QIBA fMRI Biomarker Committee (BC) Call

Wednesday, February 20, 2019 at 11 AM CT

Call Summary

In attendance			**RSNA staff**
Feroze Mohamed, PhD (Co-chair)	Cathy Elsinger, PhD	Nancy Obuchowski, PhD	Joe Koudelik
Jay Pillai, MD (Co-chair)	Ping Hou, PhD	James Voyvodic, PhD	Susan Stanfa
David Soltysik, PhD (Co-chair)	Andrew Kalnin, MD	Jerry Wang, PhD	
Shruti Agarwal, PhD	Ho-Ling (Anthony) Liu, PhD		

Review of Previous Call Summary

- The 02.06.2019 call summary was approved as presented

Discussion on Language-Mapping Research (continued)

[Some notes are from Dr. Pillai]

- Main points recapped regarding "Repeatability of language fMRI lateralization and localization metrics in brain tumor patients," recently published in Human Brain Mapping in late 2018 by Agarwal S et al. was provided by Dr. Pillai, the senior author of the paper
- The purpose was to assess the within-subject intra-scan session repeatability of language functional MRI (fMRI) activation maps in patients with brain tumors who were undergoing presurgical fMRI as part of their preoperative clinical workup at the Johns Hopkins Hospital over a period of several years
- Two different language paradigms (recommended by the American Society of Functional Neuroradiology) were studied/compared using a large subject group; only individual patients who performed two or more consecutive runs of each task in the same scan session met the inclusion criteria
- Information provided re: methodology, particularly the region of interest (ROI) selection - Broca's area (BA), Wernicke's area (WA), expressive language, receptive language and holohemispheric ROIs were used along with AAL template-based gyral parcellation for definition of each ROI
- A reasonably high correlation between lateralization index (LI) values in the 1st and 2nd runs was found for both language paradigms and across different ROIs, regardless of whether an AMPLE threshold-based approach or a statistical threshold-independent approach was used for LI computation
- A very high degree of repeatability at a single-subject level within single scan sessions of language mapping was demonstrated using both hemispheric lateralization (i.e., regional and holohemispheric LI) and center of mass computation – within scan-session repeatability (no coffee break)
- Mean variability in center of mass was low (less than 10mm) across all regions, resulting in valuable data for the Language-Mapping Profile; in particularly language-specific ROIs such as BA and WA, for both language tasks, the variability of center of mass was <5 mm
    - Discussion regarding Claims suggested based upon paper by Drs. Agarwal and Pillai
    - Repeatability as a metric would be possible as it should be no more than a 5mm difference in CMA with
    - Quantitative measures can be made from CMA (tends to be constant) but not LI (varies with ROI selection)
    - CMA but not LI data from this study to be used for the fMRI language mapping Profile 2.0 claim
    - CMA for ROI and clusters requires future discussion re how to best calculate and analyze/evaluate

- Discussion regarding LI data from this study
    - Better understanding of issues behind outliers in data needed
    - No funding available to do a full study with normal volunteers
    - Additional discussion on how to calculate LI data and how to identify and compare clusters
    - More work is needed before LI data can be incorporated into Profile 2.0
    - Hope to be able to make LI-based Claim in the fMRI Language-Mapping Profile v2.0
    - Objective performance data on which to base LI results is needed

Next calls:

- QIBA fMRI Biomarker Cmte call – **Wednesday, March 6, 2019** at 11am CT - 1st & 3rd weeks of the month
- QIBA fMRI Bias TF call – **Tuesday, February 26, 2019** at 1 PM CT - 2nd & 4th weeks of the month

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