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CASE REPORT

Anaesthetic Management of Neuroleptic Malignant Syndrome (NMS) for Electro–convulsive Therapy (ECT).

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Abstract

Electroconvulsive therapy (ECT) can be effective in treatment of resistant neuroleptic malignant syndrome (NMS) patients. Anesthesia and use of short acting muscle relaxant for electroconvulsive therapy in such patients may encounter anesthetists with specific challenges. This case report describes successful anesthetic management in 30-year-old female patient undergoing three electroconvulsive therapy sessions after ICU admission for treatment of neuroleptic malignant syndrome.
Keywords: Neuroleptic malignant syndrome, Characteristics of NMS, Treatments of NMS, Electroconvulsive therapy (ECT)

1 | INTRODUCTION

Neuroleptic malignant syndrome (NMS) is the disturbance of hypothalamic and basal ganglia dopaminergic function. It may occur during treatment with antipsychotic agents (1) . The incidence and mortality rates of NMS are approximately 0.07% to 2.2%, and 15%–25%, respectively (2) . Typical characteristics consist of hyperthermia, altered level of consciousness, muscle rigidity, catatonia, autonomic dysfunction, and elevation of Creatine Kinase (CK) level. The previous findings may be in hypothyroidism which also predisposes the patient to NMS by general increase in brain dopaminergic activity (3) . Bromocriptine, Dantrolene, and benzodiazepines are effective in the treatment of NMS (4) . Some authors recommend that electroconvulsive therapy (ECT) may be effective if signs and symptoms are resistant to supportive care and pharmacotherapy (5) (6) . There is a known similarity between the clinical symptoms of NMS and malignant hyperthermia (MH) (7) ; therefore several reports have incited some controversy regarding the safety of the use of known triggering agents of MH such as Succinylcholine in patients with a history of NMS (7, 8) . Anesthesia and muscle

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relaxation for ECT in such patients poses specific challenges to anesthesiologists. This case report describes successful use of Propofol, Midazolum and Fentanyl regimen without muscle relaxant in a patient undergoing ECT for the treatment of NMS.

2 | CASE REPORT

A 30-year-old female with a history of hypothyroidism on thyroxin treatment not past history of psychiatric illness, presented on agitation, insomnia, irritable mood, suicidal ideas and treated traditionally for 2 days was admitted to psychiatric hospital emergency and received antipsychotic and antidepressant drugs for 3 days and later, developed increasing body temperature, muscle rigidity, diaphoresis, cognitive impairment, and some degrees of impaired consciousness. On examination of the patient was agitated and irritable mood. His vital signs were as follows: temperature (38.2○C), blood pressure 137/86mm Hg, heart rate 115 beats/min, and respiratory rate 18. The CK level was markedly elevated (587U/L) other laboratory results, including electrolytes, were slightly decreased. Antipsychotic drugs were stopped, and diagnosis of NMS was made, because the patient met three major (rigidity, hyperthermia, rising of CK) and three minor criteria (tachycardia, diaphoresis, cognitive impairment) of NMS and referred to department of medicine and admitted on intensive care unit (ICU) and received Bromocriptine and improved and discharged from ICU stupor and mute planed for ECT under general anesthesia. After pre− oxygenation with 100% O2 via face mask, anesthesia was induced with Propofol 1.5 mg/kg IV, Midazolum 3mg and Fentanyl 0.5 μg/kg. Then the ECT stimulus was applied, and it produced an ensuing seizure. Succinylcholine and any other muscle relaxants were avoided. The doses of propofol, Midazolum and fentanyl sedation remained fixed in all three sessions of ECT and there was no need for adding other anesthetic or analgesic drugs for inducing anesthesia. Bilateral ECT was administered using an ECT stimulator (Analog-output ECT: Ectron, Model 6D Serial No. 124 .Ectron Co Ltd., Letch worth, Garden City, HERTS SG6 IAQ, England). The first selected stimulus intensity was 340 that induced a 21 second relatively generalized tonic colonic (GTC) seizure. The stimulus intensity titrated based on previous seizure length and reached 400 in the last session. The range of seizure duration was 17–21 second (mean 19 second). The mean time from inducing anesthesia to returning spontaneous ventilation was 8 minutes [7–10 minutes], and patient opened his eyes by commend after 9–14 minutes (mean 11 minutes). After three ECT sessions that was done two times a week, the psychotic symptoms improved considerably, and the patient was discharged from hospital without further complications.

3 | DISCUSSION

Although NMS and MH result from different pathophysiological mechanisms (9) , however, they have some common clinical features. So patients susceptible to NMS may be vulnerable to developing MH. ECT has been used as a treatment for NMS, because it supposedly increases circulating Catecholamines, including dopamine, in the central nervous system (4) .

Succinylcholine remains the most commonly used muscle relaxant to decrease the strong muscle contractions associated with ECT-induced seizure activity (10) . However, the use of this rapid and short-acting drug can accompany with side effects in patients with history of susceptibility to MH, NMS, and catatonic schizophrenia (11, 12) . And it has been suggested that the use of Succinylcholine should be avoided in patients with a history of these diseases (13) . Although nondepolarizing agents has been used successfully in the treatment of NMS, some authors suggest that these drugs are associated with increases in temperature, CK levels, and leukocytosis (14) so, it may be advisable to avoid administering depolarizing and nondepolarizing muscle relaxants to patients with NMS. Based on this information, we decided to perform ECT using fentanyl propofol without muscle relaxant in this case. In the sole related case report that we find, Franks et al. (15) (16) performed

Propofol has significant myorelaxant properties on pharyngeal and laryngeal structures, so it is the agent

of choice or intubation without muscle relaxant (17) On the other hand, there are some reports that the infusion of propofol and remifentanil slightly decrease both the train-of four ratio in comparison with the preoperative value (18) and Succinylcholine - induced fasciculation (19, 20) . Based on the results reported here in, and the mentioned pharmacological properties, individuals with NMS may be at providing general anesthesia using Propofol, Midazolum and Fentanyl regimen without muscle relaxants and able to complete sessions of ECT without any associated complications

4 | CONCLUSIONS

It is likely that propofol–midazolum and fentanyl regimen without muscle relaxants for ECT in NMS is safe and effective.

Consent

Written informed consent was obtained from closed patient relative for publication of this case report. A copy of the written consent is available for review.

Interest of conflicts

No interest of conflicts were exist

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