

Recent Developments in Neurosurgery for Dystonia – Dr. J.D. Speelman

Three important recent developments in neurosurgery can be observed: 1) the introduction of the globus pallidus as the surgical target structure; 2) the imaging technique of this target structure; and 3) the introduction of continuous deep brain stimulation.

1. The surgical target.

Originally the thalamus was the preferred surgical target for dystonia and lesions were induced either by heating or freezing. This was called thalamotomy. From about 1995 on the globus pallidus was considered the primary target, after it appeared that lesions in the globus pallidus (pallidotomy) were able to improve drug-induced dystonia in Parkinson's disease. Moreover, bilateral pallidotomy was accompanied by much less seriousness adverse events compared to bilateral thalamotomy.

2. The imaging technique

Originally, ventriculography was applied to determine the position of the surgical target structure. It was not possible to visualize the structure, but with the help of the stereotactic atlas and by applying test stimulation during surgery, it was possible to determine the position of the chosen target structure. After the introduction of the brain CT-scan and MRI-scan it was possible to see the surgical structure and it became a visible target. This improved the accuracy of the surgery and the safety for the patient.

3. Deep brain stimulation.

In 1987 Prof. ?? Benabid, neurosurgeon in Grenoble, reintroduced deep brain stimulation for Parkinson's disease. Due to technical advances it appeared possible to apply this in functional neurosurgical centres worldwide. In 2000 Prof.? Coubes, neurosurgeon in Montpellier, published very favourable results of bilateral deep brain stimulation in the globus pallidus for seven patients with very severe primary generalized dystonia. Prof.?? Schuurman, neurosurgeon in Amsterdam, demonstrated that deep brain stimulation in the thalamus was as effective as thalamotomy, but in addition that bilateral deep brain stimulation was a safe procedure.

Although evidence based studies are yet not available, bilateral deep brain stimulation in the globus pallidus (bilateral pallidal stimulation) has been applied in very disabled patients with primary generalized or primary focal cervical dystonia who were unresponsive to other medical treatments including botulinum toxin. In general, it appeared that primary generalized dystonia had a better response to this surgery than secondary dystonia. However, further studies are necessary to establish factors predicting and determining favourable outcome of pallidal stimulation, such as clinical symptomatology, precise location in the globus pallidus, and stimulation parameters.

Dr. J.D. Speelman is a clinical neurologist at the Academic Medical Centre, University of Amsterdam and Member of the EDF Medical Advisory Board