A Case Report: Anaesthetic Implications for 4-year-old Girl with Anti-NMDA Encephalitis

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Background

Anti-N-methyl-D-aspartate (NMDA) receptor encephalitis is caused by autoantibodies binding to NMDA receptor¹. Although it is uncommon autoimmune disease, it is a serious-life threatening disease with slow neurological recovery. Anaesthesia for tracheostomy or gastrostomy may be required in some of patients with anti-NMDA receptor encephalitis. Meanwhile NMDA receptor is target of many anaesthetic agents. Therefore, anaesthesia in these patients is challenging. We report an anaesthetic management of a pediatric patient with anti-NMDA receptor encephalitis.

Discussion

Symptoms of anti-NMDA receptor encephalitis are abnormal movements, seizures and autonomic nervous disturbance (i.e. hyperthermia, arrhythmia, hypo/hypertension, apnea). Those symptoms are similar to the action of some anaesthetic agents.² Anaesthetic agents with an action on NMDA receptor antagonist should be avoided (Table 1). In addition, the invasive monitoring including arterial-line, central venous pressure for patient with severe autonomic nervous disturbance should be considered. In this report, our pediatric patient underwent successful general anaesthesia using propofol, fentanyl and sevofurane.

Case report

A 4-year-old girl patient (ASA 3, 130 cm and 24 kg) presented with dystonia and behavioural change. The cerebrospinal fluid analysis was positive for NMDA antibody. She was diagnosed anti-NMDA receptor encephalitis. During hospitalization, she developed generalized seizure. As a result, she was intubated and transferred to a pediatric intensive care unit (PICU). She was given anticonvulsive drugs, cyclophosphamide, intravenous immunoglobulins and corticosteroids. Unfortunately, her conditions did not improve; she was performed percutaneous gastrostomy tube placement under general anaesthesia. For preoperative management, anesthetic agents, emergency drugs (i.e. vasopressor, atropine, adrenaline) and reserving PICU were prepared. General anaesthesia was induced with 30-mg of propofol and 10-mg of fentanyl. Subsequently, she was intubated an uncuffed oral endotracheal tube number 5 and 15 cm in depth. Anaesthesia was maintained by air-oxygen mixture with 0.6 of FiO₂ and 2% sevofurane throughout the gastrostomy. After the successful operation, the patient was extubated. She was observed in PICU for an hour and transferred to a ward in a stable condition. No anesthetic related adverse event was observed after 24-hours of postoperative period.

Table 1. Anaesthetic agents and NMDA receptor

NMDA receptor antagonist	Non NMDA receptor antagonist
Nitrous oxide	Volatile anaesthetic agents
Ketamine	Muscle relaxant
Propofol(in vitro)	Barbiturate
Methadone	Opioids
Tramadol	
Phencyclidine	

References:

1. Dalmau J, Gleichman AJ, Hughes EG, Rossi JE, Peng X, Lai M, Destain SK, Rosenfeld MR, Balice-Gordon R, Lynch DR: Anti-NMDA-receptor encephalitis: case series and analysis of the effect of antibodies. Lancet Neurol 2008, 7(12):1091- 8.
2. William M. Anti-NMDA receptor antibodies encephalitis. Pediatric Anesthesia 2009; 19,911-912.

Learning points:

General anaesthesia is safe for anti -NMDA receptor encephalitis by using propofol, fentanyl and sevofurane. Nitrous oxide and ketamine should be avoided.