UNDERTHESARY SURGERY TO TREAT LESIONS IN THE CORNERS OF THE BRIDGE CEREBELLUM AND THE RELATIONSHIP WITH FACIAL SPASMS

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ABSTRACT

Objective: *With technological developments and social progress, the use of microscopes in medicine has become common practise. However, microscopy can also be used in many surgical procedures to benefit patients. This looks at the role of microscopy for the surgical treatment of lesions of the bridge cerebellum and the relationship between the surgery and facial spasms.*

Methods: *Patients with microcephaly were selected and equally divided into two groups; experimental group (EG, n=12) and control group (CG, n=12). In the EG, microscopy was used to treat the lesions of the bridge cerebellum corner region, and in the control group, microcephaly area lesions were treated using traditional surgical methods, according to the principle of random distribution. After surgery, all patients were treated for eight months, during which the facial convulsions of the patients were carefully observed and the changes in facial muscle convulsions before and after the treatment were compared.*

Results: *After surgery, each subjects' facial convulsions were observed and recorded. Patients in the experimental group had 12–18 facial convulsions after surgery, which was within the normal range, whereas patients in the control group had 24-32 convulsions, which exceeded the normal range.*

Conclusion: *The traditional surgery for bridge small brain corner lesions increases the likelihood of facial spasms. Surgery performed using microscopy to treat lesions in the pons cerebellum area can be a good way to reduce the appearance of facial spasms.*

Keywords: *Microscope assisted, cerebellopontine angle lesions, facial spasm, muscle twitch.*

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Introduction

The cerebellopontanine angle (CPA)[1] is located between the pons and the cerebellum. The anterior wall is composed of the dura mater of the posterior fossa that covers the petrous bone and clivus. The posterior upper part of the CPA is comprised of the anterior part of the pontine and middle cerebellar peduncle, and the posterior lower part is composed of the second ventral lobe of the cerebellum and cerebellar chorion. The medial aspect is made up of the anterolateral extrapontine. The anterior part of the cerebellum (triangular subarachnoid space, trigeminal nerve, facial nerve, acoustic nerve, glossopharyngeal nerve, vagus nerve, and accessory nerve exiting the brain stem) refers to the intersection of the pons, medulla oblongata and its dorsal cerebellum. The CPA is actually a cone-shaped three-dimensional triangle located in the anterolateral part of the posterior fossa. Its upper boundary is located in the tentorium, and it is separated from the cisterna annularis by the lateral pontine mesencephalon membrane. The lower boundary is located between the vestibulocochlear nerve and the glossopharyngeal nerve. The medial boundary is separated from the anterior pontine membrane and the anterior pontine cistern. Lesions in the CPA usually produce metastases, acoustic neuromas, hemangioblastomas, neurofibromatosis, epidermoid cysts, meningiomas, arachnoid cysts, trigeminal neuromas, brain abscesses, facial neuromas, aneurysms, jugular glomus tumours, endolymphatic sac tumours, ependymomas, chondrosarcoma, choroid plexus papillomas (CPPs), and other tumours. The tumours initially grow in the internal auditory canal, enlarging it, and then grows into the CPA cistern. With the expansion of the tumour, brain stem compression, and displacement, the corresponding side of the cerebellar hemisphere is also affected. Unilateral partial or complete hearing loss is the main clinical manifestation but vestibular dysfunction and facial nerve and trigeminal nerve paralysis may also occur.

Facial spasms[(2)] also known as hemifacial spasms, refers to paroxysmal, involuntary, irregular muscle twitches on one side of the face, without other positive signs of nervous system damage and have no clear cause. Hemifacial spasm used to be called facial pumping, characterized by paroxysmal repetitive involuntary contraction of the muscles innervated by the facial nerve. At present, according to experts' statistics, the prevalence of facial spasm in society is approximately 7 in 10,000.

Facial spasm can mainly be attributed to one of the following three causes:

- Hemifacial spasm caused by pathological interference of facial nerve conduction due to compression. Most cases of hemifacial spasm are due to normal cross compression of blood vessels, usually involving the posterior inferior cerebellar artery, anterior inferior cerebellar artery, and vertebral nerve artery. Occasionally, aneurysms, arteriovenous malformations, or brain tumours can cause facial nerve root compression.
- Idiopathic facial paralysis, after rehabilitation, or secondary muscle spasm. The cause of hemifacial spasm may be demyelinating neuropathy caused by facial neuritis. There is still some demyelinating facial nerve electrical conduction generalization. Facial neuritis involving brainstem nerve nuclei, can form epileptic foci and cause paroxysmal twitches of facial muscles.
- Some patients have traumatic tumours or muscle spasms. It may be that there is a short circuit between the facial nerve and other brain nerves during facial nerve recovery. When other nerves are excited, one side of the facial muscles twitch. Hemifacial spasm is caused by yin deficiency or qi deficiency in the body, leading to yin deficiency, blood deficiency, loss of nourishment of muscles and veins, or disturbance of wind and cold. The location of the disease is related to the liver, spleen, kidney, gallbladder, stomach and viscera. Most cases of facial spasm are middle-aged women.

The onset of the disease manifests as a slight paroxysmal twitch of the orbicularis oculi muscle of the lower eyelid, and then gradually extends to the side of the face. The degree of convulsion varies. It is aggravated when nervous, emotional, or tired, and disappears when relaxed or sleeping. In a few severe cases, hemifacial spasm may involve the entire side of the face. Convulsions are mostly confined to one side, with bilateral cases being rare. The disease is chronic and progressive, and does not usually undergo spontaneous remission. Some patients in the later stages suffer from muscle paralysis atrophy of the affected side and convulsions stop. At the beginning of the disease, if the hemifacial spasms are limited to the orbicularis oculi muscle, it should be distinguished from functional blepharospasm. Blepharospasm does not extend down to the face and is often bilateral. When facial spasm is accompanied by other cranial nerve injury, limb dysfunction, or involuntary movement of limbs, intracranial lesions should be ruled out and treated if appropriate.

In recent years, microscopy has been widely used in clinical medicine. Microscopy plays a powerful role in many surgical applications, enabling more patients to receive the correct treatment.. The microscope has helped to make great achievements in the fields of medicine, biology, physics, chemistry, among others. In the process of surgical treatment of CPA lesions, the microscope can magnify tumours in the CPA area.

Each tissue of the brain has nerve fibre entanglement, which is beyond the resolution capabilities of the human eye to clearly distinguish. The magnifying function of the microscope allow surgeons to cut more accurately, which is especially beneficial for medical students, reduces the influence on the brain nerve, reducing the possibility of partial spasm. To help determine the effects of microsurgical treatment of CPA lesions on facial spasms, we selected 24 patients with CPA lesions and compared post-surgery facial spasms between patients receiving microsurgery and patients receiving the traditional surgical treatment of CPA lesions. This paper introduces the causes and effects of CPA lesions. CPA lesions can be the result of many different types of tumours, which need prompt treatment. CPA lesions can expound the causes of facial spasm, including physiological and psychological causes; therefore, treatment should be carried out from multiple angles. Through the design of the experimental scheme, the selection of study subjects, and the practice, according to the integration and comparison of experimental data, it is known that microsurgery for CPA lesions can reduce the occurrence of facial spasm in patients with CPA lesions, whereas using traditional surgery to treat CPA lesions can cause facial spasms in most patients. Therefore, microscopy plays an important role in the treatment of CPA lesions, so it is worthy of major hospitals for the treatment of CPA lesions.

Microsurgery for cerebellopontine angle lesions and facial spasms

Causes and effects of cerebellopontine angle lesions

It is generally believed that CPPs which occur in the CPA are the direct spread of tumours in the fourth ventricle or the implantation of tumours along the cerebrospinal fluid pathway; primary CPPs outside the ventricle is believed to originate from the choroid plexus protruding from the Luschka foramen or the ectopic choroid plexus island "unconnected" from the choroid plexus. Common pathological changes in the CPA area include acoustic neurilemmoma, meningioma, trigeminal neuralgia, hemifacial spasm, cholesteatoma, etc. In order to obtain good exposure and visual field, it may be related to the occurrence of intracranial infection after craniotomy.

Intracranial infection after CPA craniotomy is rarely reported, but it is more common in intracranial infection. Common clinical manifestations include hearing, facial movement, and sensory disorders; "cerebellar signs"; gait ataxia; dysarthria; etc. Intracranial hypertension caused by space occupying effects and hydrocephalus, such as headache, vomiting and optic papilledema, can be seen. The symptoms of intracranial hypertension caused by hydrocephalus are mainly due to excessive secretion of cerebrospinal fluid and obstruction of cerebrospinal fluid circulation, or subarachnoid adhesion caused by tumour haemorrhage.

It can occur as intracranial pressure increases or localized nerve damage. The latter varies with the location of the tumour. Half of all tumours growing in the lateral ventricle have contralateral mild pyramidal tract signs; patients with tumours located in the posterior part of the third ventricle show difficulty in binocular vision; those located in the posterior fossa cause walking instability, nystagmus and ataxia.

Clinical manifestations of cerebellopontine angle lesions

- Headache and vomiting: space-occupying lesions can squeeze the brain stem and cerebellum, resulting in compression and deformation of the fourth ventricle, obstruction of the midbrain aqueduct, disorder of supratentorial and infratentorial cerebrospinal fluid circulation, aggravation of supratentorial hydrocephalus, and high intracranial pressure symptoms, such as headache and vomiting. Some of them may be caused by space occupying erosion of the dura.
- Limb paralysis: space-occupying lesions oppress the brain stem, affecting the blood supply to the brain stem, resulting in compression or ischemia of the corticospinal tract. Normal cortical random movement cannot be transmitted to the spinal cord, resulting in central paralysis of the contralateral limbs.
- Facial numbness: Some of the earliest symptoms of trigeminal ganglion or nerve root compression include neurodegenerative changes, performance for facial numbness, hypoesthesia, and facial numbness.
- Hearing loss and tinnitus: unilateral sensorineural hearing loss is the most common symptom. Tinnitus can appear before hearing loss, and it is often caused by an acoustic neuroma pressing on the acoustic nerve.
- Dysphagia, shrugging weakness: the sternocleidomastoid and trapezius muscles become paralyzed after accessory nerve injury, leading to glossopharyngeal nerve dysfunction, pharyngeal muscle movement coordination disorder, and “drinking cough”.

Treatment of cerebellopontine angle lesions

- Case Selection: the average age of the patients with CPA lesions was 48.3 years old. In principle, surgical treatment should be performed for patients with clear preoperative diagnosis, good physical fitness, and no clear surgical contraindication; surgical resection of tumour is considered to be the only radical treatment.

However, some patients, considering their age, poor physical fitness (many basic diseases), intolerance or unwillingness to accept long-term anaesthesia and craniotomy, choose other treatment methods, including continued drug treatment, percutaneous bead compression (PMC), etc., to relieve symptoms. In this study, 24 cases were treated surgically.

• Surgical Method: patients in the early stage of the disease have corresponding symptoms. If the disease development is not severe, appropriate drugs can be used to control the symptoms, and psychological guidance can be given to for patients to help them remain calm, which is conducive to the control of the disease and can reduce the possibility of CPA tumours. Patients with CPA tumours should go to the hospital as soon as possible for examination and arrange surgery for treatment. All operations were performed through a suboccipital retrosigmoid approach, under general anaesthesia: routine disinfection of the skin at the site of the operation was performed. Incision of skin and subcutaneous tissue, scalp clip haemostasis, occipital muscle incision, retention of the occipital artery and greater occipital nerve as far as possible, stripping muscle attachment points, automatic retractor, exposing the upper side of the mastoid base, going down to the posterior edge of the foramen magnum, looking directly at the bone window, with a diameter of 4-5 cm. The border of the transverse sinus, sigmoid sinus, and cisterna magna could be seen on the to. The mastoid air chamber and the posterior wall bone of the internal auditory canal were filled with bone wax. Tumour exposure: the dura was incised radially, the cistern was opened, the cerebrospinal fluid was released, and the cerebellopontine angle was explored by intrahemispheric and inferior traction.

The tumour and brain nerves can be dissected and the petrosal vein, which affects the surgical procedure, can be cut off after electrocoagulation. The tumour was exposed, the arachnoid membrane on the tumour surface was opened and the capsule was cut by electrocoagulation at the most prominent part of the tumour. The silver filaments in the capsule were aspirated out, and the capsule thoroughly rinsed with a small amount of normal saline. The surrounding tissues were properly protected with brain cotton to prevent the contents of the capsule from floating into the nearby reservoir. After the tumour subsided, the capsule was removed from the posterior fossa, and the cranial nerves, arterial branches, and brainstem were with a small scalpel and sharp scissors. Attention should be paid to the protection of the brain stem and peripheral nerves and blood vessels of the tumour. If the capsule is close to the surrounding important tissues serious complications may occur after total resection, so part of the capsule or contents should be retained.

Causes and treatment of facial spasm

The cause of hemifacial spasm (HFS) is spontaneous spasm of the facial nerve

It usually starts from the orbicularis oculi muscle and gradually spreads to the orbicularis oris muscle and facial expression muscle. In severe cases, it can cause facial pain, affect vision, speech, and sleep, lasting for days to months. According to Cohen's classification of spasm intensity, there are five grades. Grade 1: non spastic plums; Grade 2: increased blink or slight facial muscle tremor caused by external stimulation; Grade 3: slight spontaneous tremor of the eyelid and facial muscles without dysfunction; Grade 4: obvious spasm with mild dysfunction; Grade 5: severe spasm and dysfunction, such as inability to open eyes and read. The primary aetiology and pathology of hemifacial spasm are not clear. The abnormal nerve impulse of hemifacial spasm may be the result of pathological stimulation caused by some parts of the facial nerves, which may come from arteriosclerosis expansion or aneurysm compression of the vertebrobasilar artery system. Jane proposed the main cause of facial nerve microvascular compression in 1967. If the microvascular is removed, the spasm can be relieved. At present, most scholars agree with the aetiology of MVC, and its pathogenesis is basically the same as in the past. The main vessels are the anterior inferior cerebellar artery, posterior inferior cerebellar artery, vertebral flexure artery, and the innominate artery and vein.

Several different treatment methods were used

• Drug treatment: patients with early onset, mild symptoms of hemifacial spasm can choose appropriate drug treatment. Sedatives, anticholinergic drugs, and antiepileptic drugs, such as carbamazepine, phenytoin sodium, baclofen, diazepam, and clonazepam, are commonly used in clinic(3). However, but the long-term efficacy is poor and there are many side effects(4). It is reported that carbamazepine can cause neutropenia, drug-induced hepatitis, and other drug reactions.

• Facial nerve block therapy: botulinum toxin type A (BTA) is often used to block facial nerve endings. BTA injected into the eye muscles and lower muscles can improve the spasm symptoms of patients. BTA is a double chain macromolecular protein neurotoxin produced by the anaerobic bacterium Clostridium botulinum. The mechanism of action is selective action on peripheral cholinergic nerve terminals, antagonizing calcium ions and interfering with acetylcholine release from motor nerve terminals. This produces chemical denervation and muscle relaxant paralysis leading to the relief of facial spasms(5). The process can be divided into three stages: merger, fixation, and paralysis. This effect can last several months but side effects include diplopia, excessive tear production, ptosis, dry eyes, etc. After a long-term intermittent injection of BTA, we can draw the following conclusions: botulinum toxin can achieve short-term curative effects in the treatment of HFS, but it will delay the surgical treatment, and repeated use may lead to permanent facial;

• Physical therapy: electrical stimulation can inhibit excessive nerve impulses and regularly correct the conduction of excitatory impulses(6). Using this mechanism, the electrical stimulator that produces pulse electricity, stimulates the strongest movement point of high frequency electrical stimulation to relieve spasticity.

Methods

Patient inclusion

Six patients with moderate and severe CPA and CPA lesions were excluded. The control group (conventional surgical treatment of cerebellopontine area lesions) consisted of 12 cases (6 males and 6 females) who met the inclusion criteria and exclusion criteria for moderate and severe cerebellopontine lesions and cognitive impairment; 9 patients with moderate lesions in the CPA region and 3 patients with severe lesions in the CPA region.

The average age of patients in the experimental group was 56.34±4.12 years old, and that of the control group was 54.23±3.98 years old. All the selected patients could complete the questionnaire themselves or obtained help. This study passed the ethical audit of the People's Hospital of China Medical University. The details of the study was provided to the subjects or their guardians and informed consent was obtained.

As shown in Table 1, there were no significant difference in the proportion of men and women enrolled in the study. The number of smokers and alcohol drinkers was more than that of junior high school, which paves the way for the operation.

Selection principle

• For the inclusion criteria of surgical treatment of CPA lesions, refer to the previous theory of CPA lesions(7).

• The cognitive function test of patients was based on the brief psychological state test, which is the most commonly used cognitive level screening scale at home and abroad [8]. Each MMSE is limited to 15 minutes, with a full score of 60 points. Illiteracy >25 points is normal, primary school >38 points is normal, junior high school and above >50 points is normal.

Project	Experimental Group	Control Group
Age	56.34±4.12	54.23±3.98
Male	6	6
Female	6	6
Smoker	8	7
Non-smoker	4	5
Drinks alcohol	10	8
Does not drink alcohol	2	4
Junior high school education	2	2
High school education	4	2
Bachelor’s Degree	6	8

Table 1: Basic information of experimental subjects.

Exclusion criteria

• Patients with a duration of less than 6 months;

• Patients with mental illness affecting self-awareness;

• Patients with other systemic diseases (such as diabetes, atherosclerosis, etc.) that may affect the observation of facial convulsions;

• Serious hearing or visual impairments, and other related diseases, communication barriers affecting cognitive function;

• The patient's face cannot be used normally.

Preoperative nursing

• Informed consent rights of patients: before treatment, each patient invited to participate in clinical observation signed an informed consent form detailing the purpose, time and procedure of clinical observation. Patients were introduced to the possible benefits of the study to the subjects.

• Clinical indicators: before treatment, 8 weeks, and 12 weeks after treatment, the daily convulsions of the patients' eyes, nose wings, mouth corners, ears, and other facial features were recorded, and the neurons in the patient's body were checked accordingly. The patients were told that they could not control their own facial convulsions through their own subjective consciousness, and that facial convulsions that could not be controlled by natural conditions could be regarded as faces. If the convulsion phenomenon was recorded, if there was a convulsion phenomenon controlled by the patient's consciousness, it must be reported to the observer in time, so as to ensure the authenticity and effectiveness of the experimental data.

Design of questionnaire survey

The subjects were investigated by questionnaire. The survey included:

- Demographic characteristics of the subjects, such as name, gender, age, occupation, education level, income level, residence, etc.
- Smoking history, drinking history, eating habits, the choice of drinks, and other behavioural risk factors.
- Details of any psychological factors such as depression, whether the patient felt that work pressure was too great, whether there were negative life events in the past two years.
- Dtails of a history of diabetes, coronary heart disease, osteoporosis, and other related diseases.
- Details of sudden headaches or nerve problems.
- Details of any comprehensive physical examination or any other medical history.

Quality control of investigation

All the patients with CPA lesions who were selected as the experimental subjects had a comprehensive physical examination in a regular and authoritative hospital, and further examination was conducted for the brain. The lesions in the cerebellopontine region did not cause any mental diseases in the patients, and the selected patients were able to communicate normally. The operation and risk factors of the experiment were clearly described to the patients and their families.

The sudden situation in the process of the experiment is borne by the hospital, and the patients and their families have signed consent. The doctor must write a detailed report of the operation and possible accidents to the patient and their family. If there were any mistakes or omissions, the doctor had to correct it the next day. Otherwise, the sample selection was discarded, and it could only be signed after careful examination.

Anatomical process of cerebellopontine angle

The anatomical structure of the CPA is complex; facial nerves and auditory nerves are in close proximity to each other. Local nerves and blood vessels often have abnormal morphology, which makes it difficult to correctly judge and reduce pressure using a conventional microscope, which impacts the effect of surgical treatment. Because of excessive separation and traction during surgery, damage to brain tissue, cranial nerve and blood vessels, the recurrence rate and related complications of MVD procedures are relatively high.

With the help of intraoperative electromyography and neuroendoscopy, the curative effect of MVD[9] has been significantly improved. Facial evoked electromyography (EMG) was used to detect the response of orbicularis mandibular marginal muscle (MDOC)[10] at each stage of surgery to determine the responsible vessels. Electromyography data was objectively analysed in 300 patients with MVD. It has been shown that this method is significant in reducing surgical complications, improves the effects of surgery, improves the ability to evaluate prognosis, and is certain practical and effective. Endoscopy has been used in MVD since the 1990s[11]. Its appearance expands the operation angle, reduces the probability of intracranial infection and the traction of cerebellar nerves, thus reducing the incidence and severity of common complications, and greatly improving the success rate of surgery. Neuroendoscopy has obvious advantages in MVD[12], such as locating the responsible vessels. Endoscopy can provide a panoramic view of the pontine angle area, the angle lens can provide a panoramic view of the pontine angle area, and the angle lens allows the surgeon to observe the structures around the nerve without leaving dead corners, thus providing the possibility of 100% detection of responsible vessels.

After the cerebellar traction is released, it is difficult to judge whether the cushion is placed accurately when it is placed under the microscope, therefore it should be checked properly. However, in the case of almost no traction, the position of the cushion can be observed using the neuroendoscope to improve the success rate of surgery.

Shortcomings of the experiment

This experiment looked at the relationship between CPA and facial spasm using microscopy. Therefore, the preliminary preparation, investigation, and specific surgical methods have not been investigated and discussed in detail for the traditional surgical techniques used for CPA lesions. This may have a certain impact on the experimental samples because the number of patients with CPA lesions in the study is small, reflecting the small number of CPA lesion cases. There are few patients who were willing to take part in the experiment, so the number of patients available for the experimental group was low(13). During the experiment, because of personal reasons, the recorder only obtained data for some groups of experimental data. Therefore, there are still many deficiencies in this experiment, which need further improvement.

Results and discussion

Comparison of postoperative facial convulsions

As shown in Figure 1, after eight months of observation, we can clearly see that microsurgery for CPA lesions is more effective than traditional surgery for CPA lesions, reducing the possibility of facial convulsions. One reason for facial spasm is that the nervous system cannot properly control the facial state, which leads to facial spasm. It is very difficult and risky to treat CPA lesions using the traditional surgical techniques, because the nerve fibres of the brain are very close to the CPA area, making it difficult for human eyes to separate them without touching them, especially in a state of high tension. However, microscopy eradicates this problem as the magnification allows surgeons to clearly see the distance between cerebellopontine and nerve fibres and more accurately separate them. This reduces the probability of touching the nerve fibres, which also reduces the probability of patients developing facial spasms.

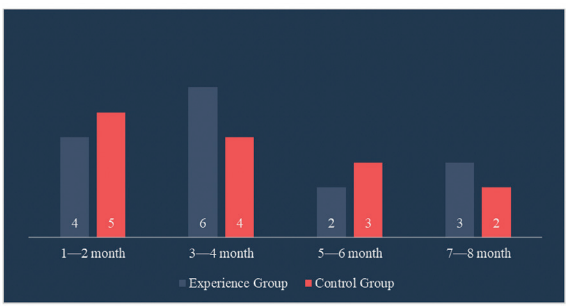

Figure 1: Comparison of facial convulsions.

Comparison of facial convulsions before operation

As shown in Figure 2, the facial convulsions of the experimental subjects were observed for eight weeks before surgery. During the period, patients were not allowed to smoke, drink, or do strenuous exercise, etc. From Figure 2, we can see that the facial convulsions of the two groups were roughly the same, and there were no individual patients beyond the normal range. Therefore, we can conclude that the experimental samples selected in this experiment are all effective samples, which can be used for the next experimental observation.

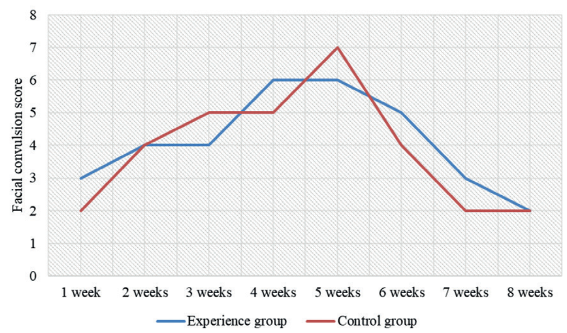

Figure 2: Comparison of facial convulsions before surgery.

Comparison of facial convulsions between the two groups before and after the experiment

As shown in Figure 3, we can see that the patients' facial convulsions before and after the microsurgery for CPA lesions are basically the same, that is to say the patients did not have facial convulsions beyond their normal conditions, indicating that the patients recovered to normal after surgery, and the possibility of facial spasm was very small.

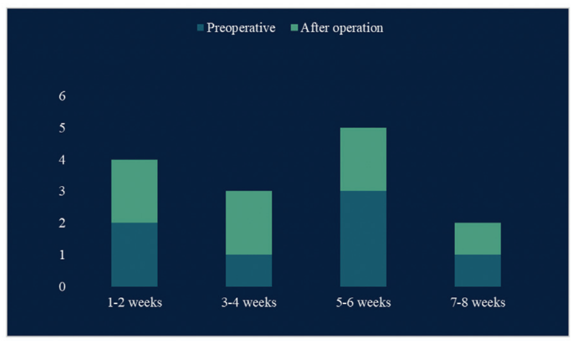

Figure 3: Comparison of facial convulsions in experimental group before and after surgery.

As shown as Figure 4, we can clearly see that there is a great difference between the preoperative and postoperative facial convulsions of patients with CPA lesions after traditional surgery. The facial convulsions of patients before surgery were normal and within the controllable range, whereas the facial convulsions of patients post surgery were higher, indicating that the traditional surgical treatment of CPA lesions increases the possibility of causing facial spasms. Through the analysis and comparison of Figures 3 and 4, it can be concluded that microsurgery for CPA lesions can effectively prevent facial spasm, which is worthy of promotion and application in the medical field.

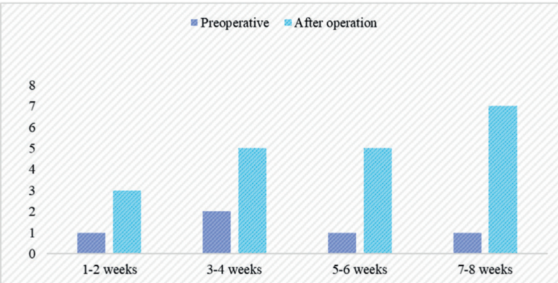

Figure 4: Comparison of facial convulsions in control group before and after surgery.

Difference between microsurgery and traditional surgery for cerebellopontine lesions

Tumours can develop in the CPA because of various reasons, leading to the development of a variety of tumours. The formation of these tumours leads to the compression of nerve fibres in the brain. To remove the tumours arising from CPA lesions, the tumour and cerebral nerve fibre must be separated accurately. Traditional surgery for the treatment of CPA lesions rely on the surgeon's eyes to perform the separation. Because of the limited resolution of human eyes, it is possible to touch the cerebral nerve fibres during the procedure, causing post-operative facial spasms in patients. By using a microscope to magnify the area of interest during the surgical treatment of cerebellopontine angle lesions, we can enlarge the distance between the tumour and cerebral nerve fibres so that they can be more accurately separated.

Conclusion

CPA lesions are a very common brain disease, but the surgical treatment may lead to patients having facial spasms. This experiment aimed to better explain the role of the microscope in the surgical treatment of CPA lesions in order to reduce postoperative facial spasm. In the experiment, 24 patients with CPA lesions were divided into two surgical groups for comparison; experimental, using a microscope and traditional, without the use of a microscope. The facial convulsions of the two groups were almost the same before surgery. Comparison of the post- and pre-operative data for the experimental group shows that there was no significant difference in the number of facial spasms. Whereas for the traditional surgical treatment of CPA, patients had significantly more facial convulsions after surgery compared with before, suggesting that the use of microscopy during surgical treatment of CPA lesions can reduce the contact with nerve fibres, effectively preventing patients from having facial spasms after surgery. The benefits of microscopy make the application of the microscope in medicine worth promoting, especially in microsurgery.

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