

# On the Edge of the Impossible – The Use of Multiple Monitored Electroconvulsive Therapy (MMECT) in a Patient with Severe Psychotic Depression after two Myocardial Infarctions

Patryk Rodek <sup>1\*</sup>, Zuzanna Mielczarek <sup>2</sup>, Krzysztof Kucia <sup>1</sup>

<sup>1</sup> Department and Clinic of Adult Psychiatry, Faculty of Medical Sciences, Medical University of Silesia, Ziolowa 45, 40-635 Katowice, Poland.

<sup>2</sup> Student Scientific Organisation of Department and Clinic of Adult Psychiatry, Faculty of Medical Sciences, Medical University of Silesia, Ziolowa 45, 40-635 Katowice, Poland.

\*Corresponding Author: Patryk Rodek, Department and Clinic of Adult Psychiatry, Faculty of Medical Sciences, Medical University of Silesia, Ziolowa 45, 40-635 Katowice, Poland.

Received Date: June 06, 2024 | Accepted Date: June 24, 2023 | Published Date: July 19, 2024

**Citation:** Salman Syed, Hadassah Stein, Fareeha Aajmal, Harinder Sawhney, (2024), On the Edge of the Impossible – the Use of Multiple Monitored Electroconvulsive Therapy (MMECT) in a Patient with Severe Psychotic Depression after two Myocardial Infarctions, *International Journal of Clinical Case Reports and Reviews*, 18(4); DOI:10.31579/2690-4861/488

**Copyright:** © 2024, Patryk Rodek. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

## Abstract:

In 1966, Blachly proposed Multiple Monitored Electroconvulsive Therapy (MMECT). This procedure consists of the induction of numerous epileptic seizures during prolonged anaesthesia. MMECT fell into obscurity for unknown reasons, and research on this method abandoned for many years. This report presents a case of an elderly patient experiencing a severe episode of treatment-resistant psychotic depression who suffered a myocardial infarction while undergoing a series of ECT in the modified MMECT approach. Following a three-month period of exclusive pharmacotherapy, the patient was re-evaluated for MMECT. Eight triple treatments administered, but the patient experienced a second myocardial infarction. After an extended hospitalization period of nearly six months, the patient was discharged home in a state of complete remission of depressive symptoms and stable overall condition. To the best of our knowledge, this case represents the first instance of successful completion of MMECT in an elderly and significantly burdened patient.

**Key words:** mmeect; ect; psychotic depression; myocardial infarction

## Introduction

80 years ago, Electroconvulsive Therapy (ECT) has stood as the most efficacious treatment modality for severe psychiatric conditions, demonstrating a robust safety profile, even within the geriatric population. Notwithstanding its efficacy, the occurrence of cardiovascular events, particularly in patients with pre-existing cardiac burdens, represents the most severe albeit infrequent side effects associated with ECT. Current estimates suggest that only a limited proportion, 2% of patients, manifest significant adverse cardiac events after undergoing electroconvulsive therapy [1].

The most innovative variant of the technique was the MMECT, introduced in 1966 by Blachly. This method revolves around the induction of multiple epileptic seizures (ranging from two to eight) within a single general anaesthesia, accompanied by continuous monitoring of the patient's electrocardiogram (ECG) and electroencephalogram (EEG). It is imperative that the intervals between successive seizures in each series last for a minimum duration of three minutes [2].

Blachly hypothesized that, for certain groups of patients, employing MMECT may be even safer compared to conventional electroconvulsive therapy (ECT) [2]. For reasons not yet elucidated, investigations into them have been discontinued, with no documented resurgence in this approach for over five decades, thereby rendering the safety profile uncertain.

The aim of the article is to demonstrate that even in extremely challenging cases, the use of MMECT can be a form of breaking the therapeutic impasse and providing assistance to patients with severe somatic burdens.

## Case Presentation

A 73-year-old male, a retired history teacher, was admitted to the department of adult psychiatry in Katowice Poland due to psychotic depression. For approximately three weeks preceding admission, he reported symptoms such as pervasive low mood, heightened anxiety, restlessness, and disruptions in sleep patterns. The patient exhibited

manifestations consistent with depressive pseudodementia, expressing delusions characterized by depressive, catastrophic, and punitive themes. Notably, he displayed marked psychomotor retardation and protracted speech latency. The patient had a history of myocardial infarction necessitating stent implantation four years prior, and he received chronic treatment for hypertension, ischemic heart disease, and benign prostatic hyperplasia. Initial laboratory tests and a head computed tomography (CT) scan conducted upon admission revealed no significant abnormalities.

The patient was diagnosed with a severe episode of depression with psychotic features. The assessment of depression severity was conducted. He reached a score of 40 points on the 17-item Hamilton Depression Rating Scale and a score of 39 on Beck's Depression Inventory. Due to the patient's serious condition and psychotic depression, he was qualified for ECT. Following two weeks of standard ECT consisting of four treatments, and in the absence of a therapeutic response, the patient manifested a complete refusal to eat and developed catatonic symptoms. Consequently, the patient was deemed eligible for MMECT. All ECT sessions were performed using the Thymatron® System IV (Somatics, LLC) with the following parameters: a current intensity of 900mA, pulse-width 0,25ms, stimulus duration 8,0s, maximum charge delivered 104mC. The procedures were conducted under propofol anesthesia (130mg) and mivacurium myorelaxation (15mg).

Two days after the conclusion of the fourth MMECT series (after the 12th procedure), the patient experienced a non-ST-segment elevation myocardial infarction (NSTEMI). Laboratory analyses revealed elevated troponin T high sensitivity levels (0.172ng/ml) and markedly increased d-dimers (4362.25ng/ml). The patient was immediately transferred to the cardiology department for coronary angiography.

Following a brief interval, the patient was re-admitted to the psychiatric ward. Despite exhibiting a pronounced depressive mood, delusional ideation, and sleep disturbances, requalification for ECT proved unfeasible. For a duration exceeding three months, the patient received exclusively pharmacological interventions due to the contraindication for general anesthesia resulting from a prior myocardial infarction. Initially, the pharmacotherapeutic regimen comprised venlafaxine (300mg), mirtazapine (45mg), and olanzapine (15mg). After discontinuing formerly used medications, quetiapine (200mg) was introduced, replaced later on by risperidone (2.5mg), vortioxetine (20mg) substituted for venlafaxine, and mianserin (90mg) added to the treatment regimen.

Due to the profound resistance to conventional pharmacotherapy, the therapeutic impasse prompted the initiation of clozapine (75mg) and a reassessment for MMECT as soon as possible. Twenty-four treatments were administered, organized into eight series of three sessions each. Anesthetic induction was achieved using etomidate (12mg) and mivacurium myorelaxation (15mg), with a maximum charge of 56 mC.

Throughout each MMECT session and the subsequent two-hour post-treatment period, vigilant ECG, EEG, blood pressure, oxygen saturation, and pulse rate monitoring were consistently maintained, with parameters remaining stable within acceptable ranges. Gradual amelioration of the patient's mental state ensued, marked by improved mood and increased activity level.

Regrettably, within two days following the final ECT procedure, the patient reported chest pain and dyspnea. ECG examination revealed a NSTEMI, prompting the patient's expeditious transfer to the cardiology department, where stent implantation was deemed imperative. After the intervention, the patient's overall health improved, and concomitantly, his mental state achieved stabilization. Approximately two weeks thereafter, concluding an extended hospitalization period of six months, the patient was discharged from the hospital in a state of complete remission of depression and psychotic symptoms.

The patient expressed informed consent for the publication of his case description.

## Discussion

ECT has extensively explored over the years to assess its efficacy and safety profiles. The most sophisticated advancement in electroconvulsive techniques to date is the introduction of MMECT in 1966 by Blachly. Notable advantages of MMECT modifications over conventional ECT encompass enhanced safety parameters and a reduced average duration of hospitalization [3]. Significant advancements have transpired in general anesthesia techniques and stimulation parameters since the 1960s. Presently, the administration of general anesthesia utilizing mivacurium and propofol has evolved into a routine and firmly established procedure. This undoubtedly played a pivotal role in our decision to undertake such a substantial risk. Blachly had reported on the method's considerable safety and efficacy, even in conjunction with older anesthesia methods [2]. Additionally, Mielke demonstrated the successful application of MMECT in the elderly without exposing them to serious adverse effects [4].

Nevertheless, it remains a relatively unexplored domain in therapeutic research, with only a limited body of literature addressing this particular subject. Our case represents the second documented report globally after an approximately 50-year hiatus in this field. The initial case, also recently demonstrated by our research team, involved a patient diagnosed with catatonic schizophrenia, for whom MMECT was administered due to the lack of efficacy in standard therapeutic interventions. This patient underwent a total of forty-two electroconvulsive treatments, of which 21 were conducted in the MMECT modification, leading to demonstrable improvement after a hospitalization period of sixty-four days [5]. In comparison, our patient underwent forty electroconvulsive treatments, with thirty-six of them in the MMECT modification, and his hospitalization extended over a total duration of six months. Limited research exists examining the association between myocardial infarction and electroconvulsive therapy, primarily in the context of the method's recognized safety and the infrequent occurrence of cardiovascular complications. In Mielke's investigation on the safety of MMECT in elderly patients with depression, only one instance of myocardial infarction was reported, observed in a patient concurrently receiving lithium [4]. Notably, there is a scarcity of additional reports documenting myocardial infarction after MMECT, with only two isolated reports of myocardial infarction following standard ECT.

One of these cases involved a 51-year-old Chinese patient who experienced two successive heart attacks and concurrently developed catatonic symptoms. In response, ECT was initiated four weeks after the infarction, leading to the resolution of symptoms by the third week with no subsequent cardiovascular complications [6]. In the context of our patient, establishing a definitive causal relationship between ECT and myocardial infarction proves challenging, given the patient's pre-existing critical stenosis of coronary arteries, a history of myocardial infarction, and other bodily burdens.

Based on reports indicating the potential of electroconvulsive therapy for the inactivation of the heat shock gene Sirtuin 1, it appears that the application of MMECT must also be considered in the context of excessive heat production; however, in our case, the lack of radical action was deemed a direct threat to the patient's life [7, 8].

The decision to pursue MMECT, in this case, was rooted in the episode's extreme resistance to pharmacotherapy, aiming to surmount the therapeutic impasse. We acknowledge that the case presented herein represents an extreme scenario. However, it is a part of the ongoing endeavour to help patients at all costs, even in seemingly hopeless circumstances.

## Conclusions

The long-forgotten MMECT may serve as a mean to break through therapeutic deadlock and assist even patients with extreme somatic burdens. Our case demonstrates that even in extremely severe cases, or in patients with significant cardiac conditions, MMECT can be applied after careful consideration of potential benefits and risks.

## References

1. Duma A, Maleczek M, Panjikaran B, et al. (2019). Major Adverse Cardiac Events and Mortality Associated with Electroconvulsive Therapy: A Systematic Review and Meta-analysis. *Anesthesiology*; Vol. 130: 83–91.
2. Blachly PH, Gowing D. (1966). Multiple monitored electroconvulsive treatment. *Compr. Psychiatry*; 7(2): 100–109.
3. White RK, Shea JJ, Jonas MA. (1968). Multiple monitored electroconvulsive treatment. *Am. J. Psychiatry*; 125(5): 622–626.
4. Mielke DH, Winstead DK, Goethe JW, et al. (1984). Multiple-monitored Electroconvulsive Therapy: Safety and efficacy in elderly depressed patients. *J. Am. Geriatr. Soc*; 32(3): 180–182.
5. Chrobak J, Rodek P, Kucia K. (2023). Multiple-Monitored Electroconvulsive Therapy (MMECT) – does it really just belong in psychiatry’s past? A case report. *Psychiatria Polska*; 1-7.
6. Hong Tay K, Lee S.Y.L, PeyYap P, et al. (2020). Electroconvulsive therapy after recurrent myocardial infarction in a catatonic patient. *PsychiatryClin. Neuroscience*; 74(11): 623-624.
7. Martins I. (2018). Electroconvulsive Therapy and Heat Shock Gene Inactivation in Neurodegenerative Diseases. *Annals of Neurodegenerative Disorders.*; 12;3(1):1-3.
8. Martins I. (2018). Brain Stimulation Therapies in Neuropsychiatric and Neurodegenerative Diseases. *International Journal of Genomics and Data Mining*.



This work is licensed under Creative Commons Attribution 4.0 License

To Submit Your Article Click Here: [Submit Manuscript](#)

DOI:10.31579/2690-4861/488

### Ready to submit your research? Choose Auctores and benefit from:

- fast, convenient online submission
- rigorous peer review by experienced research in your field
- rapid publication on acceptance
- authors retain copyrights
- unique DOI for all articles
- immediate, unrestricted online access

At Auctores, research is always in progress.

Learn more <https://auctoresonline.org/journals/international-journal-of-clinical-case-reports-and-reviews>