

Neuromarkers of Fatigue and Cognitive Complaints Following Chemotherapy for Breast Cancer: A Prospective fMRI Investigation

Mary K. Askren¹

Mi Sook Jung^{2,3}

Marc G. Berman⁴

Min Zhang²

Barbara Therrien²

Scott Peltier²

Lynn Ossher²

Daniel F. Hayes²

Patricia A. Reuter-Lorenz²

Bernadine Cimprich²

¹Integrated Brain Imaging Center, Department of Radiology, University of Washington; ²University of Michigan; ³Chungam National University; ⁴Department of Psychology, University of Chicago

Address correspondence to:

Mary K. Askren, Ph.D.
Integrated Brain Imaging Center
University of Washington
Email: askren@uw.edu
Phone: 206-221-9138
Fax: 206-543-3495

Table S2. Activation in Subregions of the Executive Network and Unrelated Networks by Group

	Chemotherapy group (n = 28)		Non-chemotherapy group (n = 37)		Control group (n = 32)	
	Pre-treatment	Post-treatment	Pre-treatment	Post-treatment	Pre-treatment	Post-treatment
	M ± SD (Range)	M ± SD (Range)	M ± SD (Range)	M ± SD (Range)	M ± SD (Range)	M ± SD (Range)
Anterior Cingulate Cluster						
Mean	5.98 ± 5.37 (-4.45 – 19.94)	6.77 ± 4.72 (-1.24 – 18.20)	4.78 ± 5.58 ^b (-8.99 – 15.21)	7.13 ± 4.90 ^b (-1.58 – 21.68)	5.49 ± 6.29 (-8.09 – 22.87)	6.96 ± 3.65 (-1.42 – 17.27)
Spatial Variance	25.57 ± 17.14 (6.60 – 92.64)	31.05 ± 24.66 (2.06 – 105.94)	22.56 ± 17.95 (2.96 – 103.07)	24.26 ± 17.96 (7.98 – 105.02)	26.85 ± 24.56 (0.50 – 129.20)	26.54 ± 17.09 (2.73 – 85.44)
Left Frontal Cluster						
Mean	4.61 ± 3.42 (-3.42 – 12.75)	4.92 ± 3.51 (-2.97 – 11.05)	3.87 ± 2.66 ^b (-1.31 – 9.74)	4.93 ± 2.90 ^b (-0.06 – 15.57)	4.12 ± 4.05 (-3.60 – 12.98)	5.12 ± 3.09 (-0.96 – 11.15)
Spatial Variance	45.75 ± 24.00 (13.50 – 136.64)	36.55 ± 24.18 (3.08 – 112.08)	35.50 ± 18.12 (8.48 – 78.26)	36.89 ± 18.72 (9.50 – 95.01)	42.19 ± 44.39 (0.70 – 264.07)	36.28 ± 17.79 (2.99 – 94.99)
Right Frontal Cluster						
Mean	3.40 ± 2.88 (-3.11 – 9.54)	3.47 ± 3.49 (-2.66 – 11.07)	3.11 ± 2.91 (-2.97 – 11.42)	3.65 ± 3.14 (-0.51 – 16.76)	2.92 ± 4.02 (-5.72 – 13.61)	3.78 ± 3.68 (-2.90 – 15.41)
Spatial Variance	22.18 ± 13.85 (2.86 – 58.45)	19.76 ± 12.09 (1.70 – 43.30)	15.95 ± 10.42 (4.09 – 45.27)	14.91 ± 8.45 (4.78 – 44.18)	18.28 ± 13.92 (0.52 – 51.06)	20.09 ± 13.67 (1.47 – 63.72)
Left Parietal Cluster						
Mean	1.88 ± 3.91 (-5.32 – 13.32)	3.37 ± 3.35 (-1.47 – 9.98)	2.34 ± 3.43 ^b (-5.61 – 9.94)	3.86 ± 3.55 ^b (-5.87 – 13.77)	3.55 ± 6.41 (-4.82 – 20.77)	4.71 ± 4.81 (-4.14 – 15.86)
Spatial Variance	21.81 ± 20.29 (3.65 – 101.20)	18.68 ± 14.19 (0.82 – 57.60)	18.68 ± 16.39 (1.15 – 82.09)	17.36 ± 14.78 (1.57 – 70.64)	22.42 ± 22.68 (0.44 – 107.25)	23.85 ± 15.50 (2.19 – 65.85)
Right Parietal Cluster						
Mean	1.26 ± 3.22 (-5.81 – 8.47)	2.60 ± 3.85 (-6.03 – 9.02)	1.48 ± 3.89 ^b (-4.89 – 10.82)	3.50 ± 3.99 ^b (-3.86 – 16.84)	3.37 ± 4.47 (-3.96 – 16.14)	4.01 ± 3.86 (-3.93 – 11.07)
Spatial Variance	11.33 ± 8.95 (0.86 – 36.53)	10.30 ± 8.71 (0.42 – 31.21)	8.39 ± 6.24 (0.89 – 26.64)	10.16 ± 7.60 (0.79 – 31.62)	12.15 ± 11.19 (0.50 – 50.70)	11.15 ± 8.78 (0.20 – 35.30)
Default Network						
Mean	-2.42 ± 3.22 ^b (-6.45 – 3.96)	-1.13 ± 3.06 ^b (-7.69 – 4.85)	-2.95 ± 2.68 ^b (-7.97 – 2.59)	-1.44 ± 3.46 ^b (-7.95 – 8.00)	-1.19 ± 3.74 (-10.11 – 8.93)	-1.40 ± 3.57 (-8.62 – 5.04)
Spatial Variance	16.65 ± 12.41 (4.61 – 49.47)	14.30 ± 10.67 (4.22 – 48.49)	15.74 ± 12.99 (4.50 – 79.11)	13.66 ± 10.31 (3.83 – 53.37)	15.60 ± 13.68 (1.02 – 69.36)	15.20 ± 9.13 (1.59 – 43.41)
Null Network						
Mean	1.45 ± 1.71 (-1.49 – 5.16)	1.66 ± 1.81 (-2.15 – 5.91)	1.25 ± 1.91 ^b (-1.97 – 6.15)	2.10 ± 2.33 ^b (-1.66 – 10.03)	1.58 ± 2.25 (-3.61 – 6.97)	1.92 ± 2.13 (-1.64 – 6.91)
Spatial Variance	35.70 ± 25.32 ^b (16.00 – 149.21)	29.28 ± 21.93 ^b (2.73 – 118.53)	26.52 ± 12.61 (12.66 – 78.54)	32.26 ± 29.02 (8.64 – 176.08)	31.43 ± 25.32 (0.72 – 132.14)	30.13 ± 12.08 (3.26 – 67.62)

^aThere were no significant differences for One-Way ANOVAs across all 3 groups. ^bp < .05 for paired t-test between pre-treatment and post-treatment assessments.