

# Description of anesthetic drugs used in Hospital del Mar and their impacts on convulsion duration and blood pressure in electroconvulsive therapy

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## Introduction

The Electroconvulsive Therapy (ECT) is an effective treatment used for several psychiatric disorders, such as major depressive disorder or catatonia. However, there are many questions remaining about the mechanism of action and factors that have an impact on its results. Some frequent questions are if the anesthetic drug makes a difference in the time of convulsion and systolic blood pressure (SBP) in the first minutes after the treatment. Many articles associate propofol with a lesser convulsion time, but this is controverted and other articles suggest that this difference would not be clinically significant. Otherwise, several articles indicate that thiopental and etomidate are the anesthetic drugs that increase the most SBP levels after convulsion, but they are still used as anesthesia induction agents in the lack of a specific protocol for an optimal control of SBP.

## Aims

Our principal aim is to describe the utilization of anesthetic drugs among the patients that are being treated with ECT in Hospital del Mar. We also want to know the differences in the time of convulsion and systolic arterial pressure for every anesthetic drug (propofol, thiopental and etomidate).

## Materials and methods

We have used the database of ECT in Hospital del Mar. It contains information like age, principal diagnosis, medical background and pharmacological treatment at the moment of starting ECTs; it also contains information of each individual ECT session as basal, 2 and 5 minutes SBP; the anesthetic drug used, and convulsion duration. We made an analysis of general conditions of the population, the differences of convulsion time and SBP between the three anesthetic drugs.

## Results

Propofol was used in 1140 sessions, thiopental in 61 sessions and etomidate in 54 sessions. The differences in the means of convulsion times between propofol (19,05 seconds) and etomidate (31,29 seconds) (**Table 1**) are statistically significant ( $p < 0,001$ ). Etomidate ( $p < 0,001$ ) and thiopental ( $p = 0,001$ ) increase more the SBP than propofol (**Table 2**). Other factors specified in the **Table 2** have also an impact on the final SBP.

Table 1. Average of convulsion time according on anesthetic drug

|                          | AVERAGE (second) | n    | p      |
|--------------------------|------------------|------|--------|
| PROPOFOL                 | 19,05            | 1129 |        |
| THIOPENTAL (vs Propofol) | 19,34            | 61   | 0,851  |
| ETOMIDATE (vs Propofol)  | 31,29            | 52   | <0,001 |

Table 2. Influence of some conditions on the observed SBP difference (before and 5 minutes after ECT)

|                             | B     | Standard error | t    | p      | 95% CI<br>Inferior limit | 95% CI<br>Superior limit |
|-----------------------------|-------|----------------|------|--------|--------------------------|--------------------------|
| Age                         | 0,6   | 0,06           | 9,46 | <0,001 | 0,47                     | 0,729                    |
| Female gender               | 26,01 | 2,22           | 11,7 | <0,001 | 21,65                    | 30,38                    |
| Initial SBP<br>(before ECT) | -0,46 | 0,06           | -6,8 | <0,001 | -0,59                    | -0,33                    |
| Tiopental<br>(vs Propofol)  | 17,72 | 5,17           | 3,42 | 0,001  | 7,55                     | 27,89                    |
| Etomidate<br>(vs Propofol)  | 20,8  | 3,78           | 5,49 | <0,001 | 13,36                    | 28,23                    |

## Conclusions

Considering that the observed differences between propofol and etomidate were statistically significative for convulsion time, the change of the anesthetic drug from propofol to etomidate when the convulsion time is too short seems to be justified.

Our study suggests a relation between both, thiopental and etomidate, and a major increase of SBP 5 minutes after convulsion. One of the important limitations is that the antihypertensive medication usually taken by patients was not considered. Both, the adverse effects on blood pressure of anesthetic drugs and sympathetic collateral effects of the ECT, should be contemplated at the time of choosing the anesthetic drug.

Nevertheless, the initial election of the anesthetic drug should be done considering relevant factors as indications and contraindications on each patient. Further research about the factors that improve convulsion duration and minimize adverse effects on blood pressure is needed.

## Bibliography

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