Published in final edited form as:

J ECT. 2019 March ; 35(1): e4–e5. doi:10.1097/YCT.0000000000000516.

The successful use of electroconvulsive therapy in a patient with cerebral aneurysms and a pituitary lesion

Brandon M. Kitay, MD, PhD¹, Rachel B. Katz, MD¹, Samuel T. Wilkinson, MD¹, and Robert B. Ostroff, MD¹

¹Interventional Psychiatry Service, Department of Psychiatry, Yale School of Medicine, New Haven, CT

To the Editor

Electroconvulsive therapy (ECT) remains one of the most effective treatments in the current psychiatric armamentarium yet recent reports highlight widespread underutilization despite its excellent safety profile.¹ Here, we seek to add to the growing list of case series of the safety of ECT use in patients with history of significant intracranial pathology.

Ms. D is a 52-year-old woman with a history of recurrent, severe major depressive disorder with psychotic features admitted to our inpatient service for consideration of ECT with worsening psychosis and catatonic symptoms despite several psychotropic trials. In the year preceding admission, the patient had one additional hospitalization following a suicide attempt via cyclobenzaprine overdose. Her past medical history is notable for Hashimoto's thyroiditis, hypertension, a non-functional pituitary lesion (microadenoma vs. cyst), and two cerebral aneurysms diagnosed in 2012 on MRI/MRA as part of a workup for chronic migraine headaches. The 4×5×7-mm aneurysm at the trifurcation of the right middle cerebral artery (MCA) was successfully clipped in 2012 and the second aneurysm 1-mm from the M1 segment of the left MCA did not receive intervention. Since neurovascular intervention, the patient had received annual follow-up including serial neuroimaging without interval progression of aneurysms or the pituitary lesion described as a "hypoenhancing 5×6.6×5-mm left pituitary lobe lesion."

Upon admission, clinical evaluation was for significant psychomotor slowing, minimal oral intake, perseveration, insomnia, and auditory hallucinations associated with depressed mood and suicidal thoughts. Despite documented history of hypertension, her blood pressure (BP) remained normotensive (range 98/69 – 122/93 mmHg) with mild tachycardia (heart rate, range 82 – 107 beats per minute) throughout inpatient admission without antihypertensive agents. Laboratory assessments were notable for an abnormal dexamethasone (1 mg) suppression test (DST, Cortisol 08:00 = 15.1 µg/dL, Cortisol 16:00 = 9.2 µg/dL), but otherwise unremarkable. Initial treatment included a benzodiazepine challenge for catatonia

Corresponding Author: Brandon M. Kitay, MD, PhD, 300 George Street, Suite 901, New Haven, CT, 06511, Phone: 561-271-1502, Fax: 203-785-4207, brandon.kitay@yale.edu.

Conflict of Interest:

BMK declares no conflicts of interest. RBO and RBK have no conflicts of interest or financial disclosures to report.

and establishing on a stable dose of loxapine 55 mg total daily that afforded modest clinical benefit. Given the severity of psychosocial impairment and trajectory of treatment course, informed consent was obtained to proceed with ECT following extensive consultation with neurosurgery, endocrinology and anesthesia and a thorough discussion of the potential risks and benefits. A review of the neurosurgical procedure documentation confirmed aforementioned placement of a permanent Yagarsil-Aesculap clip at the right MCA trifurcation composed of non-ferromagnetic, titanium phynox alloy, as well as non-metallic DuraGen® Plus Adhesion Barrier Matrix (Integra LifeSciences, France) over the site of dural incision.

Bifrontal ECT (MECTA Spectrum 5000Q device) was initiated given the severity of clinical symptoms and selected over bilateral lead placement in order to maximize distances between the location of stimulus delivery, the known neurovascular lesion, and the metallic aneurysm clip.² Over the ECT series, propofol was used as the anesthetic agent (dose range, 80–100 mg), succinylcholine was used as the paralytic agent (dose range, 30–40 mg), and ketorolac 30 mg intravenous (IV) was used for analgesia as needed pretreatment. Per discussion with neurosurgery, it was recommended to maintain systolic blood pressure below 140mmHg throughout the procedure. Prior to the first treatment, she was given labetalol 10mg IV prophylactically with a pre-ictal BP of 117/80mm Hg. Nitroglycerine 40 mcg IV was used to mitigate peri-ictal hypertension with a peak BP of 116/76 mmHg; nitroglycerine was used during all subsequent treatments as needed (dose range, 40 mcg – 160 mcg). Seizure threshold was determined by titration method during the index treatment as 20.7 joules (88 mC) with a convulsion duration of 16 seconds and electroencephalographic seizure duration of 34 seconds. The second treatment was delivered at 1.5-times the seizure threshold charge as 32.6 joules (148 mC) with the following parameters: 0.5 msec pulse width, 60 Hz frequency, 4.5 seconds duration, 900 mA current. She did not receive pretreatment with labetalol and peri-ictal BP ranged from 102/71 – 113/81 mmHg with a postictal BP of 102/76 mm Hg. The patient subsequently underwent 9 ECT sessions before transitioning to a continuation phase schedule achieving remission of her depressive and psychotic symptoms after 14 total treatments, given at 2-week intervals. Continuation phase ECT was discontinued at the patient's requested following a review of the potential risk for symptom recurrence. To date, the patient remains in outpatient treatment in the community without reported neurological or neurovascular complications associated with treatment.

This represents the eighth report of a successful and uneventful ECT course in a patient with previously repaired cerebral aneurysm in a growing series of cases^{3, 4} that includes a patient having received ECT six days following balloon assisted liquid embolization.⁵ In this case, as in most reports to date, ECT was tolerated without appreciable neurological complications, despite the presence of an intracranial metallic object (e.g. aneurysm clip) and a small, 1 mm untreated aneurysm. While size, location, history of subarachnoid hemorrhage, and comorbid medical conditions (i.e. hypertension) are independent risk factors for spontaneous rupture of large aneurysms, a recent study employing hierarchical clustering analysis suggests that more subtle morphological and hemodynamic features may contribute to this risk especially for small (< 5mm) aneurysms.⁶ Given the hemodynamic shifts associated with ECT and the inherent risk of aneurysm rupture, those patients with a known cerebral aneurysm warrant significant risk stratification and pre-procedural

consultation given the challenges in evaluating these factors that may contribute to the likelihood of rupture. While it is encouraging that this case adds to the small and growing body of literature regarding the safety of ECT in patients with known cerebral aneurysms, it remains prudent that providers continue to report upon their experiences towards better understanding of the potential risks given the predicted 5% prevalence of cerebral aneurysms amongst the general population.

Acknowledgments

Source of Funding:

BMK is supported by an R25 IMPORT grant (4R25MH071584-10). STW is supported in part by grant number K12HS023000 from the Agency for Healthcare Research and Quality. The content is solely the responsibility of the authors and does not necessarily represent the official views of the Agency for Healthcare Research and Quality. STW also reports research support from Janssen Pharmaceuticals (administered through Yale) to conduct clinical trials as well as consulting fees from Janssen.

References

1. Wilkinson ST, Agbese E, Leslie DL, Rosenheck RA. Identifying Recipients of Electroconvulsive Therapy: Data From Privately Insured Americans. *Psychiatr Serv*. 2018
2. Mortier P, Sienaert P, Bouckaert F. Is electroconvulsive therapy safe in the presence of an intracranial metallic object?: case report and review of the literature. *J ECT*. 2013; 29(3):231–238. [PubMed: 23519224]
3. Elmaadawi AZ, Mashaly SI, Nasr S. The Use of Ultrabrief Left Unilateral Electroconvulsive Therapy in a Patient With Cerebral Aneurysms and Right-Sided Encephalomalacia and Stroke: A Case Report. *J ECT*. 2017; 33(4):e37–e38. [PubMed: 28767530]
4. Wilkinson ST, Helgeson L, Ostroff RB. Electroconvulsive therapy and cerebral aneurysms. *J ECT*. 2014; 30(4):e47–49. [PubMed: 25010028]
5. Pansare NH, Trenton AJ, Pelchat R. Electroconvulsive therapy performed 6 days after repair of an intracranial aneurysm using a liquid embolic system. *J ECT*. 2014; 30(3):e19–21. [PubMed: 24487644]
6. Varble N, Tutino VM, Yu J, et al. Shared and Distinct Rupture Discriminants of Small and Large Intracranial Aneurysms. *Stroke*. 2018; 49(4):856–864. [PubMed: 29535267]