Parkinsonism-hyperpyrexia syndrome after bilateral deep brain stimulation surgery: case report in a Brazilian man

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ABSTRACT

Deep brain stimulation is a surgical treatment that has provided remarkable therapeutic benefits for otherwise treatment-resistant movement and affective disorders, including advanced Parkinson disease. Levodopa medications are usually discontinued the night before surgery to localize the optimal response site to intraoperative macrostimulation. However, abrupt withdrawal of medication may result in severe side effects. On the present report, we describe the case of a 65 years-old man that evolved parkinsonism-hyperpyrexia syndrome following deep brain stimulation procedure for bilateral subthalamic nucleus after discontinuation of antiparkinsonian medications. Physicians should be aware of this life-threatening clinical conditions, once early diagnosis and reintroduction of medication improve patient's clinical condition significantly.

KEYWORDS

Deep brain stimulation, Parkinson disease/complications, neuroleptic malignant syndrome, malignant hyperthermia.

RESUMO

Síndrome de hiperpirexia associada ao parkinsonismo após cirurgia de estimulação cerebral profunda: relato de caso em um homem brasileiro

A estimulação cerebral profunda é um procedimento cirúrgico que traz grandes benefícios clínicos ao paciente portador de doença de Parkinson. Os medicamentos antiparkinsonismo são normalmente suspensos na noite anterior ao procedimento cirúrgico. No entanto, a suspensão abrupta dos medicamentos pode provocar efeitos adversos sérios ao paciente. No presente estudo, descrevemos o caso de um paciente com 65 anos de idade, portador de doença de Parkinson, submetido à estimulação cerebral profunda bilateral, que apresentou síndrome de hiperpirexia associada ao parkinsonismo no pós-operatório imediato. Os neurocirurgiões devem estar alerta sobre essa possível complicação, pois o diagnóstico e o tratamento precoce podem reduzir os riscos ao paciente.

PALAVRAS-CHAVE

Estimulação encefálica profunda, doença de Parkinson/complicações, síndrome maligna neuroléptica, hipertermia maligna.

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Introduction

Deep brain stimulation (DBS) is a surgical treatment that has provided remarkable therapeutic benefits for otherwise treatment-resistant movement and affective disorders, including essential tremor, dystonia, advanced Parkinson disease, chronic pain and major depression.[1-4] Patients with Parkinson's disease and with indication for DBS are usually treated with a high dose of levodopa. Most centers follow the protocol of discontinuing levodopa the night before surgery because it is easier to check the patient's responses during the procedure when the patient is in the "off" state. However, abrupt withdrawal of medication may result in severe side effects. Parkinsonism-hyperpyrexia syndrome (PHS) is an extremely rare clinical complication following bilateral DBS surgery, with only four cases previously reported in the English medical literature to date.[5-8]

The aim of the present report is to describe the case of a 65 years-old man that evolved parkinsonism-hyperpyrexia syndrome (PHS) following DBS procedure for bilateral subthalamic nucleus (STN) after discontinuation of antiparkinsonian medications.

Case report

A 65-years-old man with a 15-years history of Parkinson's disease was admitted for bilateral STN DBS surgery. He had been experiencing significant motor complications, such as fluctuations ("on-off" phenomenon, wearing-off) and peak-dose dyskinesia, for the previous six years. The patient was also presenting sleeping troubles, with constant fragmentation and diurnal hypersomnolence. His past medical history was remarkable for type 2 diabetes mellitus and was taking pre-operatively metformin 850 mg twice/day, levodopa 100 mg-benserazida 25 mg six-times/day, entacapone 200 mg four-times/day and pramipexole 1 mg twice/day. The levodopa discontinuation period was a 12-hour overnight withdrawal.

Under local anesthesia, bilateral STN DBS was performed using a stereotactic frame, and the coordinates for STN were calculated by magnetic resonance imaging. Both STN sites were localized under microelectrode recording with significant improvement in the baseline rigidity to the macrostimulation supporting the optimal sites. Permanent electrodes were implanted bilaterally, and then pulse generators were placed subcutaneously under general anesthesia. The surgical procedure was performed uneventfully and the patient was maintained under medical observation in intensive care unit (ICU) during the first post-operative day. Levodopa 100 mg-benserazida 25 mg six-times/day was returned immediately after surgery. Post-operative computed tomography showed no signs of acute bleeding and apparent correct location of electrodes (Figure 1).

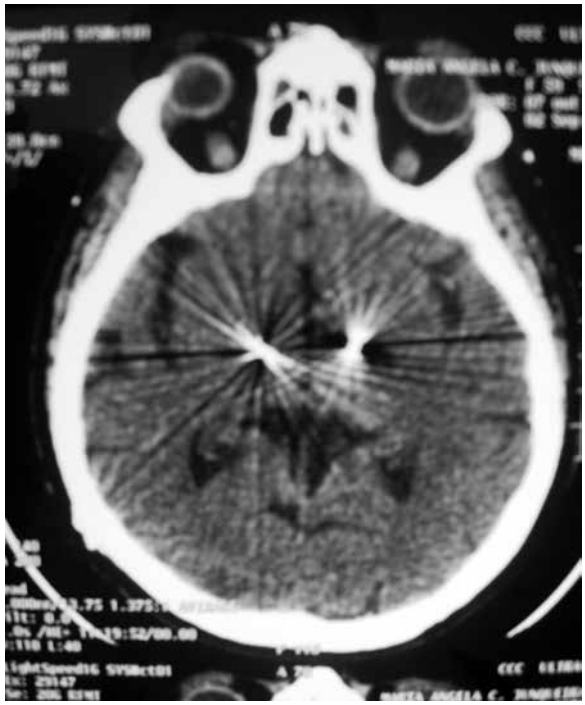

Figure 1 – Post-operative computed tomography showing bilateral STN electrodes (DBS).

After nine hours in ICU, the patient started presenting mental confusion, fever (39.5 °C) and generalized rigidity. Laboratorial and radiological exams were found to be within normal range. Nasogastric tube was introduced permitting the administration of dispersible levodopa 200 mg 2/2 hours and hyperhydration. The electrodes were turned on and the patient presented an improvement and was dismissed on the seventh post-operative day with oral diet. However, three days after the patient returned presenting again rigidity, difficulty swelling, dehydration, fever, mental confusion and adynamic ileus with abdominal distention. Laboratorial exams were compatible with acute pre-renal insufficiency (creatinine: 2.4) with significant hypernatrimeia (Na: 165) and raised creatine kinase (CK: 650). After seven days of hydroelectrolytic balance correction therapy, the patient recovered the mental status and improved clinically the rigidity. After thirty days in outpatient follow up, the patient presented completely symptom-free of previous motor fluctuation, sleeping disturbances and the pre-operative antiparkinsonian medications were re-introduced, except for entacapone.

Discussion

Parkinsonism-hyperpyrexia syndrome (PHS) is a rare complication that usually occurs after the cessation or abrupt reduction of antiparkinsonian medications during the course of parkinsonism. It is manifested by autonomic instabilities like pyrexia, hypertension, and rigidity with changes in the consciousness level that sometimes lead to fatality.[9] Typically, symptoms develop between 18h and seven days following the trigger. The patient becomes rigid, sometimes with tremor, and progresses to an immobile state.[9,10] Poor prognostic indicators in PHS include older age and higher pre-morbid Parkinson severity.[10] Our patient was experiencing significant motor complications, such as fluctuations ("on-off" phenomenon, wearing-off) and peak-dose dyskinesia, for the previous six years. We also believe that the long period of sever parkinsonism symptoms was an important factor determining PHS post-operatively.

Linazasoro *et al.*,[5] in 2004, were the first to the describe a case of PHS after DBS for advanced Parkinson disease. Factor,[6] in 2007, and Kim *et al.*,[7] in 2010, also observed that the main symptoms were confusion, fever and worsening of rigidity accompanied by raised creatine kinase levels. Additionally, the present report highlights that dehydration and difficulty on oral intake and intestinal absorption of levodopa may worse the patient's symptoms. On the present report, we showed that hyperhydration and early nutrition by nasogastric tube may contribute to improve patient's clinical condition.

In conclusion, we reinforce that PHS is an extremely rare by life-threatening condition that may occur in patients undergoing DBS surgery due to abrupt discontinuation of antiparkinsonian drugs, particularly levodopa. Therefore, clinical awareness of this important syndrome permits an early diagnosis and adequate treatment with administration of a dopamine agonist, correction of body fluid and electrolytes.

Competing interests

The authors declare no conflicts of interest.

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