

Evaluation of a Quantitative Method for Florbetaben (FBB) PET Using SUVR

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Purpose & Objective

Quantitative analysis has been shown to provide value as an aid in interpreting PET brain exams. Our goal is to evaluate a quantitative analysis method for Florbetaben PET using SUVRs compared to expert visual reads.

Methods & Materials

One-hundred fourteen Florbetaben PET scans acquired 90-110 minutes after injection were selected for analysis. All scans were classified as positive or negative by expert visual read. Three expert readers assessed the images and the majority read result was taken. For the quantitative analysis, MIMneuro@ 6.3 was used to deformably register each scan to a common template space comprised of 3 Florbetaben PET templates. Atlas regions were then applied to the registered PET scan to calculate SUVRs. Analysis regions included: Orbitofrontal, Inferior Medial Frontal Gyrus, Lateral Temporal Lobes, Precuneus, Posterior Cingulate Gyrus, Anterior Cingulate Gyrus, Superior Parietal Lobule, and Occipital Lobe. The whole cerebellum was used for reference. The SUVRs for the 8 analysis regions were averaged together to generate the Overall Average SUVR. The mean + 1.65 SD from negative cases was used to derive a cutoff for Overall Average SUVR. The percentage of cases correctly classified and agreement with visual reads were calculated.

Figure 1
Fully Automated Analysis System

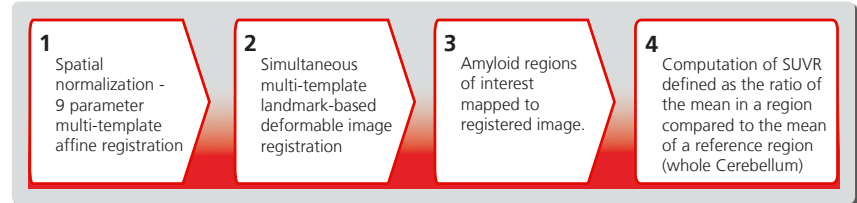
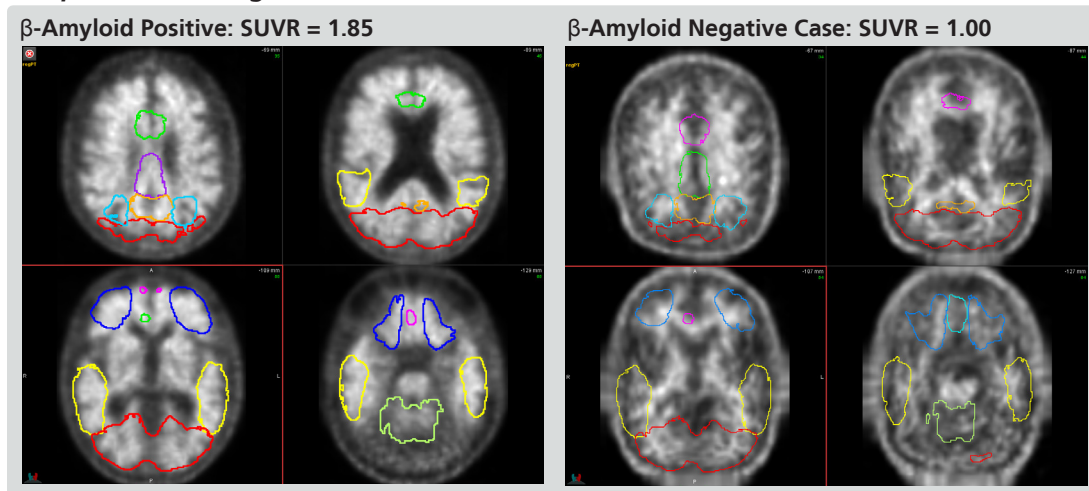


Figure 2
Sample Patient Images



Results

The Overall Average SUVR correctly classified 96.5% of the cases using the calculated cutoff of 1.25. For the cases visually read as positive, 59/62 (95%) were correctly classified and for the cases visually read as negative, 51/52 cases (98%) were correctly classified. The Kappa statistic for agreement with visual reads was 0.93.

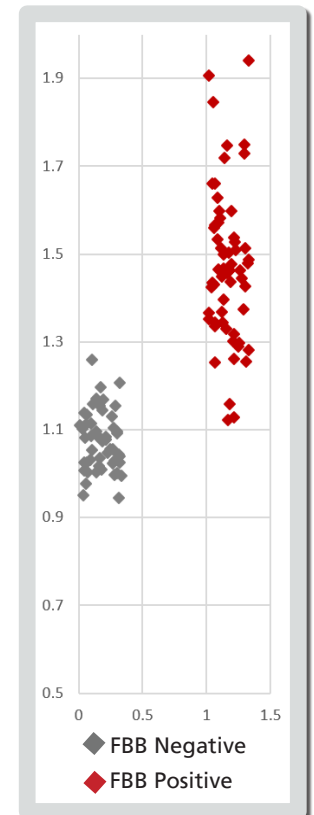
Conclusion

A quantitative analysis method using SUVR was shown to have promise as an objective method for Florbetaben PET classification with a high degree of accuracy and excellent agreement with visual reads.

Reference

1. <http://www.neuraceq.com/images/Neuraceq%20PI%20%20031814.pdf>

Figure 3
SUVR Cut-Off



SUVR cut-off derived from Mean + 1.65 SD of overall average mean ratio of negative cases. Overall average SUVR cut-off = 1.25.