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Perioperative Management and Anesthesia in Patients with Hemifacial Spasm Undergoing Microvascular Decompression: A Case Report

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A B S T R A C T

Introduction: Microvascular decompression (MVD) is an operation performed to treat a symptom of hemifacial spasm. Hemifacial spasm is described as a disorder of neuromuscular movement characterized by repeated to persistent involuntary contractions affecting the muscles innervated by the facial nerve. **Case presentation:** A 33-year-old woman came to consciousness with complaints of twitching on the right side of her face since 1 year ago. Initially, the complaint was felt for the first time 3 years ago, only on the upper right eyelid, but it has been getting worse over the past year. Magnetic resonance imaging (MRI) was obtained vascular loop on the right anterior inferior cerebellar artery (AICA) in level cerebellar pontine angle (CPA). MVD is a unilateral neurosurgical procedure in the axial section of the posterior fossa. Positions that can be used are supine and modified lateral decubitus or park bench. The management of anesthesia-related to posterior fossa surgery includes, first, the effect of the drug on the ability of the lungs to hold air from entering the venous circulation. Intravenous administration of anesthetics, for example, fentanyl, can maintain a higher threshold for retaining air bubbles in the pulmonary circulation compared with inhalational anesthetics. **Conclusion:** Optimal hemodynamic monitoring, good analgesia, and adequate muscle relaxation are the principles of anesthesia monitoring that aim to facilitate the operator in finding access to the disturbed nerve complex.

1. Introduction

Microvascular decompression (MVD) is an operation performed to treat a symptom of hemifacial spasm. Hemifacial spasm is described as a neuromuscular movement disorder characterized by persistent, repetitive, involuntary contractions affecting the muscles distributed by the facial nerve. Involuntary contractions in the muscles around the eyes in the form of twitches affect the entire face.[1,2] The incidence of hemifacial spasms in the world occurs in 9 to 11 cases per 100,000 people with an average age of 30 to 70 years.[1,2,3] At work, fatigue or stress, muscle contractions occur spontaneously and more frequently.[2,4] Symptoms of hemifacial spasms are painless but very disturbing, so sufferers can experience frustration, anxiety, and depression due to embarrassment and discomfort due to facial twitches.[3,4] Treatment of hemifacial spasms in the form of anti-spasm therapy, heat therapy, and definitive surgery, known as microvascular decompression.[1,4,5] The anesthetic management of microvascular decompression is based on the consideration of surgery in the posterior fossa area with the intraoperative goals of facilitating surgical access, minimizing nerve tissue trauma, and maintaining respiratory and cardiovascular stability.[7] The discussion of this case emphasizes the

consideration of anesthesia for microvascular decompression surgery in adult patients, which consists of management of preoperative evaluation, monitoring considerations, choice of position for surgery, risk considerations, prevention, detection, treatment, and complications, as well as post-anesthesia care.[9]

2. Case Presentation

A 33-year-old female patient came to consciousness with complaints of twitching on the right side of the face since 1 year ago. Initially, the complaint was felt for the first time 3 years ago only in the upper right eyelid, but it was getting worse and worse until the last year it was said if the patient was too tired of twitching to pull the right side of the face up to the corner of the lower lip. There is no history of pelo voice or tingling in the facial area. History of trauma to the face and head area was denied. Denied history of fever, cough, runny nose, and shortness of breath in the last 2 weeks. There was no history of drug and food allergies. There was no history of hypertension, diabetes mellitus, asthma, heart disease, and other systemic diseases. There was no history of previous operations. The patient was a housewife who was able to carry out mild, moderate activities before becoming sick without complaining of chest pain and shortness of breath.

On physical examination, the body weight was 55 kg, the height was 150 cm, and the body mass index was 24.4 kg/m^2. Blood pressure 100/70 mmHg, pulse 73 beats per minute, respiratory rate 16 breaths per minute with 98% oxygen saturation without supplemental oxygen support, axillary temperature 36.4°C. Neurologic examination reveals the patient's consciousness Glasgow coma scale (GCS) E4V5M6, accompanied by twitching facial D (orbicular muscle of the mouth, orbicular muscle of the eye). Supporting examinations can be seen in Table 1.

Table 1. Laboratory examination.

Complete blood	**Results**	**Unit**	**Normal value**
WBC	9.55	10^3/µL	4.1 - 11.0
HGB	12.50	g/dL	12.0 – 16.0
PLT	344.00	10^3/µL	140 - 440
HCT	38.50	%	36.0 - 46.0
Faal hemostasis			
PT	14.0	second	10.8 - 14.4
INR	0.98		0.9 – 1.1
APTT	36.0	second	24 - 36
Clinical chemistry			
SGOT	21.00	U/L	5.00 – 34.00
SGPT	11.00	U/L	<55
BUN	7.5	mg/dL	7.0 – 18.7
SC	0.70	mg/dL	0.57 – 1.11
Electrolyte			
Sodium	138	mmol/L	136 - 145
Potassium	3.85	mmol/L	3.50 – 5.10
Chloride	102.4	mmol/L	94 – 110

On MRI examination (Figure 1), a vascular loop was found in the right anterior inferior cerebellar artery (AICA), nearing the entrance to the right internal auditory meatus, between the nerve segments. Hyperintense foci in the bilateral frontal lobe and left parietal lobe white matter, nonspecific white matter lesion. Minimal mucosal thickening in left maxillary sinus with retention cyst. Bilateral middle and inferior turbinate hypertrophy, bilateral bullous turbinates.

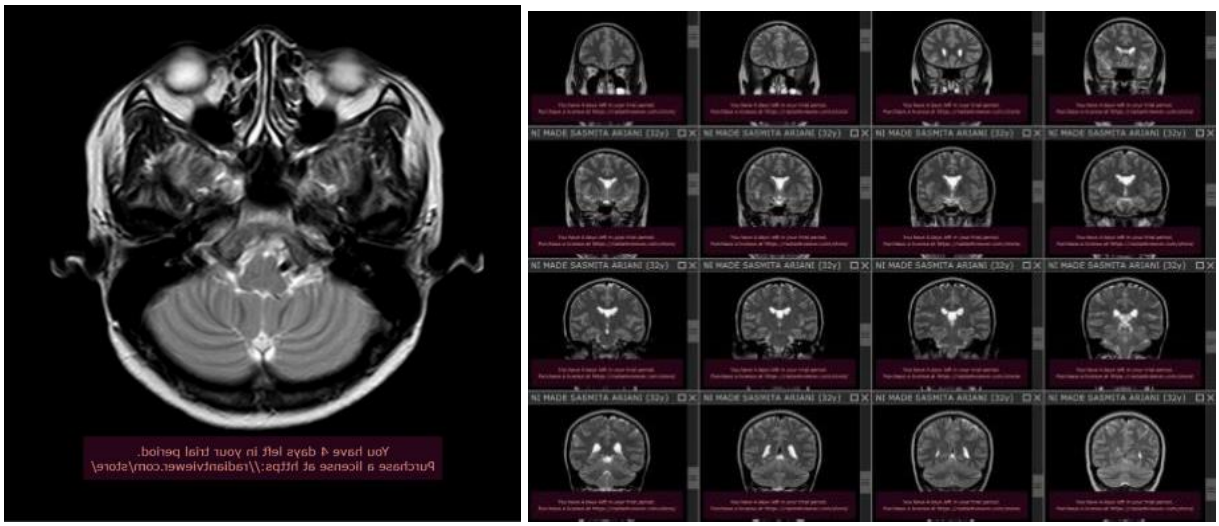

Figure 1. MRI image of the patient before the procedure.

Prior to the procedure, the patient is given education and preparation for fasting. The patient is given informed consent regarding general anesthesia and postoperative planning. Installation of intravenous access on the left hand ensured smooth preparation of ready-to-use blood components to anticipate bleeding during surgery and preparation of the room intermediate for post-surgical care. Anesthesia is planned using the general anesthesia method with scalp block. The patient was premedicated on midazolam 1 mg intravenously (IV). Installed Arterial line in the left hand with previously done all tests and 2% lidocaine local anesthetic infiltration. Analgesic fentanyl 150 mcg was given, followed by lidocaine 1-1.5mg/kg IV, dexmedetomidine 0.5 -1 mcg/kg/hour IV to blunt the sympathetic, then induction of anesthesia was carried out with propofol target-controlled infusion (TCI) with a target effect of 2-3.5 mcg/ml, and the muscle relaxant rocuronium 50 mg was administered. Intubation was performed with a number 7 endotracheal tube and fixation at the 18 cm margin at the lip margin. Once it's done, scalp block by infiltrating the supratrochlear nerve (N.), N. Supraorbita, N. Zygomaticotemporal, N. Auricotemporal, N. Occipitalis major, N. Occipitalis Minor with bupivacaine plain 0.25% volume 2-3 ml each nerve before the patient is positioned and fitted head pain on both sides.

The operation is performed in a lateral position park bench. The maintenance of anesthesia was propofol TCI with a target effect of 2-3 mcg/ml, titrated dexmedetomidine 0.2-0.7 mcg/kg/hour IV, fentanyl, and intermittent rocuronium. The operation lasted 3 hours. Intraoperatively, N.VII compression was obtained by A. anterior inferior cerebellar, right, with a larger caliber than expected. During surgery, the patient's hemodynamics were stable. With blood pressure ranging from 114-117/58-62 mmHg with a pulse of 73-81 times per minute, respiratory rate of 16 times per minute with $etCO_2$ 30-33 mmHg without any sudden changes in $etCO_2$. Intraoperative maintenance fluids with Ringerfundin 1600 ml/hour. Bleeding during surgery 150 ml. Urine as much as 500 ml. Other medicines given, such as ondasetron 4 mg are given at the end of the procedure. Postoperatively the patient was extubated in the operating room before being transferred to the regular ward.

Post-surgery the patient was admitted to the surgical ward with hemodynamic conditions of BP 104/68 mmHg, heart rate 76 beats per minute, respiratory rate 16 times per minute, and SpO_2 100% with a face mask of 6 liters per minute. GCS E4V5M6, isochoric pupil size 3mm/3mm, good light reflex in both pupils. Evaluation of pain with a numeric rating scale (NRS) obtained a scale of 1 out of 10. Postoperative pain management using Fentanyl 300 mcg in 50 ml of 0.9% NaCl at a rate of 2.1 ml/hour, Paracetamol 500 mg every 6 hours PO. The patient is

well-conscious, and there are no postoperative complications. Symptom twitching facial previously experienced by the patient was absent, and complaints of pain, nausea, and vomiting were also not felt. The patient was allowed to go home on day 4 after surgery without any complications.

3. Discussion

Hemifacial spasm is a neuromuscular movement disorder characterized by repeated and persistent involuntary contractions of the muscles innervated by the facial nerve. Pathophysiology in the form of an abnormal process that occurs in the entry zone of the facial nerve root, which can be caused by compression of the arteries (inferior anterior artery, posterior inferior cerebellar artery, and vertebral artery) or other causes such as cerebellopontine angle tumors and vascular malformations. Risk factors for hemifacial spasm are age 30–70 years, female, and history of hypertension.[1,2,4] In patients with a history of hypertension, good blood pressure control is needed to help prevent hemodynamic fluctuations during intraoperative and postoperative periods. All patients showed typical symptoms of hemifacial spasm and were supported by supporting examinations in the form of MRI. The risk factors in these patients include age 30 to 70 years and women.[3,7,8]

Anatomy of the posterior fossa is seen as an intracranial cavity located between the foramen magnum and the tentorium cerebeli.[4,5] The nerve roots pass out of the brainstem at the pontomedullary junction and then at the cerebellopontine angle anterolaterally to the acoustic porus in the internal auditory canal and anteriorly with the vestibulocochlear nerve. The basilar artery branches into the anteroinferior cerebellar artery at the junction between the pons and the medulla and then head to the internal auditory canal with the VII-VIII nerve complex. Therefore these two nerves are often compressed when there is an enlargement of the caliber of the anteroinferior cerebellar artery. An MRI examination with high sensitivity and specificity is the combination of CISS MRI (constructive interference in steady state) by angiography. This examination was not carried out due to limited equipment. This patient was diagnosed by means of an MRI scan.[8,9]

In this case, to facilitate decompression microvascular surgery, the patient was positioned *park bench*. The park bench position requires greater head rotation for access to more axial structures. Placement of the patient in the park bench position must be very careful and requires bearing at several points that support the body's weight to avoid complications of nerve injury, including injury to the brachial plexus due to pulling the arm up. In this case, the operator used the park bench position for this patient with consideration of the ease of approach to the incision up to the N.VII–N.VIII complex.[6,7,8] The patient is given pads in the axillae and elbows, back, and between the legs to prevent excessive pressure on one place on the patient's body and prevent respiratory injuries. There were no postoperative complications in this patient.

The first anesthetic consideration associated with posterior fossa surgery is the effect of drugs on the lung's ability to hold air into the venous circulation.[8,10] Administration of intravenous anesthetics, for example, fentanyl, can maintain a higher threshold for retaining air bubbles in the pulmonary circulation than inhalation anesthetics so as to reduce the impact of an air embolism occurs.[9] The second consideration is maintaining cerebral perfusion pressure. A third consideration is the potential cardiovascular response to surgical manipulation of brainstem structures. In this case, IV midazolam was given as premedication prior to induction. Midazolam, which is a benzodiazepine class, is effective in reducing anxiety but does not have a significant effect on intracranial pressure. Induction of anesthesia, in this case, used intravenous anesthetics, namely fentanyl (2–3 mcg/kg) and propofol (TCI with a target of 2-3.5 mcg/ml) followed by rocuronium to facilitate endotracheal intubation. An anesthesia induction technique was chosen in order to obtain adequate anesthesia and cause minimal hemodynamic shock.[9,10]

Optimal hemodynamic monitoring, good analgesia, and adequate muscle relaxation are the principles of anesthesia monitoring that aim to facilitate the

operator in finding access to the disturbed nerve complex. In this case, arterial line monitoring of blood pressure was used, and standard monitoring of pulse rate, oxygen saturation, urine output, and bleeding counts was used. Maintenance of anesthesia in cases of hemifacial spasm in combination with continuous intravenous anesthesia and inhalational anesthetics with minimal alveolar concentration (MAC) 0.5–1.0% and positive pressure-controlled ventilation. This choice has several advantages, including a more stable depth of anesthesia, easier control of CO_2 partial pressure, more controlled blood pressure at each surgical manipulation, provides a vasoconstrictive effect on cerebral blood vessels which reduces the risk of intraoperative bleeding, lowers intracranial pressure, less cardiovascular depressive effects, as well as prevent the patient from moving during intraoperative.[10,11]

After the operation, the patient was immediately awakened and extubated and then transferred to the intensive care unit. The principle of recovery for patients after microvascular decompression surgery is to prevent sudden increases in blood pressure, fast recovery time, return of motor strength, and minimize the occurrence of coughing or displacement of the endotracheal tube.[11,12] Complications due to postoperative microvascular decompression procedures include cerebral infarction due to damage to the basilar artery and its branches, paralysis of other cranial nerves, hypothalamic damage, new neurological deficits, subdural hematoma, cerebrospinal fluid leak, meningitis or ventriculitis infection, and scalp infection. The recommended postoperative care is treatment in the intensive care unit because of postoperative complications that can be life-threatening, namely CSF leaks and postoperative blood vessel ruptures that require immediate reoperation.[11,12] In this patient, after monitoring in the recovery room for 2 hours in a stable condition, postoperative care was carried out in the usual care room.

4. Conclusion

Hemifacial spasm is a neuromuscular movement disorder characterized by repetitive to persistent involuntary contractions of the muscles innervated by the facial nerve, which in this case is triggered by compression of the arterial vessels, and microvascular decompression surgery is performed as a long-term curative treatment by reducing vascular compression of the nerves. facialis by separating the compression of the nerve complex from the vessels. Anesthesia management refers to posterior fossa surgery, including preoperative evaluation, surgical position, choice of anesthetic agent, and monitoring, especially to prevent air embolism and maintain neurological function where optimal hemodynamic control, good analgesia, and adequate muscle relaxation are the principles that must be carried out.

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