NEUROCIRUGIA. 2016;xxx(xx):xxx–xxx

NEUROCIRUGÍA

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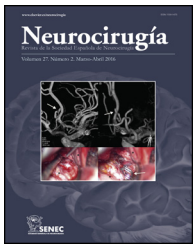

Clinical Research

Experience with "Fast track" postoperative care after deep brain stimulation surgery

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ARTICLE INFO

Article history:
Received 28 October 2015
Accepted 16 February 2016
Available online xxx

Keywords:
Deep brain stimulation
Parkinson's disease
Postoperative complications
Intracranial bleeding
Fast track
Postoperative care unit

ABSTRACT

Background: A 24-h-stay in the post-anesthesia care unit (PACU) is a common postoperative procedure after deep brain stimulation surgery (DBS).
Objective: We evaluated the impact of a fast-track (FT) postoperative care protocol.
Methods: An analysis was performed on all patients who underwent DBS in 2 periods: 2006, overnight monitored care (OMC group), and 2007–2013, FT care (FT group).
Results: The study included 19 patients in OMC and 95 patients in FT. Intraoperative complications occurred in 26.3% patients in OMC vs. 35.8% in FT. Post-operatively, one patient in OMC developed hemiparesis, and agitation in 2 patients. In FT, two patients with intraoperative hemiparesis were transferred to the ICU. While on the ward, 3 patients from the FT developed hemiparesis, two of them 48 h after the procedure. Thirty eight percent of FT had an MRI scan, while the remaining 62% and all patients of OMC had a CT-scan performed on their transfer to the ward. One patient in OMC had a subthalamic hematoma. Two patients in FT had a pallidal hematoma, and 3 a bleeding along the electrode.
Conclusions: A FT discharge protocol is a safe postoperative care after DBS. There are a small percentage of complications after DBS, which mainly occur within the first 6 h.

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http://dx.doi.org/10.1016/j.neucir.2016.02.004
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Please cite this article in press as: Martín N, et al. Experience with "Fast track" postoperative care after deep brain stimulation surgery. Neurocirugia. 2016. http://dx.doi.org/10.1016/j.neucir.2016.02.004

Experiencia con el cuidado postoperatorio "Fast-Track" después de la cirugía de estimulación cerebral profunda

Palabras clave:
Estimulación cerebral profunda
Enfermedad de Parkinson
Complicaciones post-operatorias
Sangrado intracraneal
Fast-track
Unidad de recuperación post-anestésica

RESUMEN

Introducción: La estancia durante 24 h en una unidad de recuperación post-anestésica es una estrategia común de control post-operatorio después de la cirugía de estimulación cerebral profunda (DBS).
Objetivo: Evaluamos el impacto de un protocolo Fast-track (FT) en el cuidado postoperatorio.
Métodos: Analizamos todos los pacientes que se sometieron a cirugía DBS en 2 periodos: 2006, monitorización durante la noche (grupo OMC) y entre 2007 y 2013 (grupo FT).
Resultados: Incluimos 19 pacientes en el grupo OMC y 95 pacientes en el FT. Se registraron incidentes intraoperatorios en el 26,3% de pacientes del grupo OMC vs. 35,8% del grupo FT. Postoperatoriamente, un paciente en el grupo OMC desarrollo hemiparesia y 2 pacientes agitación. En el grupo FT, 2 pacientes con hemiparesia intraoperatoria fueron trasladados a la UCI. Durante su ingreso en planta, 3 pacientes del grupo FT desarrollaron hemiparesia, 2 de ellos 48 h después del procedimiento. Al 38% del FT se les realizó una resonancia, mientras que al 62% restante y a todos los pacientes del grupo OMC se les realizó un escáner antes del traslado a sala: un paciente del grupo OMC tuvo un hematoma subtalámico; 2 pacientes del grupo FT tuvieron un hematoma en el pálido y 3, sangrado en el trayecto del electrodo.
Conclusiones: El protocolo FT es seguro después de la cirugía de DBS. Hay un pequeño porcentaje de complicaciones y la mayoría suceden en las primeras 6 h.

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Introduction

Deep brain stimulation (DBS) surgery is a procedure that consists on the implantation of electrodes into subcortical brain structures for its electric neuromodulation. After the definition of the stereotactic coordinates for a specific brain target, most of the groups use intra-operative microelectrode recordings and macro/micro stimulation to refine the final electrode positioning and subsequently connect the therapeutic electrodes to a subcutaneous Internal Pulse Generator (IPG).[1] DBS is used for the treatment of patients with neurological disorders as Parkinson's disease, dystonia, essential tremor, epilepsy, and certain psychiatric conditions.[2]

There are specific challenges and considerations in the anesthetic management of patients undergoing DBS insertion. They may present comorbidities related to the disease for which the DBS is indicated. There are also potential drug interactions and adverse effects between antiparkinsonian and anesthesia drugs.[3] Moreover, the fact that patients are operated in "off" period may increase those risks due to severe hypokinesia.

Advances in neuroradiology and neurophysiology, that have allowed reaching a more accurate target anatomy for DBS procedures, together with the development of multiple channel microelectrodes that minimize the volume of brain parenchyma penetrated during microelectrode recording[4] lead to a reduction of the surgical time and electrode tracks needed which may be promoting a reduction of morbidity.

Previous data from retrospective chart reviews have reported complication rates of 12–16%.[1,5] Venous air embolism has been reported up to 4.5% of DBS procedures. Seizures during stimulations were recorded from 0.8% to 4.5% of the cases.[1] Psychiatric problems, including depression or mania, have also been reported postoperatively in patients with subthalamic nucleus stimulation.[6] Intracranial hemorrhage is the most severe complication and is reported to occur in 0.2–5% of patients.[7–9] Risk factors for hemorrhage included hypertension, increasing age, Parkinson's disease as the surgical indication, ventricular involvement in the electrode placement trajectory and the use of microelectrode recording during implantation.[10] The size of the hemorrhage varied from small and asymptomatic to severe intracranial hemorrhage resulting in significant and persistent neurological deficits or death.

The underlying disease, functional status, comorbidities and the possibility for severe postoperative complications may suggest for a postoperative overnight monitored care (OMC) of the patient. However, our reduced number of perioperative complications[5] and our post anesthesia unit (PACU) resources prompted us to develop a "fast track" postoperative care program. It implies a 6-h monitoring period in the PACU followed by an imaging study (CT as a first option, MRI if necessary). If the patient did not present any radiological or clinical complication, an early discharge to the neurosurgical ward was established.

The aim of the present study is to analyze the impact and safety of this fast-track protocol for the DBS surgery postoperative care compared to a standard overnight postoperative care.

Patients and methods

We retrospectively analyzed all patients who underwent DBS in our institution between January 2006 and June 2013.

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