

## Background

Since the 1960's it was reported that the use of lidocaine in ECT led to diminished seizure duration, lower seizure frequency, and the loss of polyspikes<sup>1</sup>, a finding supported by more recent studies<sup>2,3</sup>. To the contrary, there have been additional studies which have demonstrated no effect of lidocaine on seizure parameters in ECT<sup>4</sup>, while others have found improved indices<sup>5</sup> such as post-ictal suppression, ictal irregularity, and ictal stereotypy. A retrospective chart review was performed on 3 female patients who had ECT treatments at the UF Health Psychiatry Hospital to assess how administration of lidocaine impacted seizure parameters.

## Methods

- The charts of 3 female patients were reviewed to assess the effect of lidocaine administration on seizure parameters between 5/2019 and 8/2020 for patients receiving ECT with a Thymatron device
- A total of 20 seizures were documented with 6 incidences of Lidocaine use in anesthesia induction
- Measures included total charge needed to induce a seizure, EEG seizure duration, ECT session number, documented seizure, amplitude administration of lidocaine, and administered dose of lidocaine
- EEG Amplitude was visualized and recorded via interpretation of voltage recorded with a baseline of 200 microvolts per cm
  - Interpretation is listed as follows : Very high (>2000µV), high (600-2000µV), moderate (400-600µV), low (200-400µV)

## Results

**TABLE 1 : Patient A**

Session #	Charge (mC)	Location	Duration	Amplitude (Voltage)	Lidocaine	Lidocaine Dosage
1	227	Bitemporal	65s	High	No	-
2	227	Bitemporal	165s	High	Yes	20mg
3	227	Bitemporal	73s	High	No	-
4	227	Bitemporal	69s	High	No	-
5	227	Bitemporal	90s	High	No	-
6	227	Bitemporal	95s	Very high	No	-
7	227	Bitemporal	53s	High	No	-

**TABLE 2 : Patient B**

Session #	Charge (mC)	Location	Duration	Amplitude (Voltage)	Lidocaine	Lidocaine Dosage
1	145	Bifrontal	29s	Very high	No	-
2	145	Bifrontal	29s	High	Yes	20mg
3	145	Bifrontal	51s	Moderate	Yes	20mg
4	145	Bifrontal	42s	Moderate - low	Yes	100mg
5	145	Bifrontal	36s	High	No	-
6	145	Bifrontal	38s	High	No	-
7	145	Bifrontal	66s	High	No	-

**TABLE 3 : Patient C**

Session #	Charge (mC)	Location	Duration	Amplitude (Voltage)	Lidocaine	Lidocaine Dosage
1	50	Bitemporal	404s	High	Yes	20mg
2	75	Bitemporal	51s	High	No	-
3	75	Bitemporal	49s	Very high	No	-
4	75	Bitemporal	47s	Very high	No	-
5	75	Bitemporal	46s	Very high	No	-
6	75	Bitemporal	55s	High	Yes	20mg

## Conclusions

- We observe that at doses above 100mg of lidocaine, there is a decrease in seizure amplitude with no effect in seizure duration
- Administration of lidocaine in ECT anesthesia resulted in 2 cases of status epilepticus
- The effects of lidocaine on seizure parameters demonstrated a possible dose-dependent relationship
- At doses at or below 40mg, lidocaine had no effect on the duration or amplitude of the seizures

## Discussion

This retrospective case review identifies the possibility that administration of lidocaine may have differing impacts on seizure parameters which previous studies have not concluded. Additionally, this case review demonstrates the use of lidocaine can lead to an increased propensity to develop status epilepticus during ECT treatment. Further research in the field could help establish a dose-dependent relationship of lidocaine's effect on seizure amplitude and assess the relationship between lidocaine use in ECT and status epilepticus.

## References

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