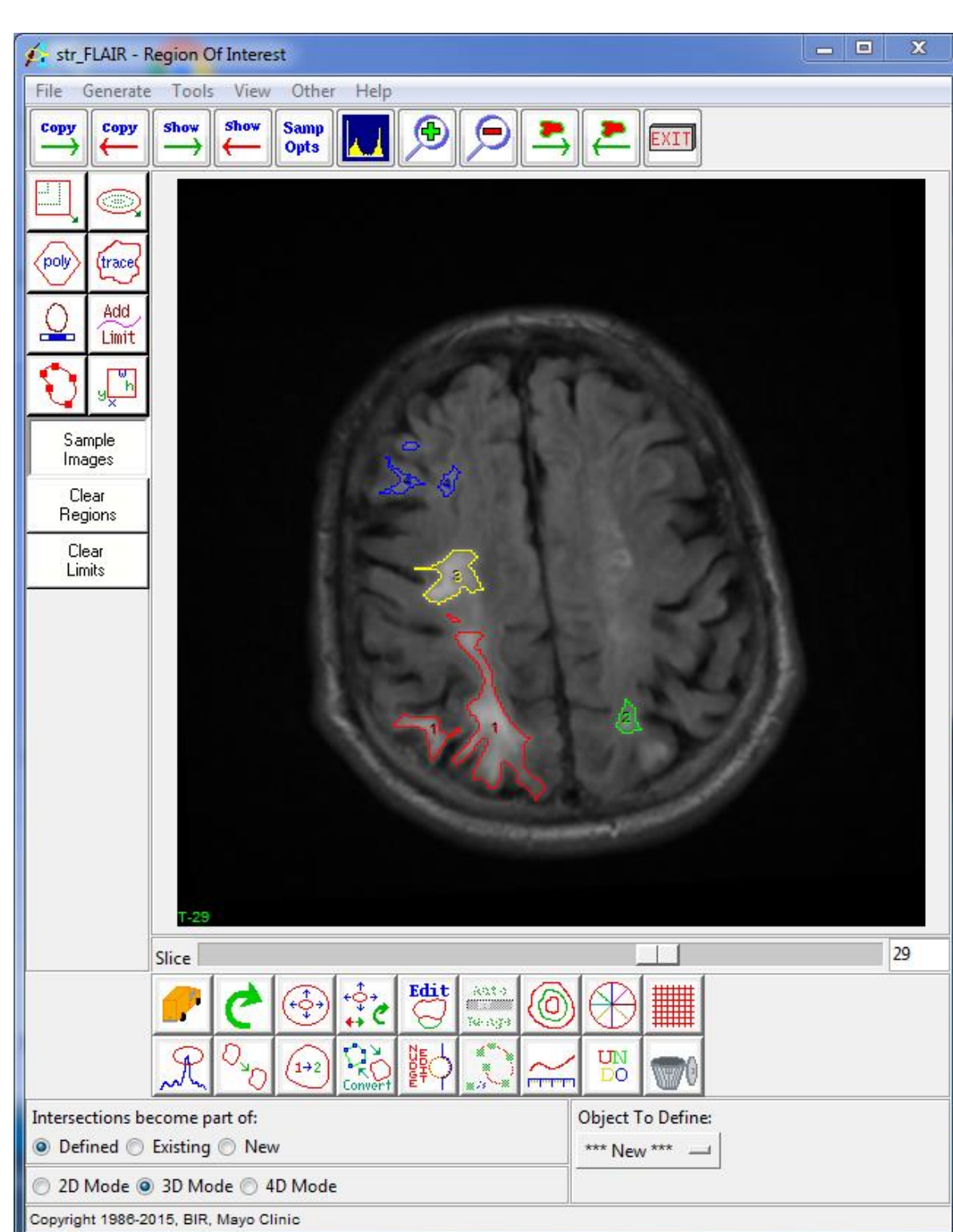
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## Background & rationale

Stroke lesions coexist and can coalesce with white matter hyperintensities to produce the same signal on magnetic resonance images (MRI).

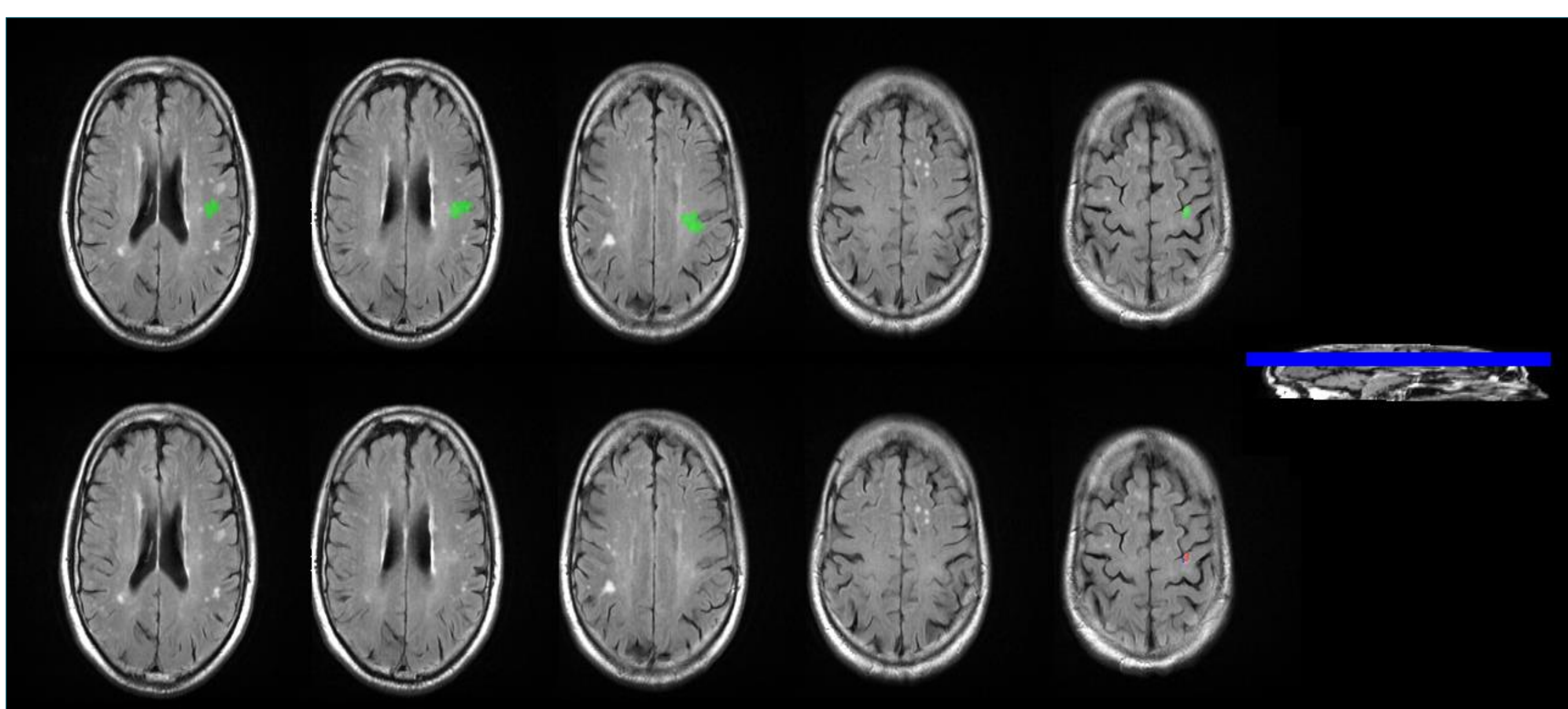
Interpretation is, therefore, subject to variation, potentially influencing clinical decisions and research outcomes. We analysed inter-observer and inter-sequence variabilities in the assessments of cortical strokes (CS) from MRI and its possible influence in their association with clinical parameters.



## Methodology

Data from 57 patients with CS were analysed. CS were delineated semi-automatically by two observers, blind to each other, in FLAIR and T1-weighted (T1W) MRI, aided-by vs. blind-to DWI.

Bland-Altman was used to analyse inter-observer and inter-modality differences, and univariate linear regression for associations with clinical variables.

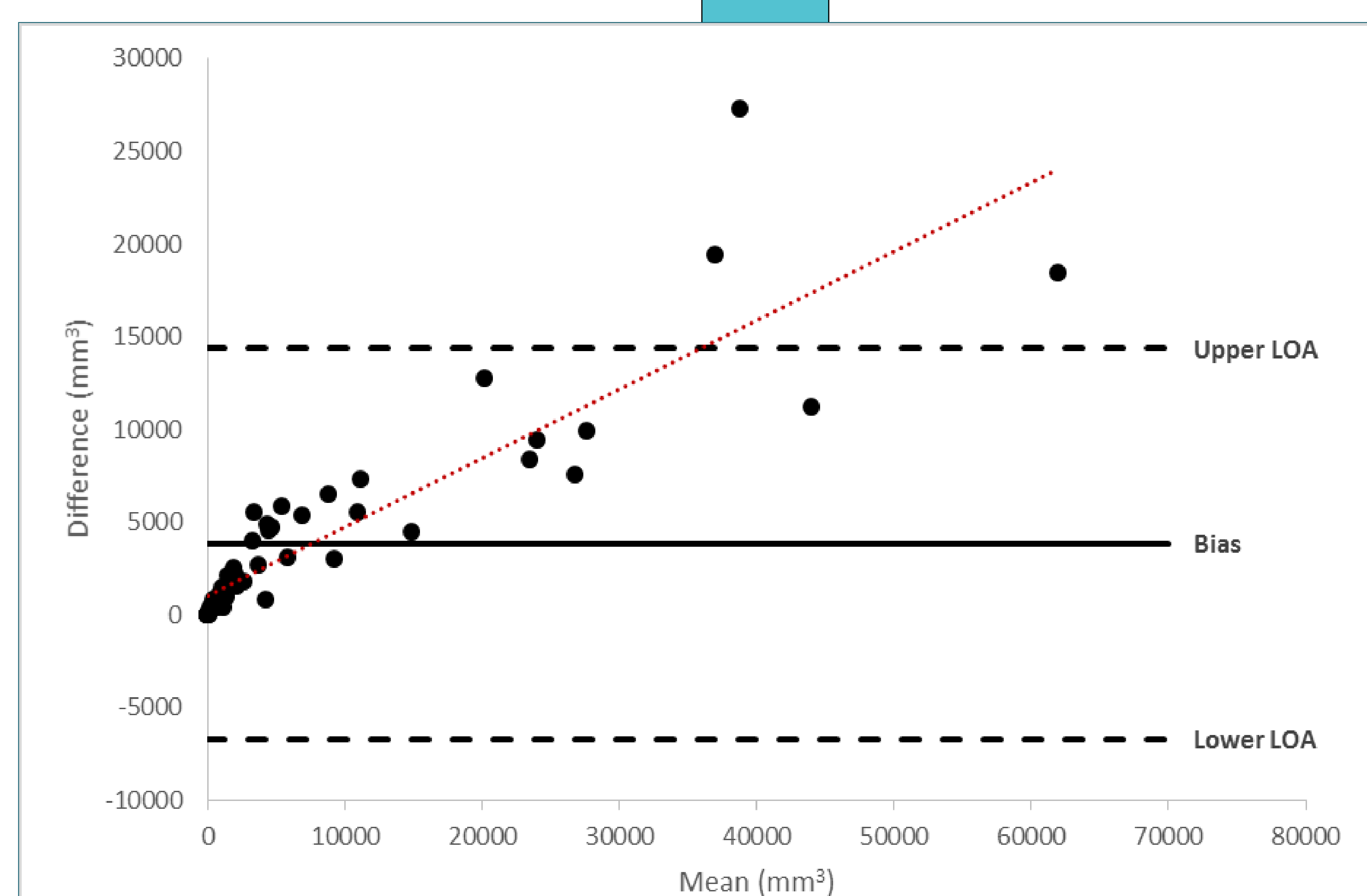


The top row shows the lesion, outlined in green, identified by DWI. The bottom row displays result from FLAIR and T1W, from which no lesion could be identified.

## Results

The use of DWI identified on average 2.6ml (95%CI [-5.4 +10.5]ml) of additional volume in index CS and 1.1ml (95%CI [-6.4 +8.6]ml) in old CS compared to when only FLAIR was used.

FLAIR identified on average 3.8ml (95%CI [-6.7 +14.4]ml) of additional volume on recent CS and 8.8ml (95%CI [-5.1 +6.9]ml) on old CS compared to T1W.



Bland-Altman plot showing the intra-observer differences using FLAIR vs. T1W images unaided by DWI

FLAIR vs.T1W discrepancies were mainly in the MCA territory. Inter-observer differences were mainly in the right PCA territory. Inter-sequence, but not inter-observer differences, increased with increasing CS volume.

None of the measurements was associated with the clinical parameters evaluated: age, basal ganglia perivascular spaces burden, blood pressure, pulse frequency, small vessel disease load, Fazekas or atrophy scores.

## Conclusions

**(1)** T1W is the least sensitive sequence in detecting CS. **(2)** Inter-observer differences for recent CS were higher without DWI. **(3)** Inter-observer and inter-sequence differences in CS volume quantification do not seem to determine their relationship with clinical parameters overall.