Safety of Electroconvulsive Therapy in Severe Thrombocytopenia

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Electroconvulsive therapy (ECT) is the most effective treatment for severe and treatment-resistant major depression. Although ECT has a strong safety profile, there are still risks secondary to the general anesthesia and the body's physiological response to undergoing a seizure.[1,2]

During ECT, the body produces a brief 10- to 15-second parasympathetic response followed by a longer 5- to 10-minute sympathetic response characterized by hypertension, tachycardia, and arrhythmias.[1] It is theorized that these increases in blood pressure and heart rate could lead to increased risk of an intracranial hemorrhage, especially in patients at an already higher risk of spontaneous bleeding.[1,3]

Having an intracranial bleed related to ECT is rare. In a series of 20,000 ECT procedures, there was a single case of intracerebral hemorrhage (0.005% of cases).[4] In another study, ECT was not associated with an elevated risk of incident or recurrent stroke, including patients with significant vascular risk factors.[5]

The American Psychiatric Association published a task force report in 2001 with recommendations regarding the treatment, training, and privileging of ECT.[2] This publication contains only 1 sentence on the use of ECT in patients with thrombocytopenia, which states "No special precautions appear indicated in patients with thrombocytopenic states."[2(p41)]

ECT has been in use for over 80 years in the United States, yet there are only 2 case reports (from 1968 to 2001) that describe use in patients with significant thrombocytopenia.[2,6,7] Due to the limited number of randomized controlled trials and lack of published guidelines regarding use of ECT in patients with comorbidities, psychiatrists may face challenges weighing risks and benefits of ECT in patients with severe thrombocytopenia.[8]

Case Report

Ms A is a 36-year-old woman with history of major depressive disorder, panic disorder, and posttraumatic stress disorder who presented to the emergency department with worsening depression in the context of multiple psychosocial stressors. Her medical history was significant for paroxysmal nocturnal hemoglobinuria and a bone marrow transplant. A complete blood count revealed pancytopenia: hemoglobin of 4.56 g/dL (11.6–15 g/dL), absolute neutrophil count of 0.7×10^9/L ($2.5–6.0 \times 10^9$/L), and platelet count of 31×10^9/L ($150–400 \times 10^9$/L).

Ms A endorsed previous trials of multiple selective serotonin reuptake inhibitors (citalopram, fluoxetine, and sertraline), lamotrigine, methylphenidate, alprazolam, aripiprazole, doxepin, lorazepam, and mirtazapine with no significant benefit. She required numerous transfusions and a bone marrow biopsy before she was transferred to the inpatient psychiatric unit for further medication management of her depressive symptoms. Due to the severity of the patient's presentation and her history of treatment resistance, ECT was initiated.

The anesthesia team recommended transfusing the patient to a platelet count of 50×10^9/L before proceeding with ECT. We researched platelet transfusion guidelines, looked at similar case studies, and had a multidisciplinary meeting with the bone marrow transplant team before establishing a preprocedural platelet goal of 20×10^9/L.

Ms A's platelets ranged from 24 to 40×10^9/L prior to all 6 ECT treatments. No platelet transfusions were required, and there were no complications. Toward the end of her ECT course, the patient's depression had significantly improved.

We could only find 2 published case reports describing use of ECT in patients with significant thrombocytopenia (Table 1).[6,7] Gonzalez-Arriaza et al[7] decided on a preprocedural platelet goal of 20×10^9/L. Randomized trials of prophylactic platelet transfusion for procedures present logistic and ethical challenges, and these cutoffs were decided empirically.

Table 1.
Overview of the Available Case Reports Discussing ECT and Thrombocytopenia

Study	Age (y), sex	Diagnosis	Platelet count	Maximum heart rate (bpm)	Maximum blood pressure (mm Hg)	Treatments requiring transfusion
Kardener[6]	64, female	Agitated depression, ITP	$7–38 \times 10^9$/L	–	–	–/24
Gonzalez-Arriaza et al[7]	74, male	MDD, CML	13×10^9/L (admission)	100	136/80	8/9

Discussion

Patients with platelet counts >50×10^9/L usually do not experience abnormal bleeding even with surgery. Patients with counts between 20×10^9/L and 50×10^9/L may experience excessive bleeding with minor trauma, but spontaneous hemorrhage is unusual. When the platelet count is less than 20×10^9/L, spontaneous bleeding may occur, and the risk for severe bleeding is high if the platelet count is less than 10×10^9/L.[9] The clinical practice guideline from the American Association of Blood Banks recommends prophylactic transfusions for the following:

1. 10×10^9/L or less to reduce the risk for spontaneous bleeding
2. 20×10^9/L for patients having elective central venous catheter placement
3. 50×10^9/L prior to elective diagnostic lumbar puncture or major elective nonneuraxial surgery

However, clinical judgment, and not a specific platelet count threshold, is paramount in deciding whether to transfuse platelets.[10] Platelet transfusion is not a benign treatment and carries multiple risks including febrile reactions, allergic reactions, and infections.[11] Excessive platelet transfusions also incur a high cost and can worsen the critically low supply of blood and platelet products.[12] If our patient had a preprocedural platelet goal of 50×10^9/L, as initially recommended by anesthesia, she would have required multiple transfusions throughout her course of ECT.

This case highlights that ECT can be used safely in patients with severe thrombocytopenia. Although rare, there is a need for more research into understanding the mechanism behind intracranial hemorrhage during ECT and potential ways to reduce complications. We recommend a platelet goal of 20×10^9/L prior to each ECT treatment; however, additional studies are needed to determine cutoff limits for platelet transfusions prior to ECT to avoid excessive platelet transfusions, while still protecting patients from spontaneous intracranial hemorrhages.

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