A280
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Room Hall E2-Area N,

Anesthesia for Electroconvulsive Therapy: Does the Device Make a Difference?

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Introduction: Hypocapnia may lower the seizure threshold and increase seizure duration.[1] Seizure duration has generally been thought to correlate with therapeutic benefit, but this is controversial.[2] Breathing circuits have various design parameters that allow rebreathing of alveolar and deadspace gases[3] The present study was designed to evaluate the effect of hyperventilation to induce hypocapnia using two different mask ventilation devices (Mapleson D and Ambu Bag™) on seizure duration in patients undergoing general anesthesia for ECT.

Method: After IRB approval, participants were recruited from among patients undergoing ECT at a large academic medical center. Subjects were ventilated with each device at consecutive treatments in a crossover design, with the initial device chosen by randomization. Aside from the airway device, clinical care was not altered by participation in the study. Oxygen flow rates were 10 liters per minute for all patients. Following muscle relaxation, the anesthetist was instructed to ventilate as effectively as possible for one minute. Continuous capnography was recorded, and clinicians were blinded to the $EtCO_2$ readings. After this period, ECT proceeded as directed by the psychiatrist. Seizure duration was assessed using single-channel EEG and gross motor EMG. The last six $EtCO_2$ plateaus were averaged and compared for each device. Data were analyzed via paired-samples t-test.

Results: Eighteen participants completed the study. Ventilation with the Mapleson D circuit produced a mean $EtCO_2$ of 25 mmHg while ventilation with the Ambu Bag™ produced a mean $EtCO_2$ of 18 mmHg ($p < 0.05$). Seizure duration as measured by EMG and EEG was not significantly different between the two groups ($p > 0.05$). Furthermore, seizure length did not correlate significantly with $EtCO_2$.

Discussion: After hyperventilation, $EtCO_2$ was significantly lower with the Ambu Bag™ than the Mapelson circuit, but seizure length did not differ. Although not significant, we found a trend toward longer seizures when the Mapleson circuit was used. Measurement error combined with a small sample size could account for this finding. It is also possible that hypocapnia makes no difference in seizure length.

References:

1. Bergsholm, P, Gran, L, Bleie, H. (1984). *Acta Psychiatry Scandinavia*, 69:121-128.

2. Kramer, BA. (1983). *Compr Psychiatry*, 24(3): 259-261.

3. Brockwell, RC, Andrews, JJ. Inhaled Anesthetic Delivery Systems. *Miller's Anesthesia, 6th ed.* (Miller, ed.). 2005.

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