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Reduced BOLD signal in anterior cingulate cortex and anterior insula in behavioral variant frontotemporal dementia when viewing images of hands in painful situations.

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State of the art- Pictures of needles pricking a hand (pain condition; PC) and Q-tips touching a hand (control condition; CC) is a well-established functional magnetic resonance imaging (fMRI) paradigm to investigate empathy for pain. The PC minus CC has been associated with increased blood oxygen level dependent (BOLD) signal in anterior cingulate cortex (ACC) and anterior insula (AI) in healthy volunteers (CTL). Behavioral variant frontotemporal dementia (bvFTD) displays lack of empathy as a prominent symptom, and here we examined whether this symptom related to altered BOLD signal and/or cortical thickness.
Methodology- 30 bvFTD patients (mean age 66 years, and MMSE=24) and 28 controls (CTL; mean age 66 years) were included. BOLD signal was analyzed on gradient echo-planar-images using FSL 6.0.3 and cortical thickness on T1 images using Freesurfer 6. Close relatives used the Interpersonal Reactivity Index (IRI), a measure of cognitive and emotional empathy, rating the patients.
Results- The PC minus the CC was associated with a lower BOLD signal change in percent in the left ($p<0.01$) and right ($p=0.023$) AI and midline ACC ($p=0.032$) in patients compared with controls.
Relatives rating of patient´s empathic concern (EC) was significantly correlated with BOLD signal but not cortical thickness in the right insula in patients. Self-reported rating of EC was significantly associated mean BOLD signal but not mean cortical thickness in AI, ACC and left supramarginal gyrus in CTL but not in bvFTD.
Conclusion- These findings demonstrates that regional BOLD signal may reflect reduced emotional empathy, in patients with bvFTD.

Conflicts of interest

Nothing to disclose