

Case Report

The use of epidural anesthesia in excision of ovarian teratoma associated with anti-N-methyl-D-aspartate receptor encephalitis: a case report

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Abstract: Anesthetic management of patients with anti N-methyl-D-aspartate receptor encephalitis is challenging, and individualized approaches should be taken based on patients' complicated pathophysiological conditions. We reported here a case of epidural anesthesia for a patient complicated with anti N-methyl-D-aspartate receptor encephalitis in convalescent phase undergoing excision of ovarian teratoma. The epidural anesthesia was performed in the L1-L2 space followed an intravenous administration of midazolam (total 2 mg) for sedation. Low dose pethidine (30 mg) was supplemented for analgesia. A satisfactory anesthesia with spontaneous ventilation was provided for the 45 minutes surgery. The patient was discharged 5 days after the surgery, and no complications were reported. This case demonstrated a successful epidural anesthesia used for a patient with anti N-methyl-D-aspartate receptor encephalitis in convalescent phase. The advantage of epidural anesthesia used for this kind of patients is to reduce the risk of postoperative anesthesia-related pulmonary complications, and avoid the potential adverse neurological effects of general anesthetics.

Keywords: Epidural anesthesia, anti N-methyl-D-aspartate receptor encephalitis, ovarian teratoma

Introduction

Anti N-methyl-D-aspartate receptor (anti-NMDA-R) encephalitis is an immune-mediated encephalitis, which was originally described in women with ovarian teratomas [1, 2]. Its clinical manifestations are related to N-methyl-D-aspartate (NMDA) receptor blockade by patient's auto-antibodies [3]. Anesthetic management of these patients can be very challenging due to the special pathophysiology, including psychiatric symptoms autonomic instability, autonomic instability, seizures, and so on. Here we reported a case of epidural anesthesia in combination with a low dose of benzodiazepines and opiates during the surgery of ovarian teratoma excision on a patient with anti-NMDA-R encephalitis in convalescent phase.

Case report

The patient's father signed the informed consent form for this case report.

The patient was a 17-year-old woman (height 157 cm, weight 47 kg). She was admitted to the neurology ward for seizures and mental disorders three months ago. She had a tracheotomy due to the difficulty in breathing and severe lung infection in intensive care unit (ICU). After medical treatment, the pulmonary infection and seizures of the patient was controlled, while mental disorders still persistent. The endotracheal tube was extubated one month before surgery. Physical examination revealed that the patient had mental disorders including somnolence, intermittent awake and mental abnormalities. The diagnosis of anti-NMDA-R encephalitis was confirmed by the presence of specific antibodies (NMDA-R-Ab/NMDA-R-AB) in serum. Surgery for tumor resection was scheduled because of a teratoma (56 mm×36 mm) located in right ovary.

At the time of surgery, the patient had mild impaired lung functions due to bronchitis, which

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manifested as cough and phlegm. The blood pressure, heart rate, peripheral oxygen saturation and coagulation function of the patient were in the normal range.

Because of the patient's complicated syndrome, an epidural anesthesia in combination with a low dose of benzodiazepines was applied. General anesthesia was the alternate plan. The patient was administered midazolam 2 mg before the epidural block was performed. Briefly, the patient was placed in the left lateral position. A 17-gauge Tuohy needle was inserted into the L1-L2 space, and a catheter was then inserted 3 cm beyond the tip of the needle. A test dose of 3 ml 2% lidocaine was administered, followed by two doses of 6 ml 2% lidocaine in 5 min intervals. The upper sensory block level reached T7 within 15 min after the last injection of lidocaine.

Dexamethasone 10 mg and pethidine 30 mg was given to the patient intravenously just before surgery. Spontaneous ventilation was maintained. The blood pressure, pulse oximetry (SpO₂) and heart rate were stable during the surgery. The patient was quiet and in somnolence, and her consciousness and language communication were maintained well during the surgery. The duration of surgery was 45 min. The total estimated blood loss of the patient was 150 ml and 800 ml of lactated Ringer's solution was infused. There were no signs of dysphoria or epileptic seizure. One hour after the surgery, the sensory and motor functions of the patient were recovered from the neuraxial blockade, and no neurological complications were observed. The Visual Analogue Scale (VAS) was 2 to 3. The patient was treated in ICU for one day after the surgery. The patient was discharged 5 days later, no other severe complications were reported.

Discussion

Anti-NMDA-R encephalitis typically occurs in young women and is commonly associated with ovarian teratomas [1, 2]. It is a syndrome with psychiatric symptoms (personality changes, irritability, depression and hallucination), short-term memory loss, confusion, coma, seizures and autonomic instability, even hypoventilation requiring respiratory support [3, 4]. It is immune-mediated encephalitis associated with the antibodies against NMDA receptors

[3]. Anti-NMDA-R antibodies may be produced as a consequence of immunization against ectopic brain tissue found in teratoma, leading to glutamatergic transmission impairment [1]. Inhibitory GABAergic interneurons with high concentrations of NMDA receptors is also affected [3]. Treatment for anti-NMDA-R encephalitis includes immunotherapy, chemotherapy, plasma exchange, and removal of teratoma if present. The removal of an underlying tumor is always associated with a good prognosis: complete recovery or mild sequelae. Nevertheless, the recovery is slow, maybe 3-4 months or longer.

It is not consistent on the ideal anesthesia method for this kind of patients undergoing ovarian tumor removal. In the present case, the patient was in the convalescent phase of anti-NMDA-R encephalitis and had a history of tracheotomy. The pulmonary infection in the patient was not completely controlled when the surgery was performed. It was very difficult for us to select an anesthesia method because of complexities of the disease. Although general anesthesia has been reported in many cases [4, 5-7], its application in this patient remains controversial. The NMDA receptors are the targets of many general anesthetics. Many anesthetic drugs, such as nitrous oxide, ketamine, tramadol, etc., directly inhibit NMDA receptors and thus induce the symptoms similar to those observed in anti-NMDA-R encephalitis [1]. Therefore, NMDA antagonists should be avoided in patients with anti-NMDA-R encephalitis. Other anesthetics commonly used in general anesthesia such as sevoflurane and propofol, can enhance GABAergic transmission, and inhibit NMDA receptors. The potential side effects of propofol and sevoflurane have been reported in the patients with anti-NMDA-R encephalitis [8].

The recent history of tracheotomy increases the risk of the difficult airway, damage of trachea and hemorrhage during intubation. The general anesthetics may aggravate the damage of cerebral tissue, and patient's condition may be deteriorated after the surgery. The aggravated pulmonary infection is another difficult issue we should consider. The perioperative risks in this case include central respiratory depression, lung infection, aggravated neurological function.

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Despite the lack of report about epidural anesthesia used in patients with anti-NMDA-R encephalitis, lumbar epidural anesthesia may be superior to general anesthesia for this patient. Spontaneous breathing is maintained without the risk of difficult airway. Potential side effects of general anesthetics can be also avoided. Anesthetics such as benzodiazepines and opiates, which do not interfere with the NMDA pathway, is recommended for these patients. Therefore, in this case, epidural anesthesia was chosen to be used in combination with a low dose of midazolam and pethidine. The patient presented here had no neurological adverse reactions after the operation.

In conclusion, epidural anesthesia can be an alternative for some patients with anti-NMDA-R encephalitis, especially in convalescent phase. The side effects of general anesthetics can be avoided, and the complications related to general anesthesia, especially the respiratory complications can be reduced.

Disclosure of conflict of interest

None.

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