Imaging abnormal skin sensations: a novel functional MRI study

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Abstract

Background A subgroup of patients present to dermatological services with unexplained skin sensations, usually ascribing them to infestation; however, no medical cause can be found. This condition is referred to as delusional infestation, a rare and difficult to treat disorder with considerable impact on psychosocial functioning. The neurobiological mechanisms underlying this condition are unclear. We undertook the first functional MRI (fMRI) study in this group of patients.

Methods Five patients presenting with medically unexplained skin sensations were recruited from the specialist psychodermatology service at The Royal London Hospital, UK (mean age 52·8 years, four women, one man). Five healthy controls were matched for age and gender. Whole brain fMRI data were acquired with a 1·5 T scanner. In an event-related design, participants were randomly shown six classes of images: insects on skin, insects on leaf, other objects on skin, other objects on leaf, neutral images, and disgusting and fearful images. Functional images were analysed with statistical parametric mapping, version 8. A full factorial model was used to analyse the results with two factors—group and stimulus type.

Findings Results are reported at the significance threshold p<0·001 (whole brain analysis xyz co-ordinates, z score, k voxel number). Across the two groups the main effect of insect versus non-insect images was to activate occipital lobe (−52, −70, 6, z 4·04, k 92). In this contrast, patients showed greater activity in the right parahippocampus than did controls (22, −32, −4, z 3·35, k 2). The main effect of presentation of skin rather than leaf was to activate inferior parietal lobule (44, −40, 30, z 4·07, k 21), with patients showing increased activity in this area. Across all conditions patients showed greater activity in the right parahippocampus (26, −4, −32, z 3·77, k 21). Patients showed greater activity in bilateral temporal lobes when viewing disgusting or fearful images than when viewing neutral images.

Interpretation We have shown for the first time that brain activity differs between patients with abnormal skin sensations and controls when viewing pictures. This activity is in regions of brain supporting emotional awareness.

Funding UK Medical Research Council.