

Deep brain stimulation for Parkinson's disease

1 Guidance

- 1.1 Current evidence on the safety and efficacy of deep brain stimulation for Parkinson's disease appears adequate to support the use of the procedure, provided that normal arrangements are in place for consent, audit and clinical governance.
- 1.2 The clinical and cost effectiveness of deep brain stimulation for Parkinson's disease is being evaluated by the PD Surg trial, which is expected to complete randomisation in 2005/6. The results of this trial are likely to provide evidence on the most appropriate use of the procedure and clinicians are encouraged to consider randomising patients in the trial (www.pdsurg.bham.ac.uk).
- 1.3 It is recommended that patient selection should be made with the involvement of a multidisciplinary team, and that patients should be offered the procedure only when their disease has become refractory to best medical treatment.

2 The procedure

2.1 Indications

- 2.1.1 Parkinson's disease is a chronic disease of the brain characterised by gradually worsening tremor, muscle rigidity and difficulties with starting and stopping movements. The condition is usually treated with drugs. Surgery may be considered in people who have responded poorly to drugs, who have severe

side effects from medication or who have severe fluctuations in response to drugs (on-off syndrome).

- 2.1.2 Parkinson's disease is common, affecting about 0.5% of people aged 65 to 74 years and 1–2% of people aged 75 years and older. Experts believe that 1–10% of people with Parkinson's disease might be suitable for brain surgery.
- 2.1.3 Surgery for Parkinson's disease is carried out on structures within the brain that are responsible for the modification of movements, such as the thalamus, the globus pallidus and the subthalamic nucleus. Each of these structures consists of two parts: one on the left hand side of the brain and one on the right. Surgery may be carried out on one or both sides.
- 2.1.4 Surgical treatment aims to correct the imbalance created by diminished function of the substantia nigra, the underlying abnormality in Parkinson's disease. Surgery alters, through either destruction or electrical stimulation, the function of brain nuclei – such as the thalamus, globus pallidus or subthalamus – that interact functionally with the substantia nigra. Deep brain stimulation is one form of surgery for Parkinson's disease.

2.2 Outline of the procedure

- 2.2.1 This procedure involves inserting very fine needles into the brain through small holes made in the skull to determine the exact position of the nucleus to be stimulated, which may be different in each patient. This part of the procedure is usually carried out under local anaesthetic. Once the nucleus is identified, a

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This guidance is written in the following context:

This guidance represents the view of the Institute which was arrived at after careful consideration of the available evidence. Health professionals are expected to take it fully into account when exercising their clinical judgement. This guidance does not, however, override the individual responsibility of health professionals to make appropriate decisions in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

permanent electrode is placed into it. Under general anaesthetic, this electrode is then connected to a pulse generator, which is implanted subcutaneously on the anterior chest wall.

2.3 Efficacy

- 2.3.1 The evidence suggested that deep brain stimulation results in improved motor skills, function and movement in patients with Parkinson's disease. For more details refer to the sources of evidence below.
- 2.3.2 The Specialist Advisors considered the procedure to be established practice within specialised units. They did not question short-term efficacy, but commented that long-term efficacy was unknown. One Specialist Advisor commented that careful selection of patients was crucial to maximise the chances of success of the procedure.

2.4 Safety

- 2.4.1 The complications associated with deep brain stimulation include risk of stroke, confusion, speech disorders and visual problems. In the two largest studies, involving 102 and 111 patients, the incidence of stroke was approximately 3%. For more details refer to the sources of evidence below.
- 2.4.2 The Specialist Advisors noted that all procedures involving deep brain stimulation carried similar risks. They considered the procedure to be safe if performed by a multidisciplinary team in a neuroscience unit. The team should include a neurologist and a neurosurgeon, and the unit should have facilities for psychological assessment and, ideally, neurophysiology.

2.5 Other comments

- 2.5.1 The Interventional Procedures Advisory Committee noted that current evidence relates to relatively young patients.

Andrew Dillon
Chief Executive
November 2003

Information for the Public

NICE has produced information describing its guidance on this procedure for patients, carers and those with a wider interest in healthcare. It explains the nature of the procedure and the decision made, and has been written with patient consent in mind. This information is available from www.nice.org.uk/IPG019publicinfoenglish and in English and Welsh from www.nice.org.uk/IPG019publicinfowelsh.

Sources of evidence

The evidence considered by the Interventional Procedures Advisory Committee is described in the following document.

Interventional procedure overview of deep brain stimulation in Parkinson's disease, April 2003.

Available from: www.nice.org.uk/ip089overview

Ordering information

Copies of this guidance can be obtained from the NHS Response Line by telephoning 0870 1555 455 and quoting reference: N0348. *Information for the Public* can be obtained by quoting reference number N0349 for the English version and N0350 for a version in English and Welsh.

The distribution list for this guidance is available on the NICE website at URL www.nice.org.uk/IPG019distributionlist

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National Institute for Clinical Excellence

MidCity Place, 71 High Holborn, London WC1V 6NA, website: www.nice.org.uk

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