

FOCUS ON RESEARCH

FUNCTIONAL NEUROSURGERY FOR INTRACTABLE MENTAL DISORDER: LONG TERM EFFECTS ON MENTAL HEALTH, NEUROPSYCHOLOGICAL PERFORMANCE, SOCIAL FUNCTION AND QUALITY OF LIFE

Researchers

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Aim

To evaluate the long-term effects of Neurosurgery for Mental Disorder (NMD) on: 1) Mental health and quality of life and 2) Cognitive functions such as learning and memory, and personality.

Project Outline/Methodology

Anterior Capsulotomy (ACAPS) and Anterior Cingulotomy (ACING) are neurosurgical operations which accurately place lesions in parts of the brain believed to be dysfunctional in depression and Obsessive-Compulsive Disorder (OCD). We assessed 28 out of 31 individuals who underwent NMD in Dundee since 1992. We used a detailed battery of clinical assessments (including rating scales for depression - the Montgomery-Åsberg Depression Rating Scale, MADRS); clinical and computerised neuropsychological testing; and Magnetic Resonance (MR) imaging. 'Response' was defined as a 50% reduction in symptoms and 'remission' was an absence of symptoms (MADRS \leq 10).

Key Results

- The primary indication for surgery was unipolar depression in 73.3%, bipolar depression in 10%, and OCD in 16.7%. Procedures for depression were: Capsulotomy (20); Cingulotomy (5). 7 individuals had had a subsequent Cingulotomy.
- At long-term follow-up (average = 6.5 years), when both procedures were combined 48% of patients met criteria for 'response' and 40% met criteria for 'remission'. Average reduction in MADRS score was 42%. 43% met response criteria after a second procedure.
- Validated measures of quality of life all improved following neurosurgery. No detrimental effect on personality could be identified and there was a non-significant reduction in neuroticism.
- General intelligence, memory, and executive function were not significantly impaired at long-term follow-up. There was a trend towards improvement in a number of areas.

- MR imaging analysis revealed a relationship between Cingulotomy lesion size and shape, and outcome.
- The burden of adverse effects was low, with most (e.g. headache, confusion) being predictable and of short duration. One patient experienced seizures in the post-op period. One patient experienced a severe intra-operative haemorrhage. There were no deaths and no suicides associated with the neurosurgery.

Conclusions

Both Anterior Capsulotomy and Anterior Cingulotomy appear to be relatively safe procedures which can result in clinically significant improvement in symptoms in over 40% of patients with depression or OCD. A relationship appears to exist between lesion location and outcome for ACING.

What does this study add to the field?

This is the only study of the outcomes of Anterior Capsulotomy for depression since 1961. It is also one of the largest prospective studies conducted of clinical and neuropsychological outcome.

Implications for Practice or Policy

The techniques employed to analyse the MR imaging data overcome many of the problems in existing research. The relationship between lesion characteristics and outcome after ACING may have major implications for future surgery.

Where to next?

Larger, and possibly double-blind, randomised trials of lesion placement should be considered. The advances made in neuroimaging will allow us to explore the functional effects of anterior cingulotomy in major depression. Collaboration between different NMD centres will afford a greater sample size with which to assess the relationship between capsulotomy lesions and outcome.

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