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Anesthesia Treatment of Vocal Cord Tumor Resection under Microscope Support

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Abstract: To explore the anesthesia method of vocal cord tumor resection under the support of microscope, and analyze the effect of vocal cord tumor resection under the support of laryngoscope and the recovery after operation. 66 patients with benign vocal cord tumor were randomly divided into two groups: experimental group and control group, with an average of 33 cases in each group. The first group was given surface anesthesia of vocal cord before anesthesia induction, and propofol 3mg/kg was injected intravenously. The patients in both groups were induced directly without surface anesthesia and given the same dose of propofol and remifentanil. And record and observe the indicators and make statistics of the data for further quantitative and qualitative analysis. In general, there was no significant difference in age, gender, BMI and operation time between the two groups ($P>0.05$). The blood pressure and heart rate of the two groups were significantly higher, especially the fluctuation of heart rate was more obvious, but the blood pressure and heart rate of the first group had no significant change. In terms of muscle relaxation, there was no significant difference in the degree of glottic exposure between the two groups ($P>0.05$), and there was no significant difference in the degree of mandibular relaxation before tracheal intubation and after the support microscope was put in place ($P>0.05$). In the comparison of anesthesia recovery, the OAA / s scores of the two groups were statistically significant ($P<0.05$), the scores of group 1 were greater than those of group 2; the retention time of group 1 in the anesthesia recovery room was shorter than that of group 2, the difference was statistically significant ($P<0.05$). Although muscle relaxant is not used in microsurgery, airway surface anesthesia can still provide a good visual field compared with traditional anesthesia. General anesthesia combined with airway surface anesthesia can effectively reduce the stress response during microsurgery.

1. Introduction

Benign tumors are common in vocal cord tumors, mainly including polyps and vocal cord cysts.

The most common clinical manifestation is hoarseness [1]. At present, it is generally believed that surgical treatment is the first choice for the treatment of vocal cord tumors [2]. Postoperative rehabilitation includes wound healing and vocal cord function recovery. The recovery of vocal cord function depends on the healing of vocal cord wound. The recovery of vocal cord function is affected by hyperemia and edema for a period of time [3].

The change of social life and the improvement of people's life quality, voice, as an important tool of interpersonal communication, plays an increasingly important role in people's life and work, and the quality of pronunciation has become an important indicator to measure the quality of human life [4]. Hoarseness is usually caused by a lump in the throat, especially the vocal cord [5]. The application of support microscope in the observation and diagnosis of laryngeal diseases is one of the most commonly used methods [6]. Under local anesthesia, the operation is carried out under the support microscope. This anesthesia mode enables the patient to keep awake during the whole operation process. It can directly observe the patient's voice, understand the closure of glottis at any time, and help the operator directly judge the operation effect [7].

In this study, 66 cases of benign vocal cord tumor resection were collected and analyzed quantitatively and qualitatively. In the experiment, 66 patients were randomly divided into two groups: the experimental group and the control group. The average group was 33 cases. The two groups were anesthetized. Before anesthesia induction, the patients in the first group were given the surface anesthesia of pharynx and larynx and intravenous injection of propofol 3 mg / kg. The patients in the two groups did not receive surface anesthesia, but could be induced directly by anesthesia, and given the same dose of propofol and remifentanil. The biggest characteristic of this study is to combine the characteristics of anesthesia under the microscope to carry out the research. In the research, the clinical treatment scheme of anesthesia treatment of vocal cord tumor resection under the support of the microscope has been fully studied. It is believed that the research in this paper can provide an effective basis for the treatment of vocal cord tumor, and lay a deeper theoretical foundation for the application of support microscope in surgical treatment.

2. Vocal Cord Tumors and Microsurgery

2.1. Vocal Cord Masses

In recent years, the incidence rate of laryngeal masses has increased year by year. With the further development of laryngeal masses, the treatment concept of benign laryngeal lesions is no longer simple surgical resection, but emphasizing the etiology and etiological treatment [8]. For laryngeal precancerous lesions, try to reduce recurrence and canceration, and prevent their natural occurrence. Speech is the oral expression of language and the way of accepting, processing and expressing meaning. Speech is the core behavior of human communication, so voice dysfunction may bring serious consequences to all aspects of patients' life. Normal pronunciation requires the larynx to play its physiological function coordinately and effectively. Any factors that affect the system will lead to the damage of normal voice function. Endoscopic laser surgery for early glottic cancer has two purposes. One is to achieve the same local control rate as the traditional surgery or radiotherapy in terms of postoperative indicators. The other is to maintain the physiological function of the larynx and achieve the level of radiotherapy [9]. Compared with radiotherapy, endoscopic laser surgery has a lower long-term recurrence rate and shorter hospital stay. Vocal cord benign tumors, precancerous lesions and malignant tumors are quite different in incidence rate, pathogenesis, treatment principles and prognosis, but the clinical manifestations are similar to hoarseness. Leukoplakia of vocal cord is the most important precancerous lesion of laryngeal cancer. Both have the same etiology and population. The most typical pathological process is from mild intraepithelial dysplasia to the whole intraepithelial layer, and then breaks through the basement

membrane to become invasive tumor [10]. The glottis is the narrowest part of the upper respiratory tract and the main source of airflow resistance. This may be one of the reasons why the glottic region is prone to precancerous lesions and tumors [11]. Most of the air flow is through this area when breathing. The function of vocal cord and vocal cord area is mainly to produce vibration and sound.

The real vocal cord can be divided into 5 layers, the deepest layer is arytenoid thyroid muscle [12]. When the thyroid muscle contracts, the hardness and thickness of vocal cord will change, which will affect the vibration amplitude of vocal cord. The lamina propria is located on the surface of the thyroid tendon. The deep layer of the lamina propria is mainly composed of relatively dense collagen fibers. The basic component of the lamina propria is still collagen, but it is different from the lamina propria, which contains a lot of elastic fibers. Lamina propria and lamina propria are of great significance in clinical and basic research. The distribution of different components in the vocal cord connective tissue makes the vocal cord move harmoniously. In vocal cord surgery, the deep and middle layers of the lamina propria are the important anatomical features to distinguish the anatomical layers of vocal cord in the surgical area. At the same time, the middle and deep layers of the lamina propria are also the transitional areas between the superficial lamina propria and the body composed of thyroid tendon. The surface of lamina propria is mainly composed of glands and a small amount of fiber. The non-keratinized squamous epithelial cells are located in the lamina propria of epidermis. In the theory of human body coating, the surface layer of epithelial layer and inherent layer together constitute the coating. Because of the layered microanatomy of vocal cords, the independent vibration of the shallow layer of vocal cords is an important structure of voice features such as timbre. Almost all patients with benign laryngeal diseases should try voice therapy or pronunciation correction before operation. The basis of speech therapy is to establish the concept of healthy use of voice, pay attention to the intake of enough water in life, avoid the abuse of vocal cords, and learn to use voice correctly. These measures will obviously improve the microenvironment of vocal cords and correct the pathophysiological process of diseases. Therefore, sound therapy may be beneficial to most patients with benign vocal cord lesions. With the development of sound physiology and evaluation instruments, sound surgery has made great progress.

2.2. Microsurgery

The surgical site is located in the glottis. Surgeons need to have a good visual field under the support microscope. In order to better implement airway management and avoid the occurrence of airway tumors, anesthesiologists need to use muscle relaxants for tracheal intubation under general anesthesia. Whether it is endotracheal intubation or support microscope, good muscle relaxation is needed. Therefore, this kind of operation not only needs to maintain enough anesthesia depth, but also needs to ensure enough jaw relaxation. In the process of wound healing, after vocal cord surgery, the destruction of the microstructure of the epithelial cell layer and the inherent layer of the surface layer will lead to scar formation, which is one of the important reasons for the functional recovery of vocal cord tumor after surgery. In order to reduce the formation of scars as soon as possible and improve the quality of vocal cords after surgery, patients are usually forbidden to speak and use antibiotics, glucocorticoids, proprietary Chinese medicine, audio therapy and ultrasonic atomization. In the 1960s, microsurgery under the support microscope was used in clinic, which depended on the high level of anesthesia technology. Because of its small trauma and high accuracy of resection, it has been widely used in otorhinolaryngology. However, anesthesia means enough anesthesia, keeping awake with patients, strong psychological quality and high cooperation, and strong support of inserting microscope in the process of mechanical stimulation. Even if the

anesthesia is sufficient, the patients are usually intolerable. For patients with pharyngeal reflex sensitivity, poor anesthesia effect can directly lead to the failure of operation. Whether it is to strengthen local anesthesia or to maintain the general anesthesia of self-breathing, there are certain deficiencies in the comfort or safety management of patients during the operation. Later, these anesthesia methods were gradually abandoned.

First of all, oral tracheal intubation is convenient and quick. We usually fix the tracheal tube at the angle of the patient's mouth, which generally does not affect the operation and visual acuity; secondly, if the tracheal tube is slightly displaced under the direct vision of the surgeon, it will cause an alarm; thirdly, the operation time is very short, generally no more than 10 minutes, but the process of nasal intubation is relatively complicated, especially for non-technical personnel, the intubation time will be much longer than the operation time. We can choose general anesthesia combined with local anesthesia or other anesthetics or auxiliary anesthetics to reduce the strong stimulation of tracheal intubation and extubation. Dexmedetomidine combined with lidocaine anesthesia can further reduce the hemodynamic fluctuation caused by tracheal intubation and operation, and reduce the restlessness in the recovery period of anesthesia. The application of dexmedetomidine in some large, medium-sized and long-term operations will have more advantages. In order to reduce the stimulation of the intubation and the insertion of the support mirror, and increase the tolerance of the patients to the tracheal tube, the surface anesthesia of the oropharynx and glottis can be performed before anesthesia induction. Sufentanil combined with remifentanil can not only ensure the stability of hemodynamics, but also avoid the restlessness caused by pain. Although the operation time is short and the operation is simple, there are many anesthesia methods.

Laryngoscopy is a common method in otorhinolaryngology and head and neck surgery. It is mainly used for the biopsy of throat tumor and the resection of small tumor, including vocal cord tumor resection, epiglottis cyst resection, vocal cord tumor biopsy, hypopharyngeal tumor biopsy, etc. These operations are usually simpler and take less time. During the operation, there will still be a strong cardiovascular response, and patients will also suffer from the discomfort brought by the surgical stimulation, and even some patients cannot cooperate with the operation, which increases the difficulty of the operation. With the development of general anesthesia technology and equipment, at present, most of the support microscope operations are carried out under general anesthesia. The patients cooperate well and are easy to control the cardiovascular response during the operation. Under general anesthesia, opioids are mainly used to inhibit the cardiovascular response caused by surgical stimulation, but the use of large doses of intravenous anesthetics can also cause great fluctuations in hemodynamics during operation, that is, preoperative hypotension and intraoperative hypertension. Moreover, general anesthesia is more expensive, and the cost of general anesthesia is also higher. The supporting microscope is a common operation method in otorhinolaryngology head and neck surgery, which is simple and short in operation time, but small in operation space and fine in operation. Because of the dense distribution of nerves in the throat, the operation of the throat is easy to cause strong reactions, including the stress response caused by pain stimulation and cardiovascular central response caused by autonomic nerve stimulation, which is mainly manifested as cardiovascular response, leading to huge hemodynamic changes, especially increasing heart rate and blood pressure.

The ideal anesthesia state to support microsurgery is good visual field exposure, vocal cord relaxation, mild vascular reaction in operation center, inhibition of various adverse reactions, and good ventilation, which is conducive to fine surgery and ensure the safety of operation. The stability of hemodynamics is more important for the elderly patients, not only to ensure the blood supply of heart, brain and other important organs, but also not to increase the heart load and cerebrovascular accident. Anterior commissure is an important anatomical sign of operation. It is often difficult to

expose and observe, which makes it difficult to confirm whether the lesion has been completely removed. There are two auditory nerve ligaments in the anterior commissure of the anterior commissure, which is a thick area and can serve as a barrier for tumor diffusion. The vast majority of laryngeal tumor operations include vocal cords, so a thorough understanding of the histological structure of vocal cords can better protect vocal cords. Now we have a deeper understanding of the anatomy of the larynx, especially the microanatomy of the vocal cord. The support microscope, appropriate anesthesia technology, microscope and the understanding of laryngeal microanatomy make the laryngeal endoscopic microsurgery more and finer. For most polyps, voice therapy also needs to be considered first. During the operation, the polyp was gently pulled to the other side and separated from the epithelial cells on the ligament surface.

In this way, the integrity of epithelial cells can be protected to the greatest extent. Sometimes it can be observed that polyps have obvious central nutrient vessels. The main nutrient vessels need laser vaporization to avoid postoperative hemorrhage and polyp recurrence. If the nutrient vessels are located at the free edge of the vocal cord near the midline, they need to be dissected carefully through the lateral incision and the micro mucosal flap technique. Quitting smoking is the first and most important step of treatment. Quit smoking combined with acoustic therapy has a good therapeutic effect on patients with mild dementia and edema. Some surgical equipments need to be operated carefully and skillfully. Each operation has its own advantages, and the principle of voice operation should be followed in operation. The choice of each surgical method depends on the characteristics of the disease and the patient's condition.

3. Research Objects and Methods

3.1. Research Object

From June 2018 to June 2019, 66 patients in the Department of Otolaryngology of a hospital in Hebei Province were selected for laryngoscope assisted vocal cord benign tumor resection. Inclusion criteria: age: 20-70 years old; body mass index: 19-29kg/m2; ASA classification: level 1-4; no history of neuromuscular system, currently no drugs affecting neuromuscular conduction; no history of tracheobronchial bronchitis, bronchial asthma, chronic obstructive pulmonary disease or acute phase; informed consent of this study and signing of informed consent. Exclusion criteria: do not meet any "inclusion criteria"; patients with mental illness cannot communicate with people normally; have obvious heart, lung, kidney and other diseases; have cough, expectoration and other upper respiratory symptoms; mouth opening less than two transverse fingers, high glottic position; have a large number of vocal cords, the patient has breathing difficulties.

3.2. Experiment Preparation

In the study group, 66 patients who met the inclusion criteria but did not violate the exclusion criteria were randomly divided into one group (test group) and two groups (control group), 33 cases in each group. One day before operation, the patient was visited in the afternoon, familiar with the patient's past history, current history and laboratory examination results, evaluated the ASA and airway classification of the patient, and formulated the anesthesia plan. All patients were fasted for 8h and without water for 4H before operation. Atropine 0.5mg intramuscular injection and phenobarbital 100mg intramuscular injection were given 30 minutes before operation. Open the vein channel of lower extremity before operation, and give routine monitoring (including noninvasive blood pressure of right upper extremity, ECG monitoring, pulse oxygen saturation, etc.) after entering the operating room. Propofol (3.0ug/ml plasma concentration) and remifentanil (3.0ug / ml target concentration) were administered by target controlled infusion. After falling asleep, the

ciliary body reflex disappeared and the patients were given cisatracurium 0.2mg/kg. After muscle relaxation, laryngoscope exposes glottis. The airway was anesthetized by laryngoscope with 2% lidocaine solution. Spray 1ml to the trachea, glottis, epiglottis and oropharynx respectively. Pull out the laryngoscope, continue to supply oxygen to the mask for 1 min, and then expose the laryngoscope intubation again. After muscle relaxation, laryngoscope directly exposed glottis for intubation. After intubation, use stethoscope to confirm the correct position of tracheal tube in the trachea. After endotracheal intubation and fixation, the ventilator was connected for mechanical ventilation, and the partial pressure of carbon dioxide at the end of respiration was monitored.

3.3. Experimental Method

(1) Anesthesia method

Before anesthesia induction: all patients were forbidden to eat for 8 hours and drink for 2 hours without any drug treatment. After entering the room, the noninvasive blood pressure, heart rate, electrocardiogram and pulse oxygen saturation of the patients were monitored. The oxygen flow rate was 5L / min, the intravenous infusion channel was opened, and sodium, potassium, magnesium, calcium and glucose were injected slowly. All operations were performed by the same otolaryngologist, and the supporting laryngoscope was of the same model. All endotracheal tubes were reinforced with silica gel wire. Tetracaine glue was applied to the cuff of tracheal tube as anesthesia lubrication. Because of the short operation time, the two groups of patients did not use midazolam, sufentanil and other long-term anesthetic analgesic sedative drugs. Before anesthesia induction, they were given 0.5mg atropine.

In group 1, laryngeal surface anesthesia was performed before anesthesia induction. The local anaesthetic prescription is: dilute 100mg of 12% lidocaine for injection with 150mg of tetracaine hydrochloride for injection, that is, mix 5ml of 2% lidocaine and 1% tetracaine. Spray the prepared local anesthetic solution on the patient's tongue base and throat through the laryngeal anesthesia tube. Because the nausea reflex of some patients is obvious, do not extend the laryngeal anesthesia tube too deep during the first superficial anesthesia. Through three times of surface anesthesia, the extension depth of laryngeal anesthesia tube was gradually increased. Each local anesthesia lasted about 3 minutes. When the patient has symptoms such as tongue numbness, foreign body sensation in pharynx, dysphagia and so on, it indicates that local anesthetic has played a role and can be used for subsequent anesthesia operation. All the patients in the two groups did not receive surface anesthesia and could be induced directly.

(2) Anesthesia induction

One group was given propofol 3mg/kg intravenously, which needed to be injected quickly. Within 10 seconds, sufficient dose was injected to make the patient's spontaneous respiration disappear. When the consciousness and spontaneous respiration of the patient disappear, the mask is closed and oxygen and nitrogen are given quickly, then the glottis is exposed with a visual laryngoscope, and the front laryngeal anesthesia tube is put into the inner surface of the local anesthesia (2ml) under the pressure of the glottis to anesthetize the inferior glottic trachea. After that, oxygen and nitrogen are tightly closed again. In the process of supporting mandible, we can consciously feel the relaxation of mandible. Endotracheal intubation was performed 3 minutes after anesthesia. Remifentanil 2μg/kg was injected intravenously for 60 seconds before intubation. Two groups of patients were given the same dose of propofol and remifentanil, but propofol intravenous injection does not need speed, can be divided into slow intravenous injection. After the consciousness of the patients disappeared, the patients were given 0.1mg/kg bensulfonatriamcuronium intravenous injection, the patients began to close the back mask to give oxygen and nitrogen to breathe irregularly or without autonomous respiration, in the process of

supporting the mandible, the degree of mandible relaxation was also felt and evaluated. Tracheal intubation was performed about 3 minutes later, when muscle relaxants began to work.

(3) Anesthesia maintenance

After intubation, two groups of patients auscultated two lung breath sounds. If the breath sounds of both sides are symmetrical, solve the problem that the patient's tracheal tube is on one side of the mouth, connect the anesthesia machine with mechanical ventilation, adjust the breathing frequency of 2l / min and 12 times / min of the mixed flow of air oxygen (oxygen concentration 50%) of the anesthesia machine with relevant parameters, maintain the ETCO2 between 35-45mmhg, and the airway pressure is less than 30mmhg. Propofol and remifentanil were continuously pumped into the vein to maintain the anesthesia depth and BIS value between 50-60. The pumping speed of the two anesthetics was adjusted. When the blood pressure fluctuation exceeds ±20% of the basic value and lasts for more than 3 minutes, corresponding vasoactive drugs are given; when the heart rate is lower than 45 times / min and lasts for more than 1 minute, atropine 0.25-0.5mg can be given according to the basic heart rate of the patient. One minute after operation, propofol and remifentanil were stopped, 0.1mg/kg of dizosin was injected intravenously to prevent postoperative pain and discomfort, and 6mg of granisetron hydrochloride was injected intravenously to prevent postoperative nausea and vomiting.

(4) Anesthesia recovery

After the operation, if the patient can open his eyes, nod and cooperate, the tidal volume is more than 3 ml / kg, and still maintain the breathing air under the condition of arterial oxygen saturation more than 95%, it is estimated that sputum aspiration and extubation will occur if there is no airway obstruction after extubation. If the extubation cannot be achieved in the operating room, it should be transferred to the anesthesia recovery room for further resuscitation, and then extubation.

3.4. Record and Observation Index

Blood pressure and heart rate were recorded 5 minutes after operation (T0), after anesthesia induction (T1), after tracheal intubation (T2), after insertion of supporting laryngoscope (T3), and after extubation (T4); mandible relaxation degree before tracheal intubation and after placement of supporting laryngoscope; exposure degree of glottis, closure degree of glottis, movement of vocal cords; operation duration and recovery time (spontaneous respiration recovery from operation time), Anesthesia recovery room with extubation time (extubation from operation time), awake time (recovery from operation time) and retention time; OAA / s score 5 minutes after extubation; dosage of propofol and remifentanil. Before endotracheal intubation, mandible relaxation has advantages, advantages and disadvantages; when mandible relaxation support laryngoscope is placed in place, it can indirectly indicate the scale of pressure platform on the basis of support frame. When the support laryngoscope is placed in the best position, it can completely expose the structure of glottis. At this time, the frame base is placed on the platform scale, and the operator can make the vocal cord clearer by adjusting the focal length, the measurement of pressure can indirectly reflect the degree of mandible relaxation.

Mandible relaxation level: excellent: one hand can easily lift the mandible angle forward and upward; good: it is difficult to hold the mandible with one hand; poor: it is difficult to hold the mandible with both hands. Cormack Lehane scoring method: anterior consortia of grade I; partial consortia of grade II; posterior consortia of grade III; no structure of grade IV. OAA/s score: 5 points: rapid response to normal voice calls, fully awake; 4 points: slow response to normal voice calls, slow speech; 3 points: only response after loud or repeated calls, vague speech, dull eyes; 2 points: only response to light push and light tap, unable to distinguish their speech; 1 point: only response to squeeze deltoid muscle; 0 point: no response to squeeze deltoid muscle, in a coma state.

3.5. Statistical Analysis

SPSS16.0 statistical software was used for statistical processing, and the measurement data was expressed as mean ± standard deviation. First, check whether the data conforms to the normal distribution. If the distribution is normal, the homogeneity of variance is tested. Blood pressure and heart rate were compared by ANOVA. Independent sample t-test is used for other measurement data. If it does not conform to normal distribution, nonparametric test is used. The number of counting data cases n indicates that chi square test is used for gender comparison, and rank sum test is used for other counting data comparison. Compared with chi square test, the counting data were statistically significant (P<0.05).

4. Results and Analysis

4.1. Basic Conditions

(1) General comparison

Table 1. General comparison

Group	Age	Male	Female	Body mass index	Operation time
1	47.91±8.86	19	14	23.07±1.84	6.89±2.97
2	45.69±12.12	16	17	22.70±1.76	6.43±1.91

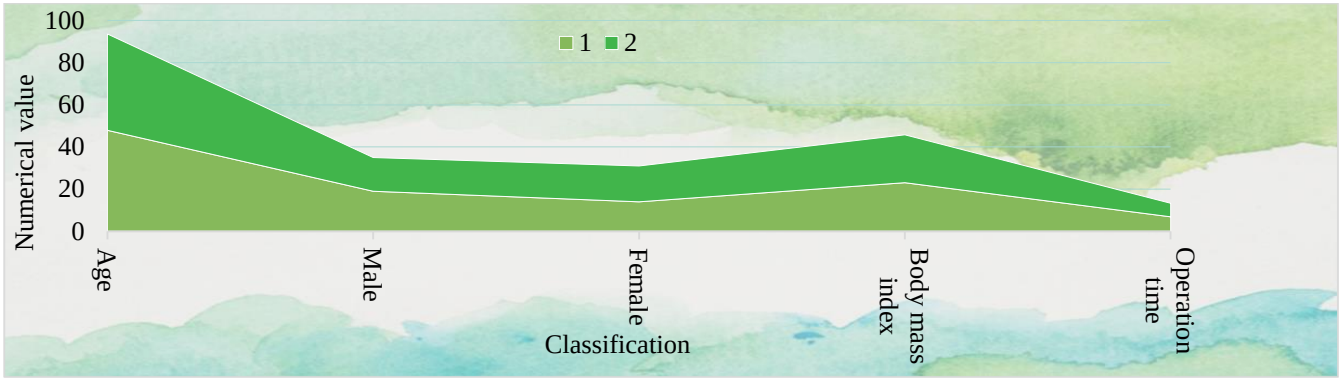

Figure 1. General comparison

According to the data statistical analysis, as shown in Figure 1 and Table 1, 33 patients were included in both groups, 19 in group 1, 14 in group 2, 14 in group 1, 17 in group 2, body mass index group 1 (23.07±1.84), and 2 (22.70±1.76). The operation time was 6.89±2.97 in group 1 and 6.43±1.91 in group 2. There was no significant difference in age, sex, BMI and operation time (P>0.05).

(2) Comparison of blood pressure and heart rate

Table 2. Comparison of blood pressure and heart rate

Group	T0	T1	T2	T3	T4
Systolic blood pressure group 1	136.88±20.50	97.37±16.79	109.71±16.79	121.40±26.77	127.40±16.18
Systolic blood pressure group 2	133.28±15.70	102.74±10.83	112.49±8.11	119.69±17.30	137.49±17.36
Diastolic pressure group 1	8.06±9.85	62.34±10.84	68.31±8.95	77.29±14.57	79.63±10.53
Diastolic pressure group 2	81.93±11.56	66.31±10.58	71.11±8.42	76.37±12.50	85.14±13.11
Heart rate group 1	72.54±11.11	65.54±11.32	69.00±9.32	70.37±12.08	78.40±11.15
Heart rate group 2	67.46±9.42	64.26±9.53	65.17±7.90	66.91±9.97	82.00±12.24

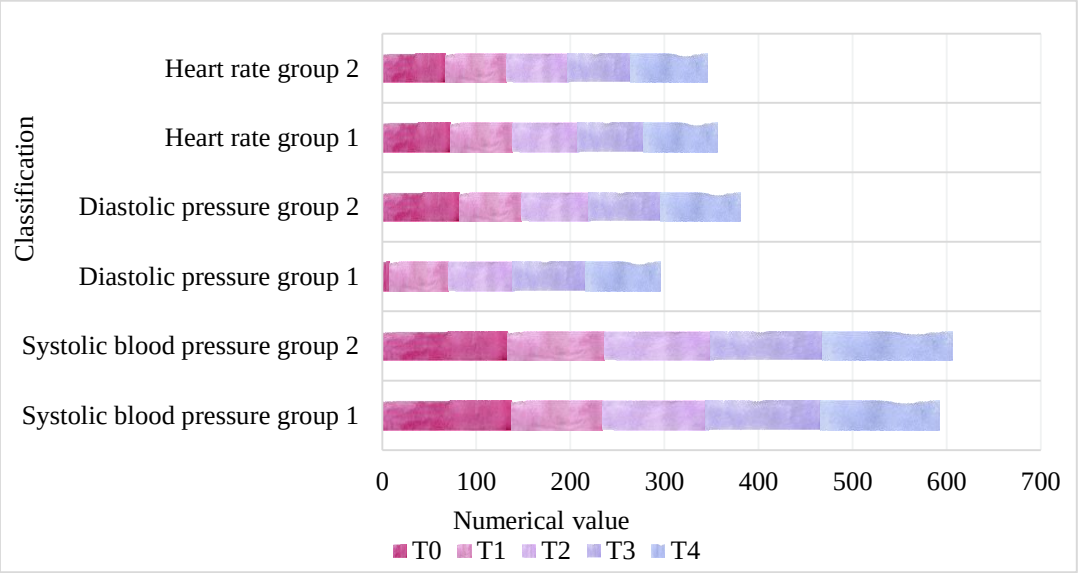

Figure 2. Comparison of blood pressure and heart rate

According to the statistical analysis of data, as shown in Figure 2 and Table 2, there was no significant difference in blood pressure and heart rate between the two groups compared with the first group (P>0.05). Comparison within the group: compared with T0 time point, systolic and diastolic blood pressure of the two groups decreased significantly at T1 time point (P<0.05). Although the systolic blood pressure increased gradually at T2 and T3 time points, there was still significant difference (P<0.05). Compared with t0 time point, the heart rate of the two groups increased significantly at T4 time point (P<0.05), but there was no significant fluctuation in group 1 (P > 0.05). After extubation, the blood pressure and heart rate of the two groups were significantly increased, especially the fluctuation of heart rate was more obvious, compared with other groups, the change of heart rate was statistically different (P<0.05); When extubation, the blood pressure and heart rate of the one group had no significant fluctuation, compared with T0 time, there was no statistical difference (P> 0.05), and the circulation was more stable. It can be seen that appropriate local anesthesia can effectively reduce the hemodynamic fluctuation caused by extubation. There was no significant difference in blood pressure and heart rate between the two groups (P>0.05); however, no anesthesia was used in the two groups, suggesting that it may be related to intravenous remifentanil before intubation, but it could not be recognized that anesthesia can reduce the stimulation of intubation and laryngoscope.

4.2. Anesthesia Effect

(1) Muscle relaxation comparison

Table 3. Muscle relaxation comparison

Group	Exposure of glottis				Degree of mandible relaxation			
	Level 1	Level 2	Level 3	Level 4	Excellent	Good	Difference	After laryngoscope placement
1	31	2	0	0	21	8	4	25.49±7.99
2	32	1	0	0	27	4	2	25.02±7.26

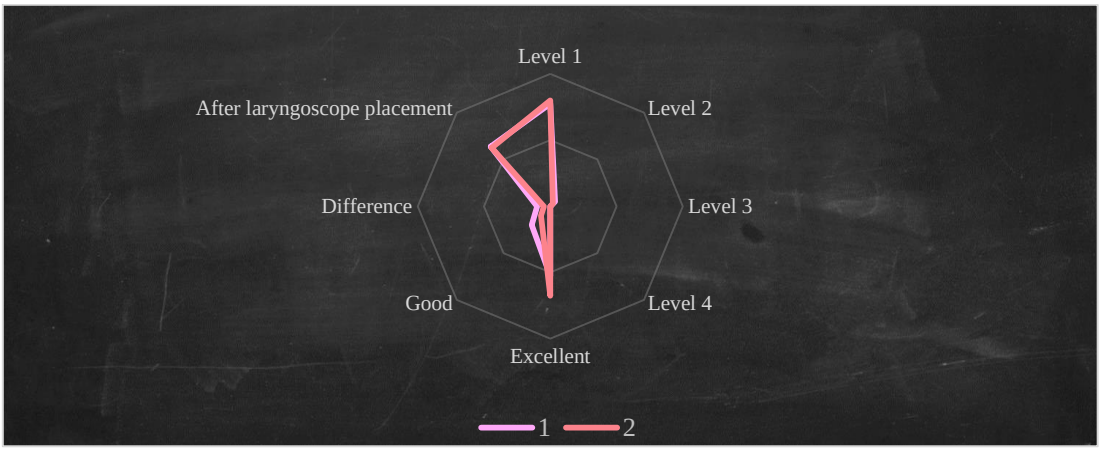

Figure 3. Muscle relaxation comparison

According to the statistical analysis of data, as shown in Figure 3 and Table 3, 31 cases in level 1, 2 cases in Level 2, and 0 cases in Level 3 and 4 in group 1. In the two groups, there were 32 cases of grade 1, 1 case of grade 2, and 0 case of grade 3 and 4. In group 1, 21 cases were excellent, 8 cases were good and 4 cases were poor. There were 27 excellent cases, 4 good cases and 2 poor cases in the two groups. There was no significant difference in the degree of glottic exposure between the two groups (P>0.05).

(2)Comparison of anesthesia and resuscitation

Table 4. Comparison of anesthesia and resuscitation

Group	Respiratory recovery time	Wake up time	Unplugging time	Recovery room retention time	OAA/S score
1	2.09±0.38	3.09±0.65	3.11±0.78	24.71±7.41	3.40±0.55
2	5.77±1.45	22.40±7.96	42.23±10.47	43.71±4.55	2.71±0.65

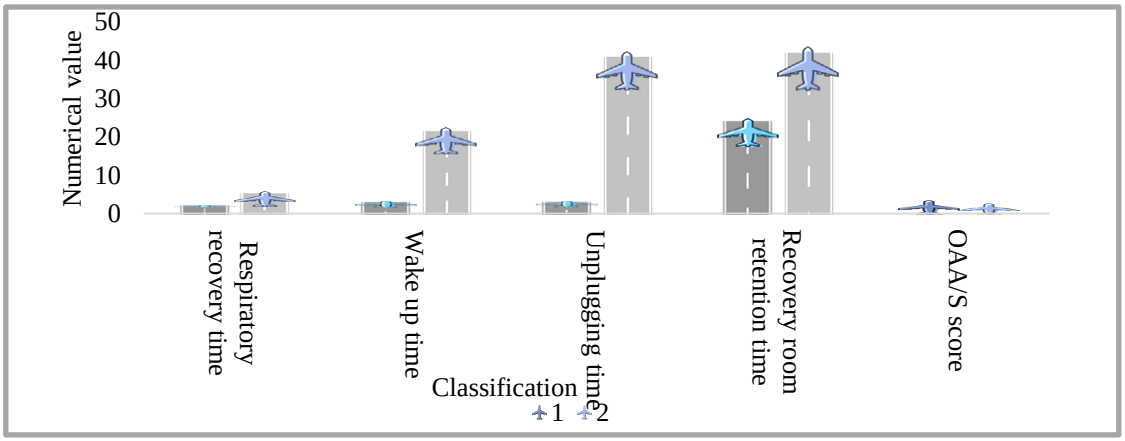

Figure 4. Comparison of anesthesia and resuscitation

According to the data statistical analysis, as shown in Figure 4, there were significant differences between the two groups in respiratory recovery time, extubation time and awake time (P<0.05), and the time in group 1 was significantly shorter than that in group 2; the OAA/s score difference between the two groups was statistically significant (P<0.05), and the score in group 1 was higher than that in group 2; The retention time in group 1 was shorter than that in group 2, and the difference was statistically significant (P<0.05).

5. Anesthesia Treatment Discussion

5.1. Vocal Cord Mass Analysis

Benign vocal cord tumors generally include vocal cord tumors, vocal nodules, vocal cyst, etc. at present; most of these operations are carried out under the support microscope. It depends on a high level of anesthesia technology. Because of its small trauma and high accuracy of resection, it has been widely used in otorhinolaryngology. Support microscope is one of the most commonly used methods to observe and diagnose laryngeal diseases. The operation time is very short, generally less than 10 minutes, but in order to better manage the airway and improve the patient's comfort, the anesthesia mode under local anesthesia is abandoned. The absorption area of alveoli is large, which can accelerate the absorption rate of local anesthetics and maintain the aging time at about 15-30 minutes. The concentration of lidocaine commonly used in clinic is 2%. The onset time may be slower than lidocaine at a concentration of 4%. The reasons for three times of local anesthesia are: the first time of local anesthesia, because of the protective reflex of the throat, the patient can only include oral local anesthesia, pouting up the oropharynx and deeper part after local anesthesia, the local anesthesia will unconsciously swallow or vomit, unable to achieve the effect of local anesthesia; the second time of local anesthesia, the protective reflex of the throat is slower than before, the local anesthesia time is longer, closer to the throat; The anesthesia effect is gradually enhanced, and the effect is good after the third local anesthesia.

After remifentanil injection, the curative effect was fast and disappeared. The half-life of remifentanil is only six minutes. It has not accumulated in the body for a long time. There are still individual differences in the effective dose of remifentanil to inhibit cardiovascular response. The general situation of patients should be considered in clinical application. It is well known that propofol can produce respiratory depression in large doses, especially in rapid intravenous injection. Propofol also has a certain degree of muscle relaxation, but its mechanism has not been reported. Generally, we work in clinical practice and find that when the operation is close to the end, but the muscle relaxation effect is poor, sometimes when a certain dose of propofol is added, the effect of abdominal muscle relaxation and patients in other areas will be similar to that of muscle relaxant. We speculate that propofol may have central sedative effect, inhibit nerve center and lead to muscle relaxation. Although no muscle relaxant was used in the first group, it met the intubation conditions and the degree of muscle relaxation required by the operation. After operation, only remifentanil disappeared, the patient's spontaneous respiration recovered, and the tidal volume and respiratory frequency soon reached the extubation state. It takes a long time to induce breathing after surgery. Even after the recovery of natural respiration, the respiratory frequency and tidal volume are irregular. As a result, neostigmine was used in almost all patients to fight residual muscle relaxation. The effect of intermediate time muscle relaxant on postoperative respiratory complications is dose-dependent, that is, the more dose and times are increased, the greater the risk of postoperative respiratory complications is. Even if no muscle relaxants were added during the operation, the shorter the operation time, the greater the possibility of residual muscle relaxants after the operation. In addition to benign vocal cord masses, this anesthesia method is also suitable for other types of operations under the support microscope, as well as small operations with low requirements for muscle relaxation, such as short tonsil masses, sinusitis, nasal polyps, etc. Neurosurgery also has low requirements for muscle relaxation. In addition to carotid stenosis and aneurysms, other selective surgery may also consider the use of this anesthesia to induce. We did not make a detailed distinction between the types of vocal cord masses, unilateral and bilateral. Then, whether there is statistical difference between the two groups. Different types of benign vocal cord tumor will have different degree of difficulty in surgery, so there may be some differences in the length of surgery.

Although the duration of hypotension is not long, elderly patients also have the risk of cardiovascular and cerebrovascular accidents.

5.2. Analysis of Anesthesia Treatment

Good anesthetic effect of tetracaine or lidocaine in various airway operations can make hemodynamics more stable and reduce the use of general anesthesia or sedatives. Levobupivacaine or ropivacaine are also used for airway surface reporting. These commonly used surface anesthetics include injection, gelatin, ointment and other types of anesthetics. The dosage can be calculated accurately during injection to prevent local anesthetics from poisoning. The dosage of gelatin or ointment is not accurate and it is not easy to give evenly. In the process of fiberoptic bronchoscopy, visual field may be affected, so local injection anesthesia is often used in airway surface anesthesia. Airway surface anesthesia: a liquid anesthetic is sprayed onto the airway mucosal surface through a sprayer, such as a throat tube. The dosage is accurate, the effect is fast and the anesthesia effect is good. Atomization is the atomizer inhaling the local anesthetic after inhaling the inhalation of the drug into the airway and acting on the airway mucosa. The inhaled drug concentration is limited, but the dosage is not accurate, the effect is slow, and the administration time is long, but the patient is easy to accept, so the general airway anesthesia can be obtained. It refers to the injection of local anesthetics into the trachea after the syringe is punctured by the cricothyroid membrane. These drugs are distributed on the airway surface through the patient's cough. The anesthesia effect of tracheal surface is good, but that of larynx is limited. In general, in order to achieve a good anesthetic effect, it is necessary to cooperate with the injection of drugs in the throat. It is mainly used as local anesthetic in gelatin and cream. Local anesthetics were directly applied to the surface of airway mucosa or the surface of tracheal tube after intubation. The dosage is not accurate and difficult to master. However, long-term use of endotracheal intubation can be used for endotracheal intubation in order to increase the postoperative tolerance of endotracheal tube. The main side effect of airway surface anesthesia is local anesthetic poisoning. The main reason is the increase of anesthetic amount and the sensitivity of patients to local anesthetic due to the change of pathophysiological conditions. In the process of anesthesia, the patient's reaction should be closely observed so as to detect the poisoning as early as possible and deal with it in time. For patients with increased sensitivity to local anesthesia under pathological conditions, try to avoid using tetracaine which can be replaced by lidocaine, and try to use the minimum dose and lower concentration.

Local anesthetics have a certain blocking effect on laryngeal nerve endings. Because local anesthetics can block the generation and transmission of nerve impulses, in theory, airway surface anesthetics can not only prevent the pain of the airway, but also block the generation and transmission of autonomic nerve impulses. Therefore, the autonomic nerve conduction directly caused by the stress response and cardiovascular response caused by pain stimulation is reduced. However, the role of local anesthetics is related to many factors, such as the concentration of local anesthetics, the time of local anesthetics and mucous membrane action, etc., especially during the spraying process of local anesthetics, the time of local anesthetics adhering to mucous membrane surface and action is limited, so multiple local anesthetics can improve the anesthesia effect, however, It is difficult to block all nerves completely with simple surface anesthesia. Because of the individual differences, the huge fluctuation of hemodynamics cannot be avoided during the operation, and even some patients cannot bear the stimulation of the operation and cannot cooperate. Therefore, airway surface anesthesia combined with intravenous sedation appears, but the effect is still not ideal. With the development of general anesthesia technology, the anesthesia mode of general anesthesia in supporting microsurgery has been explored gradually. Opioids act on opioid receptors in the nucleus tractus solitarius, which can regulate the activity of cardiac blood vessels

and further inhibit the vascular response in the operation center. In order to achieve a good inhibition of the effects of cardiovascular response in the microscopical operation support, a certain dose of opioids is necessary, but a large dose of opioids will also cause some problems, such as slow resuscitation after a short operation, blood pressure fluctuations before and after surgery, etc. General anesthesia combined with airway surface anesthesia can effectively inhibit cardiovascular response during stent microsurgery, prevent hypertension and tachycardia; combined with airway surface anesthesia can reduce the amount of general anesthesia. Microsurgery is a common method in otorhinolaryngology and head and neck surgery. It is mainly used for biopsy of laryngeal masses and resection of small masses. Common methods include vocal cord tumor resection, epiglottic cyst resection, laryngeal tumor biopsy and so on. These operations are usually simpler and take less time.

In the process of general anesthesia, support microscope: commonly used anesthetics: propofol has rapid onset, accurate anesthesia effect and quick postoperative recovery, especially suitable for short and small operations, such as the support of microscope, commonly used anesthetics at present, but it has the effect of inhibition on the circulatory system, also related to dose, large dose can cause hypotension. General anesthesia tends to endotracheal intubation, which can not only perform deep anesthesia, but also obtain good muscle relaxation effect, which is conducive to exposure. General anesthesia assisted airway surface anesthesia commonly used methods: after induction of general anesthesia, under laryngoscope exposure glottis use laryngeal anesthesia tube for airway surface anesthesia, and then intubation, easy for patients to accept. Before anesthesia induction, anesthesia should be performed on the airway surface, including atomization inhalation, puncture of cricothyroid membrane, local anesthetic spray in the larynx, and intubation after anesthesia induction. Patients will feel uncomfortable during the surface anesthesia, but under the deep anesthesia, there is no need to intubate or operate without intubation, which can maintain the hemodynamic changes before and after intubation. Combined use can reduce the use of general anesthesia to a certain extent and achieve good anesthetic effect.

6. Conclusion

(1) General anesthesia combined with airway surface anesthesia can effectively reduce stress response and make hemodynamics more stable; general anesthesia combined with airway surface anesthesia can reduce the dosage of general anesthesia.

(2) Although muscle relaxant is not used in the surgery of vocal cord benign tumor under the support microscope, airway surface anesthesia can provide the same good surgical vision as traditional anesthesia.

(3) There were no significant changes in mandible relaxation, blood pressure and heart rate. More importantly, the recovery time is short and the recovery quality is good, which improves the operating efficiency of the operating room and reduces the amount of anesthetic analgesics during the operation.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

References

[1] Ren J, Yang H, Lyu D, Zou J, Zheng YT, & Wang HY. (2017). "Clinical and Pathological Analyses of 154 Patients with White Lesion of Vocal Cord", Zhonghua Er Bi Yan Hou Tou Jing Wai Ke Za Zhi, 52(5), pp.381-384. DOI: 10.3760/cma.j.issn.1673-0860.2017.05.012

[2] Hirahara, S., Ide, S., Goto, T., Matsuda, K., & Tono, T. (2017). "A Case of Verruca Vulgaris of the Vocal Cord", Practica Otologica, 110(8), pp. 539-543. DOI: 10.5631/jibirin.110.539

[3] AntoSahaya Priyanka, Kusha Nag, VR Hemanth Kumar, DewanRoshan Singh, Senthil Kumar, & T Sivashanmugam. (2017). "Comparison of King Vision and Truview Laryngoscope for Postextubation Visualization of Vocal Cord Mobility in Patients Undergoing Thyroid and Major Neck Surgeries: a Randomized Clinical Trial", Anesthesia Essays & Researches, 11(1), pp.238-242. DOI: 10.4103/0259-1162.200240

[4] Sando, M., Kawamura, M., Ohata, H., Ota, S., & Iida, H. (2017). "Safety Airway Management Using a Fiberscope for Observation of Vocal Cords after General Anesthesia in Patients with Spino-Cerebellar Degeneration:2 Case Reports", Journal of Japan Society for Clinical Anesthesia, 37(2), pp.176-180. DOI: 10.2199/jjsca.37.176

[5] Seo, J. H., Cho, C. W., Hong, D. M., Jeon, Y., Bahk, J. H., & Thompson, J. P. (2016)."The Effects of Thermal Softening of Double-Lumen Endobronchial Tubes on Postoperative Sore Throat, Hoarseness and Vocal Cord Injuries: a Prospective Double-Blind Randomized Trial", British Journal of Anaesthesia, 116(2), pp.282-288. DOI: 10.1093/bja/aev414

[6] Kim, Se Eun, & Kim, Eugene. (2016)."Local Anesthesia with Monitored Anesthesia Care for Patients Undergoing Thyroidectomy a Case Series", Korean Journal of Anesthesiology, 69(6), pp.635-639. DOI: 10.4097/kjae.2016.69.6.635

[7] Truszewski, Z., Samarin, S., Czyzewski. Evrin, T., & Szarpak, ?. (2016). "Are Paramedics Able to Confirm Endotracheal Tube Placement Using Ultrasonography?", American Journal of Emergency Medicine,34(5), pp.923-924. DOI: 10.1016/j.ajem.2016.02.034

[8] Kadoya, T., Uehara, H., Yamamoto, T., Shiraishi, M., & Enokida, K. (2016). "A Case of Left Vertebral Artery Aneurysm Showing Evoked Potentials on Bilateral Electrodes by the Left Vagus Nerve Stimulation to Electromyographic Tracheal Tube", Masui the Japanese Journal of Anesthesiology, 65(2), pp.160-163.

[9] Serap Koybasi Şanal, Bicer, Y. O., Kukner, A., & Tezcan, E. (2016). "Effect of Pregnancy on Vocal Cord Histology: an Animal Experiment", Balkan Medical Journal, 33(4), pp. 448-452. DOI: 10.5152/balkanmedj.2016.15286

[10] Hayashi, K., Murata, K., Naito, A., Kagawa, Y., & Takeda, Y. (2017). "A Case of Resection of Obstructive Colon Cancer Associated with Aspiration Pneumonia, under Combined Epidural-Spinal Anesthesia", Gan to kagaku ryoho. Cancer & chemotherapy, 44(12), 1970-1972.

[11] Liu, T. J., Shen, X., & Li, W. X. (2017). "Desflurane Accelerates Emergence after Self-Retaining Laryngoscope under the Microscope in the Surgery of Vocal Cord", Fudan University Journal of Medical Sciences, 44(2), 192-195. DOI: 10.3969/j.issn.1672-8467.2017.02.011

[12] Song, W., Li, M., Zheng, H. L., Sun, L., & Wang, W. (2017). "Treatment of Bilateral Vocal Cord Paralysis by Hemi-Phrenic Nerve Transfer", Chinese Journal of Otorhinolaryngology Head & Neck Surgery, 52(4), pp.245-252. DOI: 10.3760/cma.j.issn.1673-0860.2017.04.002