QIBA fMRI Biomarker Committee (BC) Call

Wednesday, February 19, 2020 at 11 a.m. CT

Call Summary

In attendance			**RSNA staff**
Feroze Mohamed, PhD (Co-chair)	Ping Hou, PhD	Nancy Obuchowski, PhD	Joe Koudelik
Jay Pillai, MD (Co-chair)	Andrew Kalnin, MD	Judd Storrs, PhD	Susan Stanfa
David Soltysik, PhD (Co-chair)	Anthony Liu, PhD	Jim Voyvodic, PhD	

Review of Previous Call Summary

- The 02.05.2020 call summary was approved as presented

Profile

- Discussion re: normalization approaches and methodology continued
- It was mentioned that a list of the decisions made should be kept
- It was concluded that word generation and sentence completion tasks will be used in this Profile, as they yield very similar and meaningful results for center-of-mass and laterality indices (LI)
- Determining regions of interest (ROI) was deemed the next pressing decision
- Discussion continued re: whether to include both whole hemispheric and regional ROIs
    - Whole hemisphere previously deemed nonreproducible; inhibiting the development of a corresponding Claim
    - Past discussion indicated that fMRI BC members may be more interested in regional ROIs (e.g., Broca's area (BA) and Wernicke's area (WA) vs. global
    - The methodology of Dr. Voyvodic's ongoing language reproducibility study was discussed
    - The group contemplated the merits and practicality of using anatomical landmarks within the brain and across patients
    - Identifying anatomy and normalizing an atlas to a subject may be essential steps for language-mapping; it would be reproducible, but the specific anatomical feature would need to be fit-for-purpose
    - Sylvian and interhemispheric fissures deemed worth identifying; it was suggested that no other anatomical landmarks besides the outer surface of the brain are relevant for the group's purposes
    - Dr. Pillai's following publication was referenced: Zacà D, Nickerson JP, Deib G, Pillai JJ. **Effectiveness of four different clinical fMRI paradigms for preoperative regional determination of language lateralization in patients with brain tumors**. *Neuroradiology*. 2012 Sep;54(9):1015-25. doi: 10.1007/s00234-012-1056-2.
        - Blood oxygen level-dependent functional magnetic resonance imaging (fMRI) has demonstrated its capability to provide comparable results to gold standard intracarotid sodium amobarbital (Wada) testing for preoperative determination of language hemispheric dominance
        - Brain tumor patients who performed four different language tasks for presurgical language mapping by fMRI were included in this study
        - A statistical threshold-independent lateralization index (LI) was calculated and compared among the paradigms in four different ROIs for language activation: functional BA and WA as well as larger anatomically defined expressive (EA) and receptive (RA) areas; the central sulcus was used as a landmark
        - With the silent word generation task, activation was observed in BA, as well as several other regions; manual ROIs were drawn based on where activation was located
        - Region specific lateral indices were examined

- Using ROIs that are too large can dilute the laterality index by including bilateral activation as well as activation in non-language-specific regions
- Suggestion to choose ROIs most strongly suggested by literature to be the most closely associated with functional laterality of language, e.g., BA and WA
- Suggestion to gather literature, including comparison papers of Wada to fMRI, evaluate them and discuss limitations of past studies, including specific paradigms used and spatial extent of ROIs used
- Discussion re: a forum to gather and share literature
    - Dr. Mohamed had been compiling relevant literature on a fMRI BC team Google Shared Drive
    - Dr. Soltysik has shared a spreadsheet of language fMRI papers on the fMRI Cmte QIBA Wiki page as well
    - Dr. Liu volunteered to collect the literature re: validation of fMRI language lateralization
    - Supporting data are needed to select the best approach

Next call: Wednesday, March 4, 2020 at 11 a.m. CT (1st & 3rd weeks of each month)

RSNA Staff attempt to identify and capture all committee members participating on WebEx calls. However, **if multiple callers join simultaneously or call in without logging on to the WebEx, identification is not possible.** Call participants are welcome to contact RSNA staff at QIBA@RSNA.org if their attendance is not reflected on the call summaries.