DEEP BRAIN STIMULATION AND ETHICAL ISSUES

Deep Brain Stimulation (DBS) is a neurosurgical procedure during which electrodes are implanted through burr holes in the skull into the deep structures of the brain and connected by extension leads leading to a neurostimulator which is usually placed in the subcutaneous tissue beneath the clavicle or in the abdomen. The battery generates regular impulses transmitted to the brain nuclei through the implanted electrodes, having a modulatory effect on their function in the treatment of movement disorders. The exact mechanisms of how DBD works are not known.

The disorders shown to benefit from DBS include Parkinson's Disease, Essential Tremor, and Dystonia. The brain nuclei usually implanted are the Subthalamic Nucleus (STN) or the Ventral Intermediate Nucleus of the Thalamus (Vim), or the Globus Pallidus internus (GPi). Trials are still ongoing for Gilles de la Tourette Syndrome and some psychiatric conditions such as major depression and obsessive compulsive disorder.

Side effects of the procedure include those related to the procedure and hard ware such as haemorrhage, infection and seizures as well as lead breakage or migration, and those related to stimulation such as speech disturbances with dysarthria and dysphonia. Mood changes can also occur with mania or depression and apathy.

The ethical considerations related to DBS include:

- **Weighing the benefits versus risks of the procedure:**
  This is done with every medical or surgical intervention. The benefits of DBS is the marked improvement on motor function of patients with the above mentioned movement disorders. Risks include the side-effects mentioned above. Careful selection of patients is therefore necessary in order to flag any reason for lack of benefit to be expected from the procedure such as poor response to levodopa and axial involvement in Parkinson's Disease, or any increased risk for the side effects such as bleeding tendencies or prior psychosis unrelated to medication.

- **Patient consent:**
  Informed consent must be obtained from the patient with thorough discussion of the benefits to be expected and the risks faced. Implications on life-style, identity of self, and relationships are also important to consider. Progressive dementia which would preclude the patient from giving fully informed consent is generally taken as a contra-indication to the procedure.

- **Use in children:**
  Children are incompetent to decide for themselves and are therefore more vulnerable to abuse. Extra careful consideration of the risk-benefit ratio is to be given to this procedure in this age group.

Bibliography:

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