

Case Report

Total Intravenous Anesthesia for a Patient with Narcolepsy

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Abstract

We report the successful management of Total Intravenous Anesthesia (TIVA) for a narcoleptic patient using propofol and remifentanil under Bispectral Index (BIS) monitoring. A 63-year-old woman with narcolepsy required oral surgery under general anesthesia. On the morning of the day of operation, she took methylphenidate and modafinil for control of narcolepsy. Anesthesia was induced with continuous infusion of remifentanil and propofol, and maintained with remifentanil and propofol under BIS monitoring. Anesthesia, which lasted almost 4.5 h, was uneventful, with neither significant change in hemodynamics nor delayed emergence from anesthesia. In our patient, symptoms of narcolepsy were well controlled. In such patients, habitual central nervous system stimulants should be continued before anesthesia, and short-acting anesthetic drugs are desirable for general anesthesia.

ABBREVIATIONS

TIVA: Total Intravenous Anesthesia; BIS: Bispectral Index; REM: Rapid Eye Movement

INTRODUCTION

Narcolepsy is a disorder of unknown etiology. It is characterized by excessive sleepiness that is typically associated with cataplexy and other Rapid Eye Movement (REM) sleep phenomena, such as sleep paralysis and hypnagogic hallucinations. When administering general anesthesia to patients with narcolepsy, delayed emergence after general anesthesia, post-operative hypersomnia and drug interactions should be considered. However, there are few reports on the anesthetic management of patients with narcolepsy. We report a case of oral surgery under general anesthesia involving a narcoleptic patient.

CASE PRESENTATION

A 63-year-old woman fell from a step while changing a fluorescent light, and fractured her zygomatic arch. She was recommended open repair and fracture fixation with metal plating under general anesthesia. She first reported symptoms of excessive sleepiness at the age of 13 years, but was only diagnosed with narcolepsy several years prior to the current surgery due to the presence of the four major narcolepsy signs (excessive daytime sleepiness, cataplexy, sleep paralysis and hypnagogic hallucinations), following which medical treatment was commenced. She was also HLA-DQB1*0602 positive.

The patient was 149 cm tall and weighed 64 kg. Preoperative examinations, including blood tests, urinalysis, chest x-ray, electrocardiogram and respiratory function were unremarkable. Her habitual medications included methylphenidate, modafinil, clonazepam and brotizolam.

Her sleep attacks disappeared as long as she took the drugs regularly or got enough sleep. Her frequency of sleep paralysis, hypnagogic hallucination and cataplexy also decreased with medication. Therefore, she had no trouble carrying out daily activities and her work, hotel management, was not interfered by the disease.

On the morning of the operation, she took her daily dose of methylphenidate and modafinil. On admission to the operating room, her blood pressure was 111/66 mmHg and her heart rate was 59 bpm. In addition to routine monitoring, a BIS sensor was applied. General anesthesia was induced with continuous intravenous (IV) remifentanil and propofol. IV rocuronium (30 mg) was administered to facilitate tracheal intubation. Anesthesia was maintained with TIVA with propofol and remifentanil. The BIS value was maintained within a range of 40 - 60 during surgery. Anesthesia lasted almost 4.5 h and was completed uneventfully. Neither significant changes in hemodynamics nor delayed emergence from anesthesia was noted.

At the postanesthesia rounds, it was confirmed that neither awareness under anesthesia nor perioperative nightmares had occurred. The postoperative course was uncomplicated and she was discharged on the eleventh postoperative day. During hospitalization, no symptoms of narcolepsy were observed.

DISCUSSION

Narcolepsy with cataplexy is characterized by excessive daytime sleepiness and cataplexy. Its other symptoms are hypnagogic hallucinations and sleep paralysis [1]. Central nervous system stimulants, such as amphetamine, methylphenidate and modafinil are used to treat narcolepsy [2,3]. Delayed emergence, apnea and sleep paralysis after general anesthesia, and interactions between anesthetic agents and drugs used to

treat narcolepsy must be considered when administering general anesthesia to patients with narcolepsy.

There are few reports of delayed emergence from general anesthesia in patients with narcolepsy. Mesa et al [4] reported successful administration of general anesthesia to a patient with narcolepsy. This patient, before being diagnosed and treated for narcolepsy, had undergone general anesthesia several times, in which emergences were delayed. At the time the reported general anesthesia was performed, the patient had been diagnosed with narcolepsy and was under treatment, and the anesthetic course was uneventful. Burrow et al [5] performed a retrospective study and reported that treated narcoleptic patients were at no increased risk for postoperative complications. In the present case, the patient's symptoms were well treated and the course of general anesthesia was smooth. From these findings, it is likely that delayed emergence from general anesthesia in a controlled narcoleptic patient is rare.

It is necessary to pay attention to the patient's regular medication. Drug interactions between anesthetics and the patient's habitual medications, especially central nervous system stimulants, should be considered. Both modafinil and methylphenidate stimulate the central nerve system and may interfere with the effect of general anesthetics [6]. Although these drug interactions may affect anesthesia, the influence can be minimized with careful monitoring of anesthesia depth and hemodynamics. In addition, whether or not habitual drugs should be continued preoperatively needs consideration. Peláez et al [2] and Morimoto et al [7] continued habitual medication up to the day of surgery, and anesthesia and surgery were completed uneventfully in their case. Burrow et al [5] and Martz [8] also reported that pharmacological therapy for narcolepsy should be continued during the perioperative period. In the present case, we continued methylphenidate and modafinil. To avoid adverse anesthetic events, medication for narcolepsy should be continued preoperatively.

Selection of the appropriate anesthetic agents is also important. An atonic attack occurring under residual anesthetic effects may result in respiratory depression. With a view to prevent respiratory depression, the use of short-acting anesthetics is necessary. Peláez et al [2] reported their successful use of short-acting anesthetic drugs in a narcoleptic patient without residual sedation. In the present case, we used propofol and remifentanyl. Hence, it is essential to use short acting drugs when administering anesthesia to narcoleptic patients, to avoid postoperative complications.

BIS monitoring is useful for maintaining appropriate anesthesia depth and preventing delayed emergence. Morimoto et al [7], Ozkose et al [9] and Staikou et al [10] reported uneventful administration of general anesthesia to a narcoleptic patient under BIS monitoring. In the present case, we used BIS monitoring to avoid drug over dosage that would have caused delayed emergence from anesthesia, as well as intraoperative awareness that could have resulted due to the preoperative

administration of central nervous system stimulants. With this strategy, anesthesia was conducted uneventfully in this patient.

In the present case, we performed TIVA and avoided use of inhalation anesthetics because Mesa et al [4] reported delayed emergence from isoflurane-nitrous oxide anesthesia to an uncontrolled narcoleptic patient. According to past reports, general anesthesia in controlled narcoleptic patients was completed uneventfully with both intravenous [2,4,9] and inhalation anesthetics [7,10,11]. This indicates that both methods can be successfully used as long as the symptoms of narcolepsy are preoperatively well controlled.

In conclusion, we performed safe anesthesia management in a patient with narcolepsy. If the disease is controlled well and the patient's regular central nervous system stimulant medication is continued perioperatively, general anesthesia can be performed uneventfully. Short-acting drugs are desirable for general anesthesia and BIS monitoring is useful to prevent both awareness during general anesthesia and delayed emergence.

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