



CASE STUDY OF IMPROVED DAT SCAN IMAGING AFTER DEEP BRAIN STIMULATION IN PARKINSON'S DISEASE.

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ABSTRACT Parkinson's disease (PD) is a progressive neurodegenerative movement disorder which is primarily characterized by bradykinesia, muscular rigidity and tremor.¹⁾ Deep Brain Stimulation (DBS) is a surgical treatment used for alternative drug therapy such as Levodopa. We report a case study of improved DAT-scan imaging after DBS in PD.

KEYWORDS :

Dopamine is chemical neurotransmitter which is critically responsible for transmitting signals between the substantial nigra and striatum consists of caudate nucleus and putamen. Loss of dopamine in this circuit results in abnormal nerve-firing patterns within the brain that causes PD.²⁾

There is no cure for PD, but medications, surgery and multidisciplinary management can provide relief from the symptoms. Levodopa, which is converted into dopamine in the dopaminergic neurons, has been most widely used.³⁾ Since motor symptoms are produced by a lack of dopamine in the substantia nigra, the administration of Levodopa temporarily diminishes the motor symptoms. However, Levodopa has been related to dopamine dysregulation syndrome.⁴⁾ Deep brain stimulation (DBS) offers important symptomatic relief in patients with moderate disability from PD who still retain some benefit from antiparkinsonian medications and who are cognitively intact.^{5,6)}

The efficacy of DaTSCAN in detecting the loss of functional dopaminergic neuron terminals in patients with parkinsonian syndromes has been demonstrated.⁷⁾

However, effectiveness of DaTSCAN for response to DBS has not been well established.⁸⁾ We demonstrated a case study of improved dopamine activity with DaTSCAN after DBS surgery.⁹⁾

The patient with PD is 74 year old female. About thirteen years ago, akinesia or dyskinesia occurred and she was diagnosed PD, and medicated at one hospital. In L-dopa test, 45 points at "off" state and 23 points at "on" state in Unified Parkinson's disease Rating Scale-3 (UPDRS-3)¹⁰⁾ was observed. She was estimated to be indication for DBS, and was expected to have a surgery for DBS. In Mar. 2014, there was a strong akinesia with rigidity at preoperative examination. She had a prolonged midnight "off" symptom. In DAT-scan, the accumulation was hardly detected at caudate nucleus and putamen (Fig.1). Then Subthalamic nucleus (STN) DBS was carried out by neurosurgeon in our hospital (Fig.2). Seven days after DBS operation, right side high stimulation (130Hz) with interleaving was started. A small amount of L-dopa was also medicated. The condition of stimulation was monitored every month. One year later, she was improved on dyskinesia. However, three month after DBS, dysarthria has occurred, and rehabilitation had started.

In DAT-scan at one year after DBS, the increased accumulation of right putamen and slightly increased left putamen were found (Fig.3).

The mechanism of improved accumulation of DAT scan is thought to be a increase of activity of dopamine secreting cell. Observation of DAT scan in the patient with Parkinson disease on pre- and post-DBS is very interesting for the research of the mechanism of this disease.

(Fig.1)

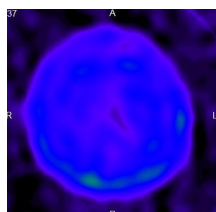


Fig3)

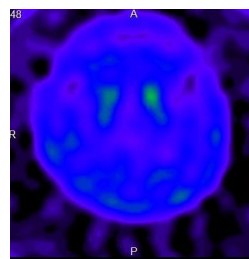
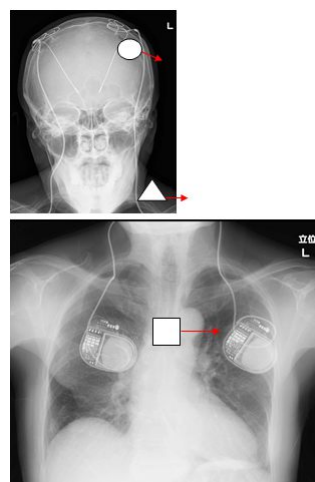


Fig.2)



- : Tip of electrode
- △ : Insulated wire
- : Neurostimulator (Battery pack)

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