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Resolution of Severe Depressive Episode Following Post Electroconvulsive Therapy Fever: A Case Report

Pooja Ramakrishna Raikar*, Mamidipally Sai Spoorthy, Parul Gupta, Pradeep S Patil

Department of Psychiatry, Datta Meghe Institute of Medical Sciences, Wardha, India

ABSTRACT

Introduction: Electroconvulsive Therapy (ECT) has been considered as the most effective intervention for severe mood disorders. Common side effects of ECT include mild and transient memory disturbances, headache, myalgia. Fever and cyanosis after ECT have rarely been reported as side effects. And effect of post-ECT fever on psychopathology has been rarely discussed.

Case presentation: We reported a case of middle-aged male with bipolar affective disorder, current episode of severe depression with minimal response to pharmacotherapy, on a trial of ECT who developed fever and cyanosis following the administration of second dose of ECT and dramatic resolution of symptoms following the bout of fever.

Conclusion: This case reminds us of the need to anticipate such rare but important side-effects and initiate appropriate care. Also, this case sheds light on possibility of symptom resolution with emergence of fever necessitating a need for research on the relationship between febrile illness and bipolar disorders.

Key words: Electroconvulsive therapy, Fever, Bipolar affective disorder, Pharmacotherapy

ABBREVIATIONS

ECT: Electroconvulsive Therapy; LDH: Lactate Dehydrogenase; RTPCR: Reverse Transcriptase Polymerase Chain Reaction

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Corresponding author: Dr. Pooja Ramakrishna Raikar
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INTRODUCTION

Bipolar disorder is a severe mental illness which is characterized by recurrent episodes of mood elevation (mania or hypomania) and/or depression. Electroconvulsive Therapy (ECT) has been considered as the most effective intervention for severe mood disorders since 1940s. ECT has been found to be equally effective in both unipolar and bipolar depression. Common side effects of ECT reported by patients include nausea, headache, myalgia, which are mild and transient. Fever and cyanosis after ECT have rarely been reported as side effects. With prior informed consent, we hereby report a case of 45-year-old male diagnosed with a case of bipolar affective disorder who developed fever and cyanosis following the administration of ECT and dramatic resolution of symptoms following the bout of fever [1].

CASE PRESENTATION

A 45-year-old married male, belonging to a middle socio economic status from an urban background presented to our hospital with complaints of low mood, decreased interest in work and in pleasurable activities, decreased interaction, lack of self confidence, feelings of hopelessness, helplessness, worthlessness, and suicidal ideations. His general physical examination and systemic examination were unremarkable. On mental status examination, he was found to have decreased tone, tempo, volume of speech, increased reaction time, depressed affect and depressive cognition of hopelessness, helplessness, and worthlessness. The score on beck's depression inventory on the day of admission was 35 (severe depression). He had past history of hospitalizations for one episode of severe depressive disorder and one episode of mania [2].

He was on treatment with several combinations of mood stabilizers and anti depressants. The patient was compliant with prescribed oral medications. These medications had limited impact on depressive symptoms. Hence a trial of ECT was planned. At the time of consultation, the patient was on lithium 800 mg, aripiprazole 15 mg and escitalopram 20 mg. Informed

consent was taken. During first treatment, general anesthesia was induced with propofol, and 100 mg of succinylcholine was given for muscle relaxation and was preoxygenated for 3 minutes. He received bilateral ECT with 120 mc charge and a pulse width of 1.0 ms, resulting in a seizure lasting for 35 seconds [3]. After the first ECT, his blood pressure (130/80 mm Hg), pulse (78 beats per minute), and respiratory rate (20 breaths per minute) were normal. The patient did not report of any side effects post ECT. The score on mini mental status examination was 29/30. Patient reported little improvement in his depressive symptoms. Second ECT was planned a day after the first treatment. During second treatment, general anesthesia was induced with propofol, and muscle relaxation was achieved with succinylcholine 100 mg was preoxygenated for 3 minutes [4]. He received the second ECT, with the stimulus of charge 132 mC and pulse width of 1.0 ms and the seizure was obtained for 30 sec. There were no complications after second treatment. Eight hours after the treatment, he developed fever with chills (102.5 F), peripheral cyanosis and his spo2 dropped to 92% on room air. After internal medicine consultation, patient was shifted to medical intensive care unit for further management of fever and cyanosis. Blood samples were drawn, which showed a normal White Blood Cell count (WBC; 9400 cu.mm), normal total platelet count (1.5 lacs/cu.mm). ESR was raised (42 mm). C-reactive protein was raised [5]. D-Dimer (DDIM) was raised (1.09). Lactate Dehydrogenase (LDH) was (324) raised. Creatinine kinase was normal. Chest radiograph showed no pulmonary pathology, and his urine analysis result showed no abnormality. His Reverse Transcriptase Polymerase Chain Reaction (RTPCR) for COVID-19 was negative. Though the fever would reduce briefly with pharmacological intervention, patient had fever spikes with chills and rigors on and off, for more than 24 hrs with maximum of 103-degree F. His blood pressure was 130/80 mm Hg, pulse was 120 beats per minute and respiratory rate was 24 breaths per minute. He was provided with supportive treatment including intravenous fluids. He was medically stable after 3 days. His blood and urine cultures did not report of any growth [6].

Considering side effects further ECTs were withheld. Meanwhile, patient reported improvement in mood, and his depressive cognition. Hence, further ECTs were stopped. He was observed for 2 days and then was discharged. He was advised to continue escitalopram 20 mg HS (Table 1) [7].

Table 1: The overview of resolution of severe depressive disorder of a patient.

During consultation		After first ECT		After second ECT	
Lithium	800 mg	Blood pressure	130/80 mmHg	Stimulus of charge	132 mC
Aripiprazole	15 mg	Pulse	78 beats/min	Pulse width	1.0 ms
Escitalopram	20 mg	Respiratory rate	20 beats/min	-	-

RESULTS AND DISCUSSION

We described a case of middle aged male patient with a history of bipolar affective disorder with post-ECT induced fever and cyanosis followed by dramatic resolution of symptoms. The mechanism of induction of fever and cyanosis following the administration of ECT is unclear. Although, our patient showed mildly elevated levels of inflammatory markers including serum LDH, D-dimer and C-reactive protein which are non specific, concomitant infections were ruled out in view of absence of any localizing signs of infection, negative RTPCR for COVID-19, normal blood cell count, negative reports on blood and urine culture and normal chest X-ray. Other causes like neuroleptic malignant syndrome and malignant hyperthermia were also ruled out. As the patient had temporal onset of fever following the administration of ECT, it suggests a remarkable association between the ECT and onset of fever in our patient. However, the pathophysiology of fever post-ECT remains largely unknown [8]. Few theories include possibility of ictal involvement of the hypothalamus where the thermoregulatory center is located and generation of pyrogens after electrical stimulation due to innate immune reaction which can also result in febrile reactions. Although the possibility of such adverse effects following use of anesthetic agents could not be ruled out. With the advent of modified ECT with an efficient anesthesia team alongside, lesser complications are expected. However, emergence of fever and cyanosis should also be anticipated, cautioning vigilant monitoring of all the patients post-ECT [9,10].

Also, dramatic resolution of depressive symptoms following the emergence of fever suggests a beneficial role of fever in symptom resolution. Pyretotherapy (induction of fever to treat a disorder) can be traced back to hippocrates and galen who observed that mental state improved after feverish crises in some individuals [11]. It was used for treating psychosis during the turn of the 19th century, but with the advent of convulsive therapies, research on relation of fever and psychosis has largely been overlooked by the scientific community [12].

CONCLUSION

However, possibility of improvement due to ECT was also considered. Patients require since our patient received only two sessions of ECT. Hence, the study of relation of psychosis and pathophysiology of fever could shed more light on aetiology of psychosis. Hence, clinicians need to anticipate such rare but important side effects like fever and cyanosis in patients who receive ECT and initiate appropriate care. Also, there is a need for research on mechanism of action involved in febrile illness leading to

symptom resolution in bipolar disorders and also to further explore the therapeutic benefits on other mental illnesses.

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