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Approach to the High-Risk Cardiac Patient

To the Editor

Electroconvulsive therapy (ECT) is recognized as a safe and effective treatment for severe treatment-resistant depression. Certain medical conditions can lead to serious complications and need to be considered before initiating treatment. Significant cardiac comorbidities present risks of particular importance in affected patients. During ECT, a surge of catecholamines is often seen with the stimulus-induced seizure activity, resulting in increased heart rate, blood pressure, and cardiac output. Patients with heart failure and low ejection fraction may be unable to tolerate this sympathetic discharge due to hemodynamic instability and arrhythmias. Because of these complications and concerns for increased mortality, certain providers may be hesitant to initiate treatment in affected patients. In this case, we will discuss the consideration of risks and benefits and treatment planning for a patient with severely reduced ejection fraction who underwent a successful ECT series in hopes of helping other providers considering ECT in similar patients.

CASE REPORT

Mr X is a 68-year-old man who was referred by his outpatient psychiatrist for ECT evaluation. He has a history of depressive episodes that previously responded to right unilateral ECT 3 years prior and remained in remission with venlafaxine. Six months before his psychiatric admission, he had a myocardial infarction that resulted in severe dilated cardiomyopathy with ejection fraction of 14% and placement of implantable cardiac defibrillator (ICD). Functionally, he was severely limited by exertional dyspnea, barely able to walk through his house and perform activities of daily living. He developed a severe depressive episode about 2 months later, which complicated his cardiac rehab and candidacy for left ventricular assist device (LVAD). He experienced depression with anxious mood, anergia, severe anorexia (90-lb weight loss), insomnia, recent-onset psychosis (somatic delusions of a foul odor coming from his body), and cognitive impairment. He failed trials of venlafaxine, vortioxetine, risperidone, and brexpiprazole. The patient and his wife were willing to consider ECT.

He was hospitalized on the inpatient psychiatric unit in preparation for ECT. The patient was able to assent for the procedure, but because of depression severity and subsequent cognitive impairment, his wife was the surrogate decision maker. Psychiatry and anesthesia providers reviewed the risk and benefit discussion with the patient, his wife, and his extended family. All psychiatric and anesthesiology providers were identified in advance and invited to participate in this risk/benefit discussion. The goal was to increase awareness of the patient's and family's preferences among all providers involved in his care before the initiation of treatment to reduce the risk of moral injury.[1]

With respect to risks with ECT and heart failure, a retrospective chart review of 35 patients with heart failure documented the tolerability of the procedure with no patient deaths, complications of decompensated heart failure, or myocardial ischemia/infarction.[2] However, only 4 of the patients in this review had ejection fractions similar to our patient (ejection fraction <15%). Other retrospective chart reviews evaluated patients with pacemakers and ICDs and found only reversible adverse events including postprocedure hypotension, tachycardia, and benign premature ventricular contractions.[3,4] These studies show that ECT can be considered in patients with severe heart failure and ICDs.

Before ECT could be seen as a potential option, we determined how to monitor and prepare for adverse events in a high-risk patient including hemodynamic monitoring during treatments. We considered using a noninvasive continuous hemodynamic monitoring system, but the accuracy of noninvasive monitoring relative to an arterial line was suboptimal.[5] Given the cardiovascular status, anesthesia providers recommended monitoring the blood pressure concurrently with both an arterial line and dual blood pressure cuff monitoring (monitors on both arms with continuous blood pressure cycling).

Given his high risk for adverse events, we discussed contingency planning in the context of code status. We discussed with the wife temporarily rescinding the "do not resuscitate" order, so cardiac medications like epinephrine could be used for hemodynamic management during procedure. She agreed to this but did not want a prolonged resuscitative effort. If catastrophic events such as myocardial infarction, acute decompensated heart failure, or massive pulmonary embolism occurred, she did not want the patient transferred to cardiac catherization or intubated, which circumvented the need for cardiac anesthesiology and contingency access to catheterization lab. She did agree to chest compressions for a limited amount of time (<15 minutes) and external defibrillation. If an adverse event occurred, ECT treatments would be discontinued.

An additional factor in his consideration for ECT was his anticipated benefit from the procedure. He had a successful response to a prior ECT series resulting in prolonged remission, and his current episode was similar in severity and phenomenology to his prior episode. His depression severity also affected his LVAD candidacy. If ECT were not an option, a palliative approach would have to be considered given severe functional limitations from his cardiomyopathy. The anticipated benefits to improve his quality of life by resuming cardiac rehabilitation and possibility of receiving LVAD outweighed the cardiovascular risks of the ECT series. The patient, his wife, and extended family were also willing to accept the possible terminal risk in favor of ECT. After this extensive risk/benefit consideration, his wife provided procedural consent for the ECT series.

He completed 10 right unilateral ECT treatments and tolerated the procedure without major complications. For his first few treatments, he had an arterial line and continuous dual blood pressure monitoring until a consistent relationship was established between the 2 parameters. At that point, the arterial line was discontinued in favor of noninvasive dual blood pressure monitoring. He benefited from the treatments with noted improvements in mood, less psychomotor retardation, less anergia, and improved functional status. He was discharged from the inpatient psychiatric hospital to resume cardiac rehabilitation and evaluation for the LVAD.

Overall, this case report shows that ECT can be an option for a patient with severe heart failure. For similar cases, we would recommend careful consideration of risk/benefit, extensive discussion with patient or surrogate decision maker, multidisciplinary discussion of primary and backup plans, and the providers' preferences with regard to participation.

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REFERENCES

1. Williamson V, Murphy D, Phelps A, et al. Moral injury: the effect on mental health and implications for treatment. *Lancet Psychiatry.* 2021;8:453–455.
2. Rivera FA, Lapid MI, Sampson S, et al. Safety of electroconvulsive therapy in patients with a history of heart failure and decreased left ventricular systolic heart function. *J ECT.* 2011;27: 207–213.
3. Kokras N, Politis AM, Zervas IM, et al. Cardiac rhythm management devices and electroconvulsive therapy: a critical review apropos of a depressed patient with a pacemaker. *J ECT.* 2011;27:214–220.
4. Dolenc TJ, Barnes RD, Hayes DL, et al. Electroconvulsive therapy in patients with cardiac pacemakers and implantable cardioverter defibrillators. *Pacing Clin Electrophysiol*. 2004; 27:1257–1263.
5. Araz C, Zeyneloglu P, Pirat A, et al. Accuracy of continuous noninvasive arterial pressure monitoring in living-liver donors during transplantation. *Exp Clin Transplant*. 2015;13 (suppl 1):301–305.