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CASE REPORT

A Case with Deep Brain Stimulation and Cardiac Pacemaker

ABSTRACT

In recent years, deep brain stimulation (DBS) has emerged as a frequently preferred method for the treatment of late-stage Parkinson's disease (PD). Both Parkinson's disease (PD) and cardiac disease rise with age. DBS and a cardiac pacemaker may be employed in the same patient. The objective of this case is to present both DBS and cardiac pacemaker in conjunction with the existing literature on the subject.

Keywords: deep brain stimulation, cardiac pacemaker, Parkinson's disease

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Introduction

Deep Brain Stimulation (DBS) represents a safe and effective treatment option for patients diagnosed with Parkinson's Disease (PD) who have reached the late stages of the disease and have not achieved adequate symptom control or a satisfactory quality of life through medical therapy. Additionally, DBS may be considered when dopaminergic drugs have resulted in severe adverse effects, such as dyskinesia. The procedure entails the transmission of high-frequency electrical current by an implantable neuropacemaker through electrodes that are permanently placed at specific points in the motor circuits of the basal ganglia (1). The implanted pulse generator is typically situated in the left or right subclavicular region according to the preferences of the surgeon and the condition of the patient.

Cardiac pacemakers have constituted the primary treatment for bradycardia resulting from sinus node dysfunction or atrioventricular block. The objective is to identify the optimal ventricular pacing site that emulates normal human ventricular physiology and conduction in the most effective manner (2). Since the need for a cardiac pacemaker may rise in PD, it is generally not known whether these two pacemakers can be used in the same patient. The objective of this article is to present a case in which two pacemakers were used in conjunction, with a review of the relevant literature.

Case

A 78-year-old male patient was admitted to the outpatient clinic with a complaint of slowed movements. The patient had previously undergone implantation of a cardiac pacemaker in 2019. Mother and father of the patient were not in relative to each other and the father had a diagnosis of PD. It was learned that his complaints had started 15 years ago with tremor in his left arm. A diagnosis of PD was made and dopaminergic treatments were initiated. Although the patient initially responded well to the treatment, the effective period of the drugs was relatively short and the patient freezing. Consequently, the patient underwent lesion surgery and then DBS to the subthalamic nucleus at another clinic in 2015. The patient did not provide any information regarding the cardiac pacemaker in his history.

When the magnet of the DBS device was put on the patient his cardiac pacemaker has been recognized. The patient's general condition remained stable with a regular and

rhythmic pulse. An electrocardiogram (ECG) was conducted, and he has been consulted to cardiology and the patient was discharged without undergoing any cardiac procedure or further monitoring. In Figure 1, both pacemakers are seen on the chest X-ray.

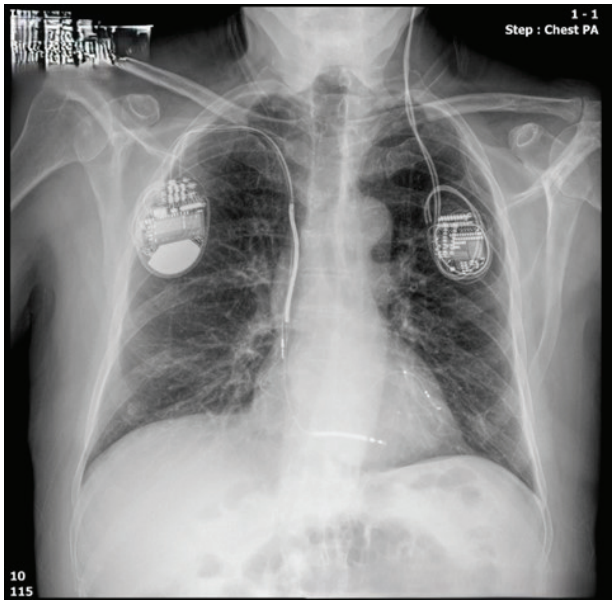

Figure 1, both pacemakers are seen on the chest X-ray.

Discussion and Conclusion

The first report of a DBS procedure being performed on a patient with a cardiac pacemaker was published in 2004 (3). It has been documented that the necessity for cardiac device implantation has increased in patients who have undergone deep brain stimulation (DBS). As reported by Elliot et al. (2019), both DBS and a cardiac pacemaker or implantable cardioverter defibrillator (ICD) were present in 13 patients (4). In the meta-analysis of Akhoundi et al. reviewing the literature on the association of DBS and cardiac implantable electronic devices (CIED), information on 34 patients was found and device-device interactions were reported in 6 patients (5). This has shown that two type of devices can safely coexist without interference when certain precautions like inter-device distance (4), bipolar configuration (4), low stimulation amplitude (6), regular system control, and informing of the patient are taken (5).

It is important to emphasise that PD is frequently a disease of patients over 60 years of age. The frequency of cardiac disease history increases in this age group. It is possible for both a DBS and a cardiac pacemaker to be present in the same patient. It is essential to take the patient's history into consideration before battery adjustment in order to avoid increasing the anxiety of both the patient and the doctor. It is also important to note that DBS is not a contraindication to a cardiac pacemaker and a cardiac pacemaker is not a contraindication to DBS..

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