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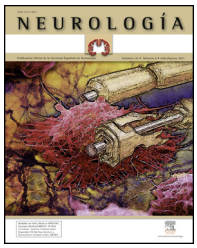

ORIGINAL ARTICLE

Vagus nerve stimulator implantation for epilepsy in a paediatric hospital: outcomes and effect on quality of life☆

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KEYWORDS
Drug-resistant epilepsy;
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Quality of life in children with epilepsy scale

Abstract
Introduction: Epilepsy, which is present in 0.5—1% of the paediatric population, is one of the most frequent childhood neurological disorders. Approximately 20% to 30% of these cases will be drug-resistant. The objective of this study is to describe the impact of vagal nerve stimulation (VNS) on seizures and quality of life in a sample of 30 patients.
Methods: Descriptive, retrospective study of all patients with a VNS device implanted between 2008 and 2013 in a single paediatric hospital, based on patients' medical records. Quality of life was assessed using the Spanish scale for quality of life in children with epilepsy, completed by means of a telephone interview.
Results: We describe a population of 19 boys (64%) and 11 girls (36%) with a mean age at seizure onset of 21 months (1—144 months). The mean age of VNS implantation was 11.89 years. Follow-up periods ranged from 6 to 36 months. Mean reduction in seizures at 6 months was 38%, with a reduction of 43% at 12 months, 42% at 24 months, and 54% at 36 months. At least half of all patients were classified as responders. According to the quality of life scale, 54% of the families rated the effect of VNS as either very good or good while 39% rated it as fair.
Conclusions: VNS is a safe palliative treatment that is generally well tolerated. It is partially effective for controlling drug-resistant epilepsy and exerts a positive effect on quality of life.

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PALABRAS CLAVE
Epilepsia refractaria;
Tratamiento de epilepsia refractaria;
Estimulador nervio vago;
Escala de calidad de vida en el niño con epilepsia

Resultados de la colocación del estimulador del nervio vago en epilepsia y calidad de vida en un hospital pediátrico

Resumen
Introducción: La epilepsia es uno de los trastornos neurológicos más frecuentes de la infancia, presentándose en un 0,5—1%. Aproximadamente un 20—30% de los pacientes son farmacorresistentes. El objetivo de este trabajo es describir en 30 pacientes el impacto sobre las crisis y la calidad de vida del estimulador del nervio vago (ENV).
Métodos: Se trata de un estudio descriptivo, retrospectivo, mediante revisión de las historias clínicas de todos los pacientes a quienes se les colocó el ENV entre el 2008 y 2013 en nuestro centro. La calidad de vida fue valorada mediante la escala de calidad de vida en el niño con epilepsia (CAVE), obtenida por medio de una entrevista telefónica.
Resultados: Se incluyeron 19 niños (64%) y 11 niñas (36%) con una mediana de comienzo de las crisis de 21 meses (1—144 meses). La edad promedio de colocación del ENV fue de 11,89 años. El tiempo de seguimiento fue de 6—36 meses. A los 6 meses la reducción de las crisis en promedio fue del 38%, a los 12 meses del 43%, a los 24 meses del 42% y a los 36 meses del 54%. De todos los pacientes evaluados al menos un 50% se catalogaron como respondedores. Según la CAVE un 54% de las familias encontró el efecto del ENV como bueno o muy bueno y un 39% como regular.
Conclusiones: El ENV es un tratamiento paliativo, generalmente bien tolerado, parcialmente efectivo para el control de la epilepsia refractaria en pediatría y con repercusiones positivas sobre la calidad de vida.

Introduction

Epilepsy is one of the most frequent neurological diseases in childhood, presenting in 0.5% to 1% of children. In 20% to 30% of patients, antiepileptic drugs (AED) fail to control seizures.[1,2] Epilepsy is considered drug-resistant when the patient does not respond to 2 first-line AEDs in monotherapy or to combined therapy with 2 first-line AEDs appropriately chosen for the type of seizure and syndrome and dosed at the maximum tolerated dose.[3] Drug-resistant epilepsy has a significant and negative impact on development, learning, behaviour, and quality of life in patients and their families and therefore poses a major challenge for doctors.[1,2] Some treatment alternatives for patients with resistant epilepsy include the ketogenic diet, vagus nerve stimulation (VNS), and functional epilepsy surgery.

The first experimental studies of VNS were carried out in the 1980s and results indicated good tolerability and a significant reduction in seizure frequency.[4—6] The antiepileptic mechanism underlying VNS is not fully understood; however, it is believed that the intermittent electric stimulation of the left vagus nerve desynchronises the thalamic-cortical circuits involved in seizure propagation.[5,7] The vagus nerve terminates in the solitary nucleus, which projects to other nuclei of the brain stem; activation of these nuclei may control epileptic activity.[8]

VNS was approved by the US Food and Drug Administration in 1997 as a neuromodulator adjuvant therapy for patients aged over 12 years with drug-resistant partial epilepsy.[9,10] VNS is regarded as a safe and effective palliative treatment for patients with severe drug-resistant epilepsy who are not eligible for functional epilepsy surgery.[3,7]

The first study conducted in children (60 patients) was published by the Paediatric VNS Study Group in 1999 and revealed a reduction in seizure frequency.[8] Since then, several studies have shown similar effectiveness and safety rates in both children and adults with different types of seizures and epileptic syndromes of different aetiologies. Effectiveness improves when VNS is used for a long period of time. The mean reduction in seizure frequency in paediatric patients treated with VNS ranges from 30% to 62% and the percentage of respondents varies from 26% to 77%.[8,11]

The purpose of our study is to describe the impact of VNS on seizure frequency and quality of life in a series of 30 patients. As far as we know, this is the first study evaluating the results of VNS in a paediatric hospital in Spain.

Patients and methods

We conducted a descriptive retrospective study in a single centre; all medical histories were reviewed and we applied the CAVE questionnaire to the families by telephone in order to assess quality of life in children with epilepsy.

We included data from all patients treated with VNS at Hospital Sant Joan de Déu between April 2008 and May 2013. The minimum follow-up time was 6 months. Patients were considered eligible for VNS if they had drug-resistant epilepsy (as defined in the introduction) and were not candidates for functional epilepsy surgery. Informed consent forms were signed by the families of all patients. The exclusion criterion was paediatric patients with progressive diseases. All patients underwent a comprehensive evaluation before having the VNS device implanted, including a