Safe Administration of Electroconvulsive Therapy in Patient with Ventricular Septal Defect Patch: A Rare Case Report

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ABSTRACT

Electroconvulsive therapy (ECT) is a safe and effective treatment for many psychiatric illnesses. Even in cardiac patients, it is a low-risk procedure as compared to chronic use of the medications with possible side effects. Although rare, cardiovascular events during ECT remain a principal cause of morbidity and mortality. Therefore, administration of ECT in cardiac patients remained questionable. There is no data regarding the safety of ECT administration in patients with repaired ventricular septal defect (VSD), and to the best of our knowledge, this is the first case report of safe administration of ECT in patient with VSD. In this case report, we describe a patient with bipolar affective disorder, with repaired VSD, who was safely and successfully treated with ECT. It is essential that appropriate cardiac management be provided before, during, and after ECT by a multidisciplinary team of psychiatrists, cardiologists, and anesthesiologists. This case report suggests that ECT can be safely given to patients with repaired VSD, wherever there is an absolute indication for ECT.

Key words: Electroconvulsive therapy, safety, ventricular septal defect

INTRODUCTION

Electroconvulsive therapy (ECT) is used since decades by psychiatrists as lifesaving treatment modality. It is an important nonpharmacological modality of treatment for many major psychiatric illnesses.

There are no absolute contraindications for ECT;[1] however, clinicians should be aware of certain potential side effects or complications of ECT, mainly in patients with cardiovascular disease and in organic brain pathology.

Can ECT be used in cardiac patients is major question, the answer for which depends on the many factors. ECTs in cardiac patients are the low-risk procedure as compared to chronic use of the medications with possible adverse effects. However, case reports of cardiac rupture, cardiogenic shock, etc., in cardiac patients on ECTs have been reported. Hence, it is necessary to weigh the risks and benefits before giving ECT in a patient with major cardiac condition. There is paucity of data regarding the safety of ECT.
administration in patients with cardiac diseases, and to the best of our knowledge, this is the first case report of safe administration of ECT in patient with VSD.

Hereby, we are discussing a case of safe administration of ECT in operated VSD.

**CASE REPORT**

A 20-year-old woman was admitted for complaints of, increased speech, talking high of self, smiling excessively, increased goal-directed activity, and a false belief that someone would harm her. She had a history of two episodes of mania and one episode of depression, she had prior history of VSD, for which she was operated 8 years back. She has a family history of psychiatric illness in her uncle. On physical examination, she has a linear scar on her chest and rest of the systems respiratory, and genitourinary and per-abdominal findings are normal.

Mental status examination revealed increased tone tempo and quantum of speech with flight of ideas, inflated self-esteem, and delusion of persecution, with impaired judgment and insight. She was diagnosed with bipolar affective disorder, current episode manic with psychotic symptoms. Her Young’s Mania Rating Scale (YMRS) score on day 1 of admission was 41/60. She was started on tablet lithium 800 mg and tablet trifluperoxazine30 mg/day. Patients psychotic symptoms came down, but affective symptoms continue to persist. Hence, tablet sodium valproate was added. However, she developed hyperammonemia due to which sodium valproate was stopped and dose of lithium was increased to 1000 mg and then to 1200 mg, but the patient did not show any response after two weeks hence ECT was planned. Routine investigations are normal. Echo showed VSD patch in situ and rest of the parameters was normal. Medical and cardiology fitness were taken for ECT, and a written informed consent was obtained.

Anesthesia was induced with 175 mg of thiopentone and 50 mg of succinylcholine, and ventilation by mask using Ambu bag. During first ECT, SpO2 was 99%, baseline blood pressure was 110/70 and heart rate is 70 beats/min. Bi-temporal brief pulse ECT was given. A generalized tonic/clonic seizures was induced which lasted for about 56 s after which patient recovered well. The patient had shown significant improvement with three ECTs, and her YMRS score came down to 31/60. A total of ten ECTS were given over the span of 3 weeks with mean seizure duration of 71 s; her subsequent YMRS scores decreased gradually to 7/30.

**DISCUSSION**

Only little is known about the safety of ECT in cardiac patients. To better understanding regarding the safety issues and to prevent the harmful consequences of ECTs in cardiac patients, thorough knowledge about changes in cardiac physiology that occur during the ECT is required.

Variations of heart rate, blood pressure with anesthesia are described in Table 1.

The ECT stimulus and the induced seizure both exert cardiovascular effects, primarily through the direct neuronal transmission from the hypothalamus to the heart through parasympathetic tracts (the vagus nerve) and sympathetic tracts (primarily in the spinal cord). The cardiovascular response pattern is described in Table 2 as a four-stage process, involving shifts from parasympathetic to sympathetic to parasympathetic to sympathetic phases.

Here are some of the studies indicating the ECTs are safe in cardiac patients. Rivera et al., (2011) reported safety of ECT in heart failure patients under controlled conditions. Guttmacher and Greenland (1990) reported safety of ECT in elderly patients with a history of cardiac disease. Mueller et al. (2009) reported ECT is safe even in abdominal aortic aneurysms. However, Ali and Tidmarsh reported cardiac rupture in a 57-year-old man with recurrent depression, after a course of ECTs. Although most of the studies emphasize on the safety of ECT in cardiac patients, careful monitoring, and vigilance is needed in every step as untoward incidences were reported in patients with cardiac ailments.

Regarding the present case, VSD is a hole in the ventricular septum. VSD is most common congenital heart defect. This is treated by open-heart surgery, by sewing a patch of fabric or pericardium over the VSD to close it completely. A small number of patients with repaired VSDs may have problems with the heart valves (aortic or tricuspid), endocarditis, abnormal heart function.

**Table 1: Variations of heart rate, blood pressure with anesthesia during ECT procedure**

| Anesthesia | Heart rate | Blood pressure | Reason |
|------------|------------|----------------|--------|
| Before anesthesia induction | Elevated | Elevated | Anxiety |
| Anesthesia takes off | Decreases gradually | Decreases gradually | The muscle relaxant |

**Table 2: Variations of heart rate, blood pressure with anesthesia during ECT procedure**

| Anesthesia | Heart rate | Blood pressure | Reason |
|------------|------------|----------------|--------|
| Before anesthesia induction | Elevated | Elevated | Anxiety |
| Anesthesia takes off | Decreases gradually | Decreases gradually | The muscle relaxant |
rhythms and decrease in inotropic action of cardiac muscle. Therefore, require a regular check up with a cardiologist postsurgery.

**CONCLUSION**

This case report suggests that ECT can be safely given to patients with repaired VSD, wherever there is an absolute indication for ECT.

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**Conflicts of interest**

There are no conflicts of interest.

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**Table 2: The cardiovascular changes during electro convulsive therapy**

| Stimulus                  | System activated | Blood pressure               | Heart rate          |
|---------------------------|------------------|------------------------------|---------------------|
| Just after the electrical stimulus | Parasympathetic activation | Drop in blood pressure | Transient sinus bradycardia |
| In clonic phase           | Sympathetic discharge    | Blood pressure rise  | Heart rate rise      |
| After clonic phase        | Parasympathetic system is reactivated | Blood pressure drop | Heart rate drop      |
| Awakening                 | Sympathetic hyperactivity | Blood pressure rise | Heart rate rise      |