# Largest real-world comparison indicated equivalent antidepressant and utilization outcomes associated with anesthetic type in electroconvulsive therapy (ECT)

Kevin J. Li, MD, Natalie E. Slama, MPH, Matthew E. Hirschtritt, MD, MPH, Rajani S. Rajan, MD, Prachi Anshu, BS, Esti Iturralde, PhD

|  |  |
| --- | --- |
| Challenge | There is no set gold standard choice of anesthetic for electroconvulsive therapy (ECT). |
| Existing Evidence | Prior to this study, there was only one small investigation with 68 patients comparing etomidate and methohexital specifically examining real-world outcomes of ECT. |
| Target Population | Patients receiving ECT. |
| Intervention or Exposure | ECT anesthetics – etomidate versus methohexital |
| Outcomes/Key Findings | There was no significant difference in depression remission as measured by 9-item Patient Health Questionnaire (PHQ9). Additionally, no significant difference in 12-month post-ECT healthcare utilization, namely emergency department visits and inpatient hospitalizations. Exploratory subgroup analysis of patients who switched anesthetics during an acute series of ECT showed that etomidate was associated with higher rates of patient discomfort side effects such as post-ictal agitation, phlebitis, and myoclonus. |
| Resulting Action/Change | Methohexital should be the preferred anesthetic agent for ECT given the lower risk of patient discomfort side effects and equivalent efficacy. |
| Additional Recommendations | If patients receiving etomidate have patient discomfort side effects such as those noted above, physicians now have an evidence-based approach in terms of changing to methohexital. |
| Implementation Tools  | Physician education seminars in ECT regional meeting, local physician education on respective ECT treatment sites, manuscript publication, conference presentation at the International Society of ECT and Neuromodulation (ISEN) annual meeting. |
| Implementation and Follow-up Measures | Implementation through change of practice workflow per each ECT treatment site’s discretion. Follow-up will be conducted at the regional ECT meeting through discussion of the practice changes and associated effects. |
| Reference(s) [Key Figure if applicable] | **TABLE 2. Association Between Anesthetic Type and 12-month Depression Remission**

|  |  |
| --- | --- |
|   | Depression Remission  |
| Predictor  | Odds Ratio  | 95% Confidence Interval  | P Value  |
| Etomidate (ref: methohexital)  | 0.90  | (0.59, 1.37)  | 0.631  |
| Age, years  | 1.02  | (1.00, 1.04)  | **<.05**  |
| Male (ref: female)  | 0.67  | (0.44, 1.02)  | 0.059  |
| Non-white (ref: non-Hispanic white)  | 0.75  | (0.47, 1.19)  | 0.225  |
| Medicare (ref: no Medicare)  | 0.66  | (0.40, 1.09)  | 0.106  |
| *Psychiatric condition (ref: depressive disorder)* |   |   |   |
|  Psychotic disorder  | 1.42  | (0.82, 2.46)  | 0.206  |
|  Bipolar disorder  | 1.04  | (0.65, 1.67)  | 0.864  |
|  Substance use disorder (ref: no substance use disorder)   | 1.30  | (0.79, 2.14)  | 0.234  |
| Baseline depressive symptoms, PHQ-9 score  | 0.91  | (0.88, 0.94)  | **<.001**  |
| Charlson comorbidity index  | 1.07  | (0.92, 1.26)  | 0.384  |

The logistic regression model included N = 495 with follow-up depressive symptom data who did not have an anesthetic change during the treatment course. Among these participants, 197 (39.8%) of patients had depressive symptom remission, defined as PHQ-9 Score < 10. **TABLE 3. Association Between Anesthetic Type and Adverse Events**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   |   | Unadjusted  |   | Adjusted (ref: methohexital)a  |
| Adverse event, no. (%)  |   | Etomidate  | Methohexital  | P Value  |   | Odds Ratioa  | (95% Confidence Interval)  | P Value  |
| Medical complications during ECT treatment, anyb  |   | 2 (0.5)  | 1 (0.0)  | NA  |   | --  | --  | --  |
| Cardiac  |   | 2 (0.5)  | 0 (0.0)  | NA  |   | --  | --  | --  |
| Neurological  |   | 0 (0.0)  | 1 (0.0)  | NA  |   | --  | --  | --  |
| Other  |   | 0 (0.0)  | 0 (0.0)  | NA  |   | --  | --  | --  |
|  |  |  |  |  |  |  |  |  |
| Mid-course anesthetic changec  |   | 26 (6.0)  | 62 (25.0)  | **<.001**  |   | 0.18  |  (0.11, 0.30)  | **<.001**  |
| Due to seizure inadequacy  |   | 8 (1.8)  | 52 (21.0)  |  **<.001** |   | --  | --  | --  |
| Due to unintentional awareness  |   | 1 (0.2)  | 4 (1.6)  |  1.00 |   | --  | --  | --  |
| Due to agitation (PIA), phlebitis, or myoclonus |   | 9 (2.1)  | 1 (0.4)  |  **<.001** |   | --  | --  | --  |
| Due to other or unknown reasons  |   | 8 (1.8)  | 5 (2.0)  |  **<.05** |   | --  | --  | --  |

aAdjusted logistic regression models per adverse event outcome adjusted for age, sex, race/ethnicity, Medicare, psychiatric condition, substance use disorder, Charlson comorbidity index, hypertension, cardiovascular disease, lung disease, and diabetes. b N = 596 with no anesthetic change during the treatment course. cComplete cohort (N = 684).  |