FUNCTIONAL IMAGING OF PSYCHGENIC AND FEIGNED WEAKNESS

1Department of Medical and Surgical Sciences and 2Department of Psychology, University of Otago, 3FMRIotago, 4Dunedin Hospital, Dunedin, and the 5Van der Veer Institute, Christchurch, New Zealand

Introduction

Conversion syndrome manifests as neurological symptoms unexplained by organic neurological disease and thought to have a psychogenic basis. In malingerers, symptoms are deliberately feigned. Our primary aim was to use functional MRI (fMRI) to compare neural activation during a tapping task in patients with unilateral conversion weakness with control subjects feigning weakness. Psychological factors are crucial in the pathogenesis of conversion syndrome, but the neural mechanisms by which they are converted into physical symptoms are poorly understood.

Methods

Subjects

We studied 5 patients fulfilling DSM IV criteria for conversion disorder and 10 control subjects with no history of neurological disease.

<table>
<thead>
<tr>
<th>Age (years ± sd)</th>
<th>Sex (M-F)</th>
<th>Side affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>41 ± 14</td>
<td>4:1</td>
</tr>
<tr>
<td></td>
<td>3 left, 2 right</td>
<td></td>
</tr>
<tr>
<td>Controls</td>
<td>38 ± 14</td>
<td>6:4</td>
</tr>
</tbody>
</table>

Table 1. Controls: Feign vs Tap

<table>
<thead>
<tr>
<th>BA</th>
<th>MNI coordinates</th>
<th>Voxels</th>
<th>Z</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient 1</td>
<td>-12 24 0</td>
<td>56</td>
<td>4.08</td>
<td>p &lt; 0.001</td>
</tr>
<tr>
<td>Patient 2</td>
<td>-18 26 0</td>
<td>35</td>
<td>3.08</td>
<td>p &lt; 0.05</td>
</tr>
<tr>
<td>Patient 3</td>
<td>-21 25 1</td>
<td>30</td>
<td>3.00</td>
<td>p &lt; 0.05</td>
</tr>
<tr>
<td>Patient 4</td>
<td>-6 27 0</td>
<td>46</td>
<td>3.00</td>
<td>p &lt; 0.05</td>
</tr>
</tbody>
</table>

Table 2. Patients Tapping vs Controls Tapping

Discussion

• Although our sample was small it was larger than other neuroimaging studies of movement execution in conversion disorder1-4
• Psychogenic and feigned weakness were both associated with decreased activation of the sensorimotor cortex and cerebellum. This is consistent with all but one previous study5.
• Both psychogenic and feigned weakness were associated with activation of dorsolateral prefrontal cortices. Together with areas such as the pre-supplementary motor area, anterior cingulate cortex (ACC), inferior parietal lobule (IPL), insula, and temporoparietal junction, these may represent an inhibitory system activated also in go/no-go tasks5,6.
• Activation of this system may be associated with movement inhibition in general and may not be specific for conversion syndrome.
• Activation of the left cingulate gyrus appeared to be more strongly associated with psychogenic weakness, while right inferior frontal gyrus was more strongly activated in psychogenic weakness.

Results

Behavioural

• Control subjects produced the required number of taps.
• Patients missed occasional taps, especially on the affected side.

Controls

• Tapping in controls was associated with activation of motor areas including the pre-and post-central gyri, supplementary motor cortices and cerebellum (Figure 1a).
• With feigned weakness, there was reduced activation of sensorimotor cortices and cerebellum and enhanced activation of the prefrontal cortices and inferior parietal lobule (Figures 1b and 1c, Table 1).

Patients

• Tapping in patients produced less activation of motor areas and activation patterns were quite variable (Figures 1d, 2).
• Compared to controls feigning weakness, patients showed less activation of left inferior parietal lobule, left cingulate gyrus, right insula, left precentral gyrus and right medial frontal gyrus. Patient tapping was associated with more activation of the right inferior frontal gyrus (Figure 1f, Table 3).

Patients compared to controls

• The postcentral gyr and right insula were activated more in controls and the right middle frontal gyrus (figure 1f, Table 3).
• With feigned weakness, there was reduced activation of sensorimotor cortices and post-central gyri, supplementary motor cortices and cerebellum (Figure 1a).

Tapping in controls was associated with activation of motor areas including the pre-and post-central gyri, supplementary motor cortices and cerebellum. Patient tapping was associated with more activation of the right inferior frontal gyrus (figure 1f, Table 3).

References