Rev Psiquiatr Salud Ment (Barc.). 2014;7(1):42–47

Revista de Psiquiatría y Salud Mental

www.elsevier.es/saludmental

BRIEF REPORT

Propofol and thiopental as anaesthetic agents in electroconvulsive therapy: A retrospective study in major depression☆

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Received 3 December 2012; accepted 22 January 2013
Available online 25 November 2013

KEYWORDS
Propofol;
Thiopental;
Electroconvulsive therapy;
Major depression

Abstract
Objective: To determine the influence of propofol and thiopental as anaesthetics in electroconvulsive therapy (ECT), as regards, seizure duration, electrical charge, clinical efficacy, cardiovascular profile, and presence of adverse cognitive effects.
Methods: A retrospective design including 127 patients who received bilateral ECT for the treatment of a major depressive episode.
Results: The mean seizure duration in the propofol group was significantly shorter than in the thiopental group (21.23 ± 6.09 versus 28.24 ± 6.67 s, $P < 0.001$). The mean stimulus charge was 348.22 mC in the propofol group, and 238 mC in the thiopental group ($P < 0.001$). Propofol was associated with a lower increase in blood pressure. There were no differences between groups in treatment response or presence of adverse effects.
Conclusions: The anaesthetic agent used in ECT might determine differences in parameters such as seizure duration or electrical charge. However, this does not seem to be translated into differences in clinical efficacy or the pattern of adverse effects observed.

☆ Please cite this article as: Martínez-Amorós E, Gálvez Ortiz V, Porter Moli M, Llorens Capdevila M, Cerrillo Albaigés E, Garcia-Parés G, et al. Propofol y pentotal como agentes anestésicos en la terapia electroconvulsiva: un estudio retrospectivo en el trastorno depresivo mayor. Rev Psiquiatr Salud Ment (Barc.). 2014;7:42–47.

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2173-5050/$ – see front matter

PALABRAS CLAVE
Propofol;
Pentotal;
Terapia electroconvulsiva;
Trastorno depresivo mayor

Propofol y pentotal como agentes anestésicos en la terapia electroconvulsiva: un estudio retrospectivo en el trastorno depresivo mayor

Resumen
Objetivo: Determinar la influencia de la utilización de propofol y pentotal como anestésicos en la terapia electroconvulsiva (TEC), en relación con la duración de la crisis, la dosis eléctrica, la eficacia clínica, el perfil cardiovascular y la aparición de efectos cognitivos.
Método: Estudio retrospectivo sobre 127 pacientes que recibieron TEC bilateral como tratamiento de un episodio depresivo mayor.
Resultados: La duración media de la convulsión eléctrica en el grupo de propofol fue significativamente más corta que en el de pentotal (21,23 ± 6,09 versus 28,24 ± 6,67 s; $p < 0,001$). La dosis de estímulo media fue de 348,22 mC en el grupo de propofol y de 238 mC en el grupo de pentotal ($p < 0,001$). Propofol se asoció a un menor incremento de la tensión arterial. No se encontraron diferencias en la respuesta clínica al tratamiento ni en la aparición de otros efectos adversos.
Conclusiones: El anestésico utilizado en la TEC puede determinar diferencias en parámetros como la duración de la crisis o la carga eléctrica aplicada. Sin embargo, estas diferencias no parecen traducirse en la eficacia clínica ni en el patrón de efectos adversos.

Introduction

Electroconvulsive therapy (ECT) requires sedation with a short-term anaesthetic that interferes as little as possible in the convulsive threshold and in the duration and quality of the convulsion, while simultaneously guaranteeing haemodynamic stability of the patient.[1] It is accepted in guidelines, despite being a cause for controversy, that the therapeutic effect of ECT depends on the production of a generalised convulsion of an appropriate duration.[2,3] It has been postulated that the choice of anaesthetic could have significant consequences in the performance of ECT, as it might affect the convulsive threshold and modify the duration of the seizure.[4,5]

Various anaesthetic agents such as methohexital, thiopental, propofol, etomidate and ketamine, characterised by short-term action, are used as inductors in ECT. In spite of the fact that there is no anaesthetic of choice, methohexital seems to be the one with the most generalised use[3,6,7]; however, it is unavailable in Spain, where propofol and thiopental are the ones used.[2,8,9]

Propofol has been shown to have a better haemodynamic profile and to facilitate more rapid post-crisis recovery.[10–14] However, it could shorten the seizures[4,10,15–25] and increase the convulsive threshold,[17] which would lead to applying greater electrical stimulation.[15,17,20] Consequently, the use of propofol might be associated with a greater number of ECT sessions, as well as with differences in clinical efficacy and increased appearance of adverse effects.[26,27]

The objective of the study was to analyse any possible differences between propofol and thiopental with respect to ECT parameters, clinical response and adverse effects.

Method

Sample

A total of 196 patients were recruited among patients admitted to the psychiatric services at the Hospital Universitari de Bellvitge (thiopental) and the Hospital de Sabadell (propofol) during the 2005–2010 period. They fulfilled DSM-IV-TR diagnostic criteria for major depressive disorder (MDD) and had received an acute course of ECT. We excluded patients having another Axis I disorder (except for nicotine dependence) or Axis II disorder. The final subject count for analysis was 127 patients (32.3% received propofol and 67.7% thiopental).

Variables collected

Through revising case histories, we collected demographic variables, information on the course of the disorder and that relative to the event. During the hospital stay, psychometric scales–21-item Hamilton Depression Rating Scale ($HDRS_{21}$) and Global Assessment of Function (GAF)–were administered before the commencement and the end of the course of ECT.

With respect to ECT, we collected the number of sessions, stimulus dose, duration of convulsion per session and accumulated duration (clinical and electroencephalographic), need for restimulation, impedance, cardiovascular parameters (blood pressure and heart rate) and the appearance of other acute adverse effects (headache and cognitive effects).

The demographic, clinical and treatment characteristics are presented in Table 1.

Procedure

Electroconvulsive therapy

The ECT was administered using Thymatron™ DGx and System IV (DGx and 2× dose/double dose stimulation programmes) following the clinical guidelines.[2,3] The anaesthesia included thiopental (1.5–2.5 mg/kg) or propofol (0.75–1.5 mg/kg) and succinylcholine (0.5 mg/kg). The patients were preoxygenated and ventilated manually. The electrode placement was bifrontotemporal.[3] The data corresponding to ECT are described in Table 2.