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Scanning Microscopic Observation of Bronchial Mucosa Before and after Bronchoalveolar Lavage in Children with Acute Lower Respiratory Tract Infection

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Abstract: In recent years, the incidence of acute lower respiratory tract infections in children has gradually increased, seriously threatening children's lives and health. The emergence of bronchoalveolar perfusion therapy has brought good news and achieved good results. Therefore, it is very necessary to actively carry out scanning microscopy observation research on bronchoalveolar lavage based on bronchoalveolar lavage to treat children with acute lower respiratory tract infection. The purpose of this article is to investigate the bronchoalveolar lavage in the treatment of children with acute lower respiratory tract infection before and after bronchial mucosa scanning microscopy, a retrospective study of 120 children with acute lower respiratory tract infection, according to whether bronchoalveolar lavage is divided into control groups cases and 60 cases in the lavage group to observe changes in mucosal area and secretion content, respectively. The results of the study showed that the number of children with a bronchial mucosal surface reduction of more than 30% before and after surgery in the lavage group and the control group were 24 and 6, respectively, and the proportions were 40% and 10%, respectively. The number of children whose bronchial mucosal surface decreased by more than 0-30% before and after surgery in the lavage group and the control group were 27 and 31, respectively, and the proportions were 45% and 52%, respectively. It can be seen that the scanning microscope is important for the observation of bronchial mucosa before and after bronchoalveolar lavage treatment of children with acute lower respiratory tract infection.

1. Introduction

Local respiratory tract infections of the respiratory tract can be divided into upper respiratory tract infections and lower respiratory tract infections. Infections with decreased airway

inflammation include acute lower bronchial-acute bronchitis, chronic obstructive bronchitis, pneumonia, and bronchiectasis. Mainly, various microorganisms such as viruses, bacteria, mycoplasma, chlamydia, and legionella directly infect and infect bacteria. Respiratory bacterial infections are the most common infectious bowel disease. The main pathogen causing this infection must be clearly diagnosed, and effective antibiotics should be selected during the treatment process, but when the drug resistance is severe, other therapeutic effects are limited.

Bronchoalveolar lavage is a method of injecting liquid into bronchoalveolar fluid and aspiration to diagnose and treat lung diseases [1]. Usually, a bronchoscope is inserted into a specific lung of the bronchus, injected with saline at 37 ° C, and then aspirated under low negative pressure. Scanning microscopes use narrow focus and high-energy electron beams to scan samples [2]. The interaction between the beam and the substance stimulates various physical information, which is collected, enlarged and imaged to achieve the purpose of characterizing the microscopic morphology of the substance [3]. It is widely used to observe the bronchial mucosa before and after bronchoalveolar lavage in children with acute lower respiratory tract infection.

According to Matsunaga, scanning microscopes have tubule diameters and soft bodies. You can use the operation button to bend it into multiple angles, rotate it, and then enter the upper valve and accessory bronchus. Optical fiber has excellent light conduction performance, excellent lighting, clear vision, and is found on the mucosal surface of trachea and bronchus, anatomical structure, dynamic change, secretion change [4]. Hyono explained that in addition to its excellent scanning microscopic diagnostic ability, direct bronchoalveolar lavage (BAL), biopsy and brush examination play other roles in the diagnosis and treatment of diseases [5]. Lixia believes that the process is safer, less invasive and easier to operate. It has been gradually improved in high resolution, good lighting, moderate bending angle, wide field of view and thin blade. Examination, diagnosis and treatment of disease is the first choice of tools necessary for pulmonary doctors a powerful weapon [6]. Okayasu pointed out that the bronchoscope of scanning microscope is too thick, which will directly block the airway and affect the breathing of children. In severe cases, it can even cause suffocation. At the same time, too thick diameter will continue to stimulate the glottis and tracheal mucosa, causing local physical damage, such as mucosal edema and laryngospasm [7]. Kuwabata analytical scanning microscope is difficult to use in infants because children are growing and developing, and the diameter of the trachea changes significantly with age [8]. Catli found that the more preoperative airway pressure, the longer postoperative intubation time. Some patients are often intubated, which makes the extubating difficult [9].

Compared with the previous literature of scanning microscope observation of bronchoalveolar lavage treatment, the innovative content of this article is roughly divided into the following points: the first point is to provide a basis for the diagnosis, treatment and prognosis of clinical diseases by evaluating respiratory diseases. The second point is to observe the secretion of bronchial mucosa in children before and after acute lower respiratory tract infection. This is of great significance for preoperative bronchoalveolar lavage and postoperative airway management. The third is to calculate the changes of bronchial mucosa area before and after bronchoalveolar lavage in children with acute lower respiratory tract infection. This is the basis for further research to improve the accuracy of microscope atomic surface detection and error analysis.

2. Pathology of Lower Respiratory Tract Infection

The clinical incidence of acute lower respiratory tract infection in children ranks first among infectious bowel diseases common in Chinese children [10]. It may be directly caused by the mutual infection of many different pathogens or microorganisms (such as various bacteria, viruses, mycoplasma, chlamydia). Among them, viral infection is one of the main causes of acute lower

respiratory tract infection in children. Common clinical viruses in children with acute lower respiratory tract infections include influenza virus, respiratory syncytial virus, adenovirus, parainfluenza virus, human interstitial lung virus, coronavirus, and human boca virus. As shown in Figure 1, the common viral infections are the following.

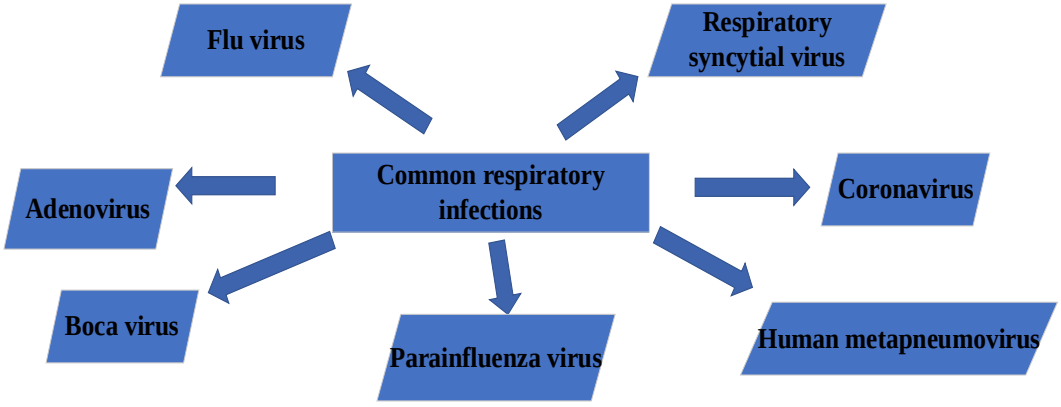

Figure 1. Acute lower respiratory tract infections often cause viruses

Influenza virus is a typical species of the orthro family. It is called influenza virus including human influenza virus and animal influenza virus. It is divided into three types, A, B and C, and is the pathogenic bacteria of influenza [11]. Influenza a virus can infect a variety of animals, including many poultry and mammals. Viruses B and C can only be isolated from the human body. Among them, the antigenicity of influenza a virus is prone to mutation, which has caused many epidemics worldwide. Influenza viruses are spherical, and most of the newly isolated strains are filamentous, with a diameter of 80-120 nm and a maximum length of 400 nm. Influenza virus structure is a segmented single-stranded RNA virus composed of a nucleus and a membrane. About the classification of influenza virus, as shown in Figure 2.

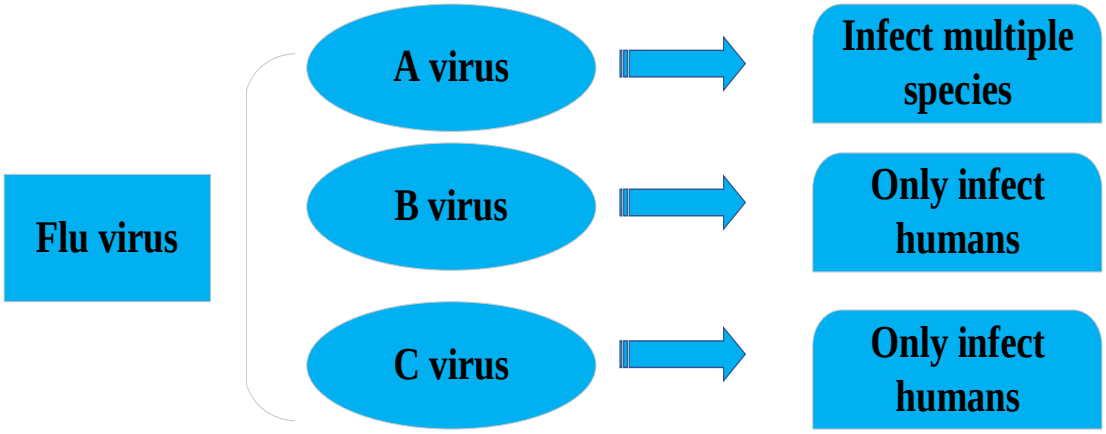

Figure 2. Influenza virus classification and characteristics

Respiratory syncytial virus is currently the main pathogen causing lower respiratory tract infections in infants and children. It is a single negative-stranded virus with a diameter of 125-250nm and belongs to the paramo loviride family. The disease is often spread by close contact with droplets and bacteria in the air. More common in one-year-old newborns and newborn babies within 6 months. The incubation period is 3-7 days. The early symptoms of infants and young children are generally severe, and they may include acute high fever, rhinitis, pharyngitis. Most of the early manifestations are bacterial bronchitis and chronic pneumonia. A few critically ill children also have cocoon complicated with otitis media, pleurisy, and acute myocarditis.

Adenovirus belongs to the adenovirus family. Adenovirus is spherical, 70-90 nm in diameter, and has no envelope. The core is double-stranded DNA, and the nucleocapsid is a typical icosahedral three-dimensional symmetry. The spread of adenovirus can spread to human respiratory tract, gastrointestinal tract, human eyes, conjunctiva, etc. Susceptible people are school-age babies, children and the elderly with poor immunity. These diseases can directly cause a variety of skin diseases. Early pneumonia symptoms caused by adenovirus infection account for 20% to 30% of human viral early pneumonia. Most symptoms occur in infants and young children between 6 months and 2 years of age, with sudden mild fever in the lungs (above 39 ℃), cough, difficulty breathing, sweetness and other early symptoms. Severe drowsiness, convulsions, conjunctivitis, severe heart failure.

Human parainfluenza virus's influenza viruses are classified into the paramos override according to the 4th international virus nomenclature committee [12]. Under the electron microscope, human para-influenza virus is spherical, medium in size, and generally 120-200nm in diameter. Nuclear proteins are helically symmetrical, and nucleic acids are single negative-stranded RNA with no segments. The virus is enveloped. There are two nails on the envelope. One is the HN protein, which has the functions of HA and NA. The other is F protein, which has the function of fusing cells and dissolving red blood cells. It consists of F 1 and F 2. The subunits are connected by two transistor Luff keys. Inside the virus envelope, there is a virus called nucleoside, which consists of RNA, N protein, P protein, and L protein. In many cases, a variety of children may cause bacterial infection of the throat and airways, and its clinical pathogenicity may be second only to the child's respirator pneumonia syncytial herpes virus. As with other respiratory syncytial influenza viruses, people are infected by the parade virus disease, which directly causes repetitive and persistent acute upper respiratory tract infections, fever, and nighttime sore throat. symptom. In addition, especially for infants, the elderly, and people with severe immune system disorders, it can also be used for descending respiratory diseases that cause severe repetitive bacterial infections such as chronic pneumonia, bronchitis, and bacterial bronchitis.

Human metapneumovirus is a new respiratory virus. It was first isolated and identified from the nasopharyngeal secretions of children with respiratory infections. It is also the first metapneumovirus to be a human virus. Virus particles are polymorphic, spherical and filamentous, with an average diameter of 200 nm, and have envelopes and surface proteins. The nucleic acid is a single 13.4 kb long negative-strand RNA, no matter what its fragment is, and the nucleocapsid is spirally symmetrical. Metapneumovirus can cause upper respiratory and lower respiratory tract infections in infants, the elderly, and those with weakened immunity, especially infants under two years of age. The threat is greater. About 5% to 15% of bronchiolitis is caused by human interstitial pneumonia virus. Its clinical manifestations are similar to respiratory syncytial virus infections. Peak seasons and epidemics overlap with acute respiratory syncytial virus infections, suggesting that there may be co-infection with viral infections. As shown in Figure 3, the structure of human metapneumovirus is as follows.

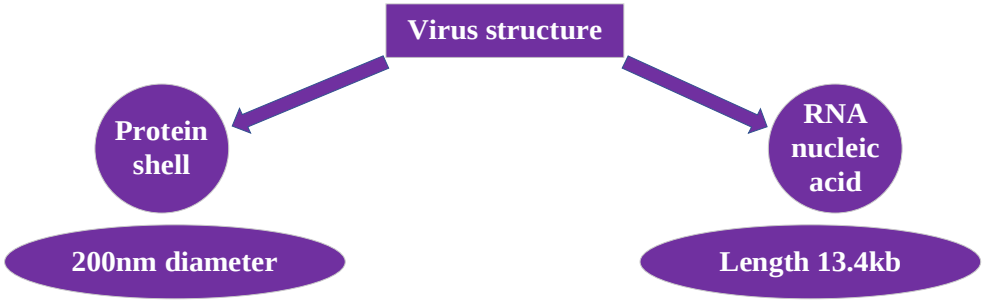

Figure 3. Human metapneumovirus structure

Coronaviruses belong to the coronavirus genus of coronaries in the systematic classification. Corona spike virus is named because the crown spikes on the envelope of the corona virus protrude outwards, which is named like a sunshade or a star crown. The virus particles of this medicine have multi-cell morphology. The shape and diameter of the virus cell particles are 60-220nm in diameter and have an envelope. The projections of human respiratory coronavirus are petal-shaped and arranged in a circle. The viral nucleic acid is a single positive-stranded RNA, with a total length of 27-33 kb, regardless of segment, and the nucleocapsid is spirally symmetrical. Coronavirus is mainly spread through the intestinal tract of bacterial droplets, and groups of different ages are susceptible, but mainly infants and young children. .

Human boca virus is a genus of the parvorder subfamily of the parvorder family and is an unenveloped low-chain virus. The genetic virus may be a new type of human small genetic virus rediscovered in the mucus secretions of the upper respiratory tract of children. Now, boa virus is widely considered to be a new type of viral virus in human parvovirus, it is likely to be an important pathogen for respiratory bacterial infections, and the specific clinical symptoms may be caused. It is acute pneumonia or bronchial inflammatory pneumonia, which is similar to the specific clinical manifestations of other boca viruses.

3. Principle of Scanning Microscope

In the fluorescence scanning processing microscope, a single point of the sample is generally fixed, so that the single point excitation light is automatically scanned and the local fluorescence at the fluorescent position of the sample at different scanning positions is excited. A single point of fixed detector is used to automatically collect each fluorescence that has been processed by a single point of motion, and then a scanning method of automatic reconstruction of the fluorescence image can obtain a local fluorescence motion image of a sample. Of course, the scanning processing system can also use the continuous movement of the sample to achieve continuous excitation light. Automatic scanning method. Scanning imaging microscopes generally use diffractive laser light sources as emission sources, so they are also simply referred to as scanning laser mirrors or scanning imaging microscopes. In order to obtain its higher tomographic scanning capability at the same time, a small hole similar to the detector is usually added in front of the laser detector to form a focused laser microscope shared by the focusing laser and scanning.

So far, the acousto-optic effect deflector is still the only electronic device that can directly realize random image scanning. It is actually a kind of random scanner designed and made using the acousto-optic effect. Acousto-optic effect diffraction refers to a type of sound-emitting optical wave that does not propagate rapidly in the sound-generating medium. However, it is a phenomenon called ultrasonic field laser diffraction or sound wave scattering. Since the medium acoustic wave itself is a medium elastic reflection wave, the sound wave propagates rapidly in the affected medium, and at the same time, it will directly generate various elastic wave stress or reflection strain. This elastic phenomenon is also called the medium elastic light reflection effect. The deformation of the elastic wave in the dielectric wave directly leads to the alternation of the density and density of the medium that affects the wavelength density cycle of the medium, which directly causes the elastic change of the wavelength cycle that affects the medium density refracted light efficiency, forming a grating with high medium refracted light efficiency. When the medium light wave vibration propagates in the ultrasonic medium at high speed, the phenomenon of light wave diffracted light may occur naturally, and the vibration intensity and irradiation direction of the diffracted light change with the intensity of the medium ultrasonic field. Specifically, whenever the ultrasonic light waves sequentially undergo brag second-order diffraction in the crystal that emits the acoustic beam, most of the kinetic energy of the outgoing diffracted light will be concentrated

on the first-order second-order diffracted light. The movement direction of the second-order diffracted light changes with the continuous change of the crystal ultrasonic emission frequency. The movement direction of the 0-order light is consistent with the direction of the incident light, and there is no possibility of direction deflection. When the first-order acousto-optic diffraction deflector works normally in the diffraction deflection mode of brag, the inclination angle of the first-order light relative to the 0-order light is 1:

$$\theta=\frac{\lambda}{\Lambda}=\frac{\lambda f}{v} \tag{1}$$

Where λ is the wavelength of light, f is the wavelength of sound wave, f is the frequency of sound wave, and ν is the speed of sound wave propagation in the acousto-optic crystal. The frequency range of the sound wave determines the size of the scanning angle:

$$\Delta\theta=\frac{\Delta\lambda f}{v} \tag{2}$$

Where Δf is the frequency bandwidth of the acousto-optic deflector. The resolvable scanning point when the acousto-optic deflector is working is:

$$N=\frac{\Delta fD}{v}=\Delta f\tau \tag{3}$$

Where D is the clear aperture size of the acousto-optic crystal, and τ is the time required for the beam position to stabilize when the frequency of the acoustic wave changes, which becomes the transit time. When the acousto-optic vibration deflector automatically scans the diffracted beam image, as long as you need to quickly and automatically change its sonic vibration frequency, the direction of the diffracted beam can quickly change it slightly to achieve automatic scanning, because this automatic scanning is performed. There is no excessive mechanical movement in the middle of the method, which eliminates any inertial effects, so the automatic scanning execution speed is high, and the user can easily achieve random automatic scanning. When we use a small two-dimensional sonic laser scanning deflector placed between the directions x and y or y orthogonally, the two-dimensional acousto-optic scanning of the light beam can also be easily achieved.

Acousto-optic crystals disperse materials by ultrashort pulse laser. If no sound wave is loaded on the AOD, it is actually equivalent to the ordinary TeO2 crystal. The thickness of the crystal is L, and the direction of the crystal axis is perpendicular to the plane of the paper. The ultrashort pulse light is perpendicularly incident on the crystal surface, and the phase delay of the incident light passing through the crystal is:

$$\phi(\varpi)=\varpi t \tag{4}$$

Among them:

$$\varpi=2\pi\frac{c}{\lambda} \tag{5}$$

$$t=\frac{n(\lambda)L}{c} \tag{6}$$

The multi-photon excitation random scanning microscope can not only provide rapid imaging and detection, but also meet the research needs of rapid events. Since it can perform depth imaging,

it is particularly suitable for research in the medical field.

4. Performing Bronchoalveolar Lavage Surgery

4.1. Experiment Preparation

(1) Experimental subjects

Through a long-term retrospective investigation of 120 children with acute lower respiratory tract infection admitted to the department of respiratory medicine, according to whether children need routine bronchoalveolar alveolar lavage, they are divided into a treatment control group 60 cases and a conventional lavage control group 60. Routine clinical general comprehensive treatment methods of respiratory system medicine include effective control of local infections, alleviation of lower expiratory spasm, maintenance of local respiratory tract patency, cough and phlegm, maintenance of blood water and acid-base balance in electrolytes, etc. The lavage control group underwent routine bronchoalveolar lavage of acute bronchus on the basis of the clinical comprehensive treatment of respiratory system medicine. The short-term clinical pulmonary symptom improvement and relief time, lung sign improvement and improvement effect time, pulmonary symptom imaging anatomy and sign improvement effect, clinical effect, and lung function recovery and improvement were compared between the two groups of patients after treatment.

Table 1. Introduction to the basic situation of the test subjects

Project	Control group	Lavage group	P value
Age	10.17±2.01	10.13±2.22	0.937
Gender	36(60)	38(60)	0.730
Weight	28.53±5.18	28.16±5.29	0.487

As shown in Table 1, male 74 and female 46. The 60 patients in the cleaning group, including 38 men and 22 women, had an average age of (10.13 ± 2.22) years and an average weight of (28.16 ± 5.29) kg. The control group consisted of 60 patients, 36 males and 24 females, with an average age of (10.17 ± 2.01) years and an average weight of (28.53 ± 5.18). There was no statistical difference in age, weight or gender between the two groups (P> 0.05).

(2) Exclusion criteria

The age is not 3-14 years old. Complicated with tuberculosis, bronchial asthma, congenital heart disease, neuromuscular disorders, immune insufficiency, genetic or metabolic diseases and other basic diseases. Bronchial alveolar perfusion Children with intolerance. Patients with incomplete clinical data.

(3) Data processing

Statistical description: SPSS 21.0 statistical software is used for statistical analysis. If the measured data conforms to normal distribution and variance uniformity, the mean and standard deviation (-x ± s) are used for statistical description. When filling non-normally distributed data, the median (M), minimum (MIN), and maximum (MAX) are used for statistical description. Statistical inference: if the normal distribution is consistent and the variance is uniform, the paired t test is used. If the non-normally distributed data is satisfied, the rank-transformed non-parametric test is used. Count data is expressed as a percentage or ratio, and the $\chi 2$ test is used. Both parties tested, and P <0.05 was considered statistically significant.

4.2. Experimental Content

Bronchoalveolar perfusion surgery allows infusion of perfusate to wash away inflammatory

substances, pathogens, and purulent secretions remaining in the bronchi and alveoli, thereby accelerating the control of lung infections and providing excellent interventions. It can be treated. Local administration of arborol, antibiotics, pulmonary surfactant (PS) and other drugs can significantly increase the local drug concentration and can achieve direct sterilization and anti-inflammatory effects, so long-term large-scale systemic use avoids management. Certain side effects induced in children with acute lower respiratory tract infections can greatly reduce the absorption time, which helps to control the infection.

(1) Preoperative preparation

Before lavage of bronchoalveolar, three routine examinations are routinely performed: liver function, prothrombin time, electrocardiogram, chest radiograph and lung CT examination. Communicate well with children and their families, work with them to help them, clarify the purpose of the test, and be prepared to resolve any possible complications.

(2) Bronchoalveolar lavage

According to the patient's imaging examination results, first check the healthy side or the lightly affected side, and then check the affected side. Select the area with the largest infiltration shadow and enter the lung segment or sub-segment through the tracheal tube for bronchoalveolar lavage. The specific steps are as follows:

6 hours before surgery, fasting water, intravenous sedation (midazolam 0.1-0.15 mg / Kg static sedation) and local anesthesia, 2% lidocaine throat local anesthesia; fiber bronchus from the nose, throat, and glottis airway microscopic examination. Enter and use lidocaine to "progress during paralysis", observe the bronchial morphology, and determine the lung segment, middle lung, or tongue that is most affected by 37 ℃ saline (natural saline). Wash at least 3 times with 1.0 ml / kg, the total volume does not exceed (1-2) ml / kg; at least 30% of the infusion solution is collected by negative pressure suction, and the sample of alveolar lavage fluid is fixed hold, and then slowly pull the fiber bronchus out of the scope. Immediately, the collected alveolar lavage fluid was filtered through two layers of sterile gauze to remove mucus, placed in a special silicone plastic bottle, and then placed in a hot water bottle filled with ice. Common bacterial culture, mycoplasma DNA, mycobacterium tuberculosis smear, etc.

Precautions during surgery: In bronchoalveolar perfusion, the bronchoscope is near the bronchial orifice, and the narrow caliber is rapidly expanded with physiological saline, and the attached sputum must be relaxed. Do not wash for too long. In 10 minutes, in the case of intraoperative mucosal bleeding, in order to achieve the purpose of hemostasis, 1ml of 1: 10000 epinephrine can be used for local cleaning; to varying degrees, it can completely attract the secretions of the trachea and bronchial lumen. There is no obvious effect. It can be removed with forceps or with bronchial brush test forceps. During the operation, the patient's blood is closely monitored, oxygen saturation, blood pressure, heart rate, etc., the child's breathing, lips, face, etc. If the oxygen saturation of the patient's blood is reduced, usually less than 80%, the operation needs to be suspended. After pulling out the bronchoscope, quickly perform low-flow oxygen inhalation, backpack, etc. Repeat the operation after the patient's blood oxygen saturation is normal. In order to avoid contamination of upper airway secretions, please do not inhale the corresponding bronchial segment of the upper bronchoscope, give low flow of oxygen during the operation, and regularly monitor the patient's blood oxygen saturation.

5. Scanning Microscope Observation of Bronchial Mucosa

5.1. Analysis of Changes of Bronchial Mucosa in Children before and after Acute Lower Respiratory Tract Infection

The experimental group and the control group were tested for functional observation indexes

before surgery. The commonly used observation indicators are as follows: FVC refers to the forced vital capacity FVC, that is, the maximum amount of gas that can be exhaled as soon as possible after the maximum inhalation. FEV1 refers to the forced expiratory volume for 1 second. That is, the amount of gas exhaled per second is called the amount of exhaled gas in 1 second. PEF refers to the maximum expiratory flow, which is the instantaneous flow with the fastest expiratory flow in the forced spirometry. FEF refers to the maximum midstream expiratory flow, which is the average value when the expiratory power is 25% to 75% of the gas flow.

Table 2. Index detection

Group	FVC	FEV1	PEF	FEF
Control group	1.71±0.25	1.71±0.08	2.57±0.86	1.62±0.16
Lavage group	1.68±0.15	1.71±0.19	2.93±0.59	1.45±0.19

As shown in Table 2, the four indicators of lung function before treatment in the lavage group were FVC (1.68 ± 0.15) L, FEV1 (1.71 ± 0.19) L, PEF (2.93 ± 0.59) L / s, and FEF 25% -75% (1.45 ± 0.19) L / s; the four indexes of lung function before treatment in the control group are FVC (1.71 ± 0.25) L, FEV1 (1.71 ± 0.08), LPEF (2.57 ± 0.86) L / s, FEF (1.62 ± 0.16) L / s. There was no statistically significant difference in lung function between the lavage group and the control group before treatment (P> 0.05).

Bronchoalveolar lavage in the treatment of children with acute lower respiratory tract infection before and after changes in the area of the bronchial mucosa is an important indicator of the effectiveness of bronchoalveolar lavage treatment. A reduction of more than 30% in the bronchial mucosal surface before and after surgery is considered significant; a reduction in the area of 0-30% is considered effective, and a change in the bronchial mucosal area is not considered effective. Scanning microscope is now used to observe the changes in the area of bronchial mucosa before and after bronchoalveolar lavage treatment of children with acute lower respiratory tract infection.

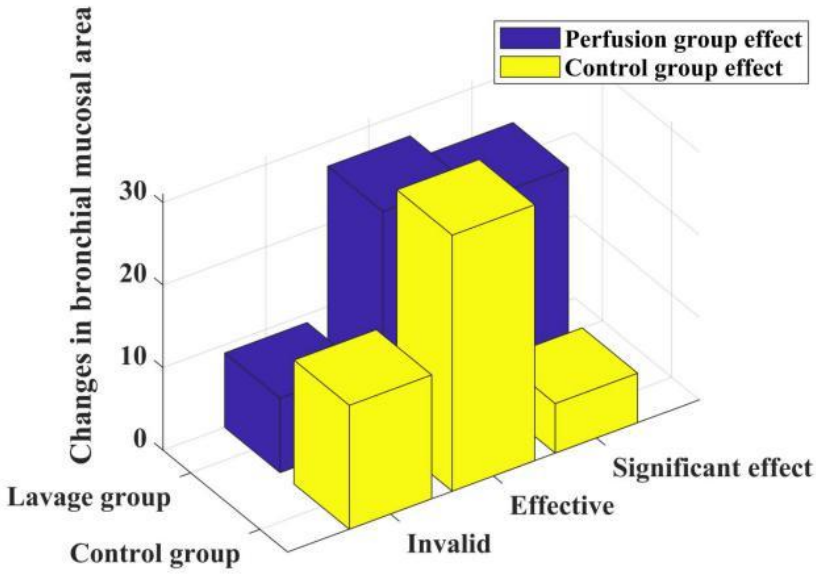

Figure 4. Changes in bronchial mucosal area

As shown in Figure 4, the number of children with a bronchial mucosal surface reduction of more than 30% before and after surgery in the lavage group and the control group were 24 and 6, respectively, and the proportion was 40% and 10%, respectively. The number of children whose bronchial mucosal surface decreased by more than 0-30% before and after surgery in the lavage

group and the control group were 27 and 31, respectively, and the proportions were 45% and 52%. The number of children whose bronchial mucosa area did not change or increase before and after surgery in the lavage group and the control group was 9, 15 respectively, accounting for 15% and 38%. By comparing the rate of change of the bronchial mucosa area between the two groups, the improvement rate of the lavage group was higher than that of the control group, and the difference was statistically significant (P <0.05).

Bronchial perfusion therapy can directly reach lung lesions. Bronchial alveolar lavage therapy can effectively remove phlegm embolism, inflammatory secretions and harmful pathogenic microorganisms, relieve airway obstruction, promote lung activity, improve ventilation and can be used for lesions. The drug promotes the absorption of inflammation and healing of lesions. Bronchial mucosa often suffers from inflammation, pale mucosa, mucosal congestion, longitudinal folds, etc. after damage. Therefore, the scanning microscope observes the damage before and after bronchial mucosa surgery as a criterion for evaluating the therapeutic effect.

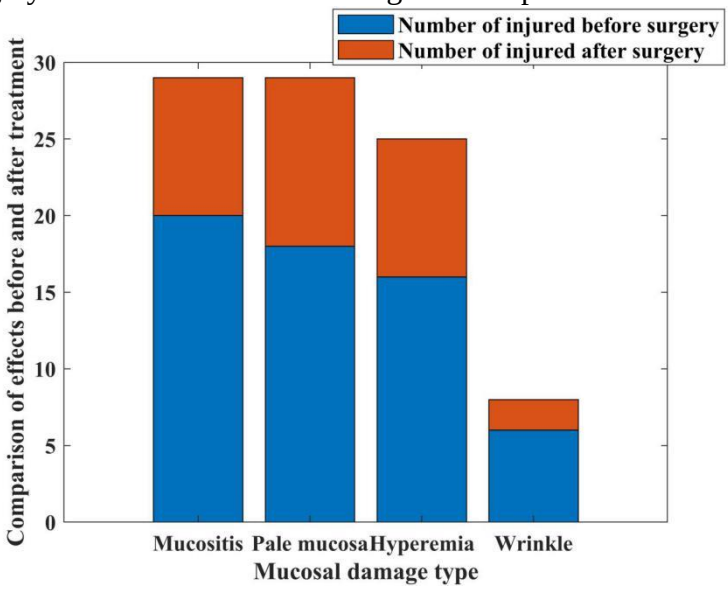

Figure 5. Changes in mucosal damage before and after surgery

As shown in Figure 5, 20 cases of mucosal inflammation, 18 cases of pale mucosa, 16 cases of mucosal congestion, and 6 cases of longitudinal folds can be found by scanning microscope; and the number of mucosal inflammation after scanning microscope observation after surgery only 9 people, a decrease of 55%, the number of pale mucosa was only 11 cases, a decrease of 38%, the number of mucosal congestion became 9 cases, a decrease of nearly 31.25%, the number of longitudinal folds was only 2, a decrease of 66.6 %.

5.2. Scanning Microscope Observation and Analysis before and after Bronchoalveolar Lavage Treatment

When a child has an acute lower respiratory tract infection, the bronchial mucosa is prone to edema, ciliary cell damage and shedding, mucosal gland hypertrophy, and increased secretions. Scanning microscope can be used to observe the changes of bronchial mucosa secretion before and after bronchoalveolar lavage treatment of children with acute lower respiratory tract infection. Through the feedback of the scanning microscope, we can clearly know the efficacy of bronchoalveolar lavage in the treatment of children with acute lower respiratory tract infection, and also clarify the direct relationship between secretions and the disease.

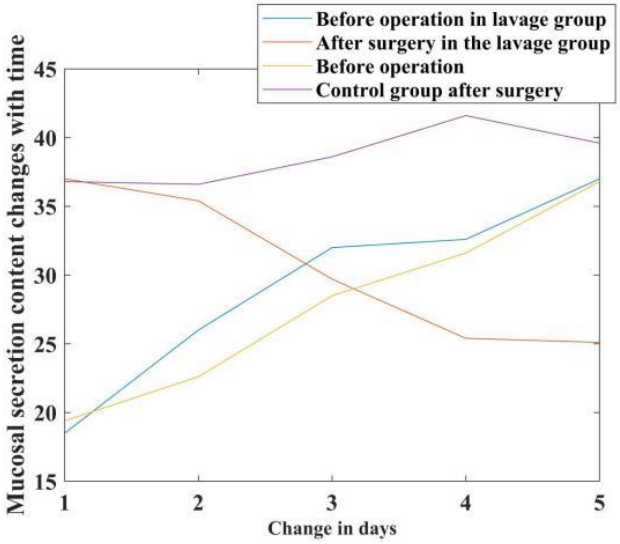

Figure 6. Mucosal secretions before and after surgery

As shown in Figure 6, the proportion of children with acute lower respiratory tract infection mucosal secretions in the lavage group increased from 18.5% on the first day to 37% on the fifth day. After bronchoalveolar lavage surgery, the secretions the indicators of the proportion of visual field within five days are 37%, 35.4, 29.7%, 25.4%, and 25.1%. It can be clearly seen that after bronchoalveolar lavage surgery, the content of secretions has been greatly reduced. The pre-surgery ratio in the field of view increased from 19.4% on the first day to 36.8% on the fifth day. After performing bronchoalveolar lavage surgery, the indicators of the field of secretions within 5 days were 36.8%, 36.6%, and 38.6 %, 41.6%, 39.1%, which indicates that the secretion of the control group is increasing.

Scanning microscopy is widely used in the observation of bronchoalveolar lavage before and after treatment of children with acute lower respiratory tract infection. The observation data is of great significance for the later diagnosis and surgical treatment. Therefore, there are strict requirements for the accuracy and precision of the scanning microscope. Score the observation performance of the scanning microscope to judge the performance.

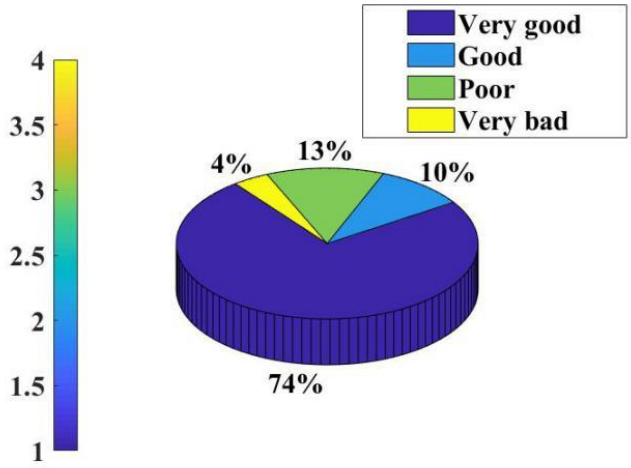

Figure 7. Evaluation of scanning microscope

As shown in Figure 7, the support rate of 74% believes that the scanning microscope performance is very good and can be applied to the observation of bronchial mucosa before and after bronchoalveolar lavage treatment of children with acute lower respiratory tract infection. The support rate of 10% believes that the scanning microscope performance is better. Those who think that the accuracy and accuracy of the scanning microscope are poor have a support rate of 13%, and only 4% think it is very poor.

6. Conclusion

(1) The research background of this article is that in recent years, the incidence of acute lower respiratory tract infections in children has gradually increased, seriously threatening children's lives and health. It is mainly caused by a variety of microorganisms such as viruses, bacteria, mycoplasma, chlamydia, and legionella directly infecting bacteria. The emergence of bronchoalveolar perfusion therapy has brought good news and achieved good results. Therefore, it is very necessary to actively carry out scanning microscopy observation research on bronchoalveolar lavage based on bronchoalveolar lavage to treat children with acute lower respiratory tract infection.

(2) The purpose of this article is to investigate the bronchoalveolar lavage in the treatment of children with acute lower respiratory tract infection before and after bronchial mucosa scanning microscopic observation, a retrospective study of 120 children with acute lower respiratory tract infection, according to whether bronchoalveolar lavage. There were 60 cases in the control group and 60 cases in the lavage group. In the lavage group, bronchoalveolar lavage was performed on the basis of routine treatment in respiratory medicine, and the changes in mucosal area and secretion content were observed.

(3) Experimental data show that the pre-operative proportion of children with acute lower respiratory tract infection mucosal secretions in the lavage group increased from 18.5% on the first day to 37% on the fifth day. After bronchoalveolar lavage surgery, the secretion the indexes of the field of view accounting for five days are 37%, 35.4%, 29.7%, 25.4%, and 25.1%. It can be clearly seen that after bronchoalveolar lavage surgery, the secretion content has been greatly reduced. The pre-surgery proportion in the visual field of secretions increased from 19.4% on the first day to 36.8% on the fifth day. After performing bronchoalveolar lavage surgery, the indexes of the visual field of secretions within 5 days were 36.8%, 36.6%, 38.6%, 41.6%, 39.1%.

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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.

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