

A pilot fMRI study of the effect of negative stressful factors on the onset of female depression

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Background: Negative stressful life events (NSLEs), such as bereavement, accidental disasters are closely related to the occurrence of major depressive disorders. Our purpose was to observe the differences in brain activation under negative emotional picture stimuli in drug-naïve female patients with a first major depressive episode, comparing patients with and without NSLEs prior to the onset of depression.

Methods: 10 patients who experienced NSLEs and 13 patients who did not were scanned by a 3.0 T MRI system (Siemens Magnetom Trio Tim, Germany). SPM 8.0 software(<http://www.fil.ion.ucl.ac.uk>) was used to process the fMRI data. This experiment adopted a block pattern design: +N-C-N-C-N-C-N-C (+ indicates rest, N indicates a neutral picture, and C indicates a negative picture). An echo planar imaging (EPI) sequence was adopted:TR/TE =3000 ms/30 ms, slice thickness=3 mm, interval=1 cm, flip angle=90°, FOV=200 × 200 mm, matrix=64 × 64, voxel size=3.1 × 3.1 × 3.0 mm, slices number=36, and gap=0.75 mm.

Results: The quantity of NSLEs was differences between depressed patients with and without NSLEs(Table 1).Upon stimulation with negative emotional pictures, depressed patients with NSLEs showed significantly abnormal activation of the left frontal lobe, right precuneus, right angular, bilateral occipital lobe compared with depressed patients without NSLEs (Figure1).

Discussion: Several studies have reported that the frontal lobe, the occipital lobe, the precuneus play a key role in processing emotional information^[1-2]. These results were consistent with the negative cognitive theory of depression^[3], which proposes that negative stimulation is an important factor in the onset and maintenance of depression^[4]. However, These studies did not compare the differences between patients with endogenous and reactive depression. Therefore, our results complete this knowledge gap to a certain extent.

Conclusion: Our study found that drug-naïve female patients with their first major depressive episode who had experienced NSLEs prior to the onset of depression had abnormal activation of several brain regions involved in emotional perception, memory, evaluation, and regulation. The results of our study indicate that NSLEs play a key role in the onset and maintenance of depression.

Reference:

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Table 1. Socio-demographic and clinical characteristics of the participants

	NSLEs (n=10)	No NSLEs (n=13)	t	P
Age (years)	42.64 (10.99)	47.46 (12.61)	1.18	0.290
Duration of illness (months)	3.78(3.19)	5.73 (3.94)	1.58	0.125
Education (years)	7.56 (5.41)	5.73(3.94)	0.69	0.495
HAMD-24	49.56 (8.45)	48.07 (9.96)	0.47	0.645
LES-Negative stimulus level	29.68 (8.59)	11.87(2.33)	11.50	0.000

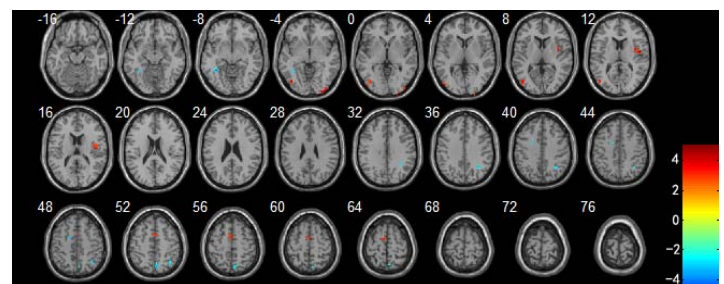


Figure1 Brain regions with abnormal activation in the patients with NSLEs compared to the patients without NSLEs stimulated by negative emotional pictures. $P<0.05$ & cluster size ≥ 18 (AlphaSim correction)