

Surgical technique of lesions through DBS Medtronic electrode and results in 14 patients

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**Objective:** Medtronic deep brain stimulating electrodes are usually used for deep brain stimulation (DBS), but these electrodes could also in some cases be used for creating therapeutic lesions in the brain. To evaluate using DBS electrodes to create lesions in the brain, we performed clinical studies in 14 patients. Safety of this procedure was tested in white eggs and cadavers in a previous study. The follow-up ranged to 6 mois to 6 years (mean 15±3 mois).

**Methods:** 14 patients (mean age : 68±1 years old), 11 men and 3 women were implanted with a DBS electrode using a stéréotatic procedure. We performed 9 thalamotomies, 3 subthalamotomies (one is bilateral subthalamotomy) and 2 pallidotomy. Five patients were parkinson's patients and eight patients had essential tremor and one had a posttraumatic tremor.

A ventriculography was performed in each patients and MRI using a referenciel system (ISS Lyon). Targets were chose as VIM nucleus for thamatomies, as Laitinen's target for pallidotomy and as Talairach's target for subthalamotomies. Surgery was performed under local anesthesia and clinical benefits or side effects were tested peroperatively. When clinical results were good a DBS Medtronic electrode (3387 or 3389) was implanted. The RF generator (Radionics<sup>®</sup>, Division of Tyco Healthcare Group LP, Massachusetts, USA) was connected to the adjacent contact of the lead with alligator clips and lesions were performed with clinical control.

**Results:** Only bipolar lesions must be performed with a radiofrequency generator which must have frequency about 250 Khz, not less. Clinical results were immediatly good. All tremor was abolished in patients with tremor without permanent side-effects. We observed 2 transient confusions. There was no hemiparesis. The lead was living in place in these patients with only one cutaneous erosion. Resurgence of tremor was observed in 3 patients at 6 month and at 3 years. A simple surgical procedure (open the skin and connecting the lead to the RF generator and remake a lesion) was successful perform. For subthalamotomies results were good with a post-op UPDRS less than 70% of its preoperative value with this sustancial benefit maintained 1 year. The lead was not living in place because indications for subthalamotomies were hardware infections.

**Conclusion:** This study demonstrates that DBS electrodes can be used for lesioning the brain. A staged lesion through an implanted electrode could be considered as a variant technique capable of reducing the morbidity of thalamotomy, pallidotomy or subthalamotomy when a unilateral surgical treatment is indicated. In such cases it thus offers an alternative to neurostimulation with the advantage of a much lower cost and when infection occur in patients.