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Prefrontal cortical dysfunction in schizophrenia: an fMRI study

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Background

Prefrontal cortical dysfunction has been implicated in the pathophysiology of schizophrenia [1], although functional neuroimaging studies have reported mixed findings. A major concern is that alterations in the prefrontal activation in patients may be related to differences in task demand and performance [2]. This study manipulated task demand during an established frontal task to examine these issues.

Materials and methods

A paced overt verbal fluency task, requiring word generation in response to "easy" or "difficult" auditory letter cues, was used in twelve patients with schizophrenia, and 9 age- and education-matched healthy volunteers. Functional magnetic resonance imaging (fMRI) data were acquired using a clustered acquisition technique to enable monitoring of behavioural responses. Data was analysed using in-house software, XBAM [3].

Results

The patients with schizophrenia demonstrated activation of the left prefrontal cortex, but attenuated activation in the right inferior and middle frontal gyri, anterior cingulate gyrus and cerebellum compared to the healthy controls. As task demand increased, healthy subjects showed increased activation of the anterior cingulate cortex, while the patients demonstrated decreased activation.

Discussion

Patients with schizophrenia demonstrate attenuated activation of the right prefrontal cortex during more demanding verbal fluency task, indicative of demand-related hypofrontality, while additional task-related decreases in anterior cingulate activity may be an early indicator of incipient performance decrement.

References

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