

An Analysis of Nursing Factors Affecting Flatulence in Patients with Non-Invasive Ventilator Assisted Therapy

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Abstract: *Objective:* To analyze the factors of flatulence in patients treated with non-invasive ventilator and summarize practical and effective nursing measures. *Methods:* From July 2020 to June 2021, 40 patients who complained of flatulence after using non-invasive ventilator were analyzed. *Results:* 20 cases of abdominal distension were caused by the habit of breathing with their mouth open, 10 cases of abdominal distention were caused by liking to eat soup, 10 cases of abdominal distention were caused by long-term bed-in-bed activity reduced gastrointestinal peristalsis constipation. *Conclusion:* We should investigate the causes causing gastrointestinal flatulence with the use of non-invasive ventilators, intervene in advance, boost patient comfort, collaborate with therapy, and improve the therapeutic result.

Keywords: Non-invasive ventilator; Flatulence; Nursing

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1. Introduction

The use of non-invasive ventilator refers to the way that the respirator connects with the nasal mask or orb mask to provide effective mechanical ventilation. It can effectively correct the patient's hypoxia and carbon dioxide retention, improve the patient's general condition and avoid all kinds of injuries and complications of invasive mechanical ventilation. The operation of nurse is simple. At present, it has been widely used in clinic^[1]. However, during the use of non-invasive ventilator, patients complain that abdominal distension is difficult to adhere to the use, which affects the treatment effect. Therefore, it is very important to take effective methods to prevent and alleviate gastrointestinal distention. Through the clinical analysis and exploration of influencing factors, the corresponding nursing measures are summarized as follows.

2. Materials and methods

2.1. General information

90 cases of non-invasive ventilator assisted therapy admitted to the respiratory department of our hospital from July 1, 2020 to June 30, 2021 were summarized and analyzed. The main analysis was 40 cases of patients with abdominal distension, including 25 males, aged 65-80 years and 15 females, aged 45-75 years. The cumulative use time of noninvasive ventilator per day was 8 hours and 1.5 hours.

2.2. Methods

Operate according to the use process of non-invasive ventilator:

- (1) According to the patient's condition and blood gas analysis results, the doctor gives the doctor's order of non-invasive auxiliary ventilation, and the nurse handles the doctor's order.
- (2) Explain the purpose and precautions of use to patients and their families, and obtain the understanding and cooperation of patients and their families.
- (3) Select the appropriate nasal mask and connect the ventilator pipe.
- (4) Adjust the parameters of the ventilator according to the doctor's advice and add the humidifying liquid.
- (5) Assist the patient to take a suitable position, generally half sitting and lying position, so as to facilitate breathing.
- (6) Turn on the power supply, adjust the oxygen flow, connect the nasal mask with the patient, make good observation, make patrol according to the level of nursing, and deal with abnormalities in time.

2.3. Results

The summary found that among 90 patients using non-invasive ventilator, 40 patients complained of difficulty in maintaining flatulence. And by analyzing, we can find that 20 cases of abdominal distension were caused by the habit of breathing with their mouth open, 10 cases of abdominal distention were caused by liking to eat soup, 10 cases of abdominal distention were caused by long-term bed-in-bed activity reduced gastrointestinal peristalsis constipation.

3. Cause analysis

3.1. Patient's factor

- (1) The patient complained of pressure sense when using non-invasive ventilator for the first time, and could not coordinate breathing with non-invasive ventilator.
- (2) The effect of long-time use at night is good, but the patient is used to breathing with his mouth open, resulting in gas entering the stomach.
- (3) Long term use of non-invasive ventilator makes the patient feels thirsty and prefers to eat soup.
- (4) Patients has poor cardiopulmonary function, feels asthma after activity, is unwilling to move, and is long-term bedridden.
- (5) Patients are lack of knowledge about the purpose, principle and mechanism of ventilator treatment, and are too worried about the efficacy of ventilator treatment. Under the influence of fear and tension, they may feel suffocated when wearing mouth and nose mask. In addition, the mask may contact local skin for a long time, which can further affect the patient's breathing, and even cause skin and nose damage and tenderness.
- (6) The patient breathes and swallows' gas, causing gas to enter the gastrointestinal tract and causing flatulence.
- (7) Affected by the change of breathing habits, it may lead to man-machine confrontation ^[2].

3.2. Nurse factors

- (1) The propaganda and education on the use of non-invasive ventilator are not in place, and the instruction of the synchronization between patient breathing and ventilator is not in place.
- (2) The diet education was not specific enough, and the patients were not informed to reduce the intake of soup and indigestible food.
- (3) The guidance of daily activities and pulmonary function exercise is not enough, which does not make the patients establish the awareness of appropriate activities.
- (4) Ventilator parameters were not adjusted according to individual differences of patients.

4. Nursing

4.1. Do a good job in humanization nursing

In the process of patient treatment, humanized nursing measures should be provided for patients, mainly including giving patients certain humanistic care, trying to respect the wishes of patients, meeting various needs of patients, strengthening communication with patients and giving patients certain social support. At the same time, the family members of patients should be instructed to keep psychologically positive during the illness of patients, make patients feel more support from society and family.

4.2. Do a good job in the publicity and education of ventilator knowledge

The nurse explained the purpose and precautions of the ventilator to the patients and their families in detail, informed the nonverbal communication methods, and assigned a special person to monitor at the beginning of treatment. The nurse told them to avoid open mouth breathing, and the exhalation and inhalation were synchronized with the ventilator. The nurse asked the patients to move in bed during the acute period of lying in bed, and got out of bed and moved properly beside the bed after the condition was stable.

4.3. Sputum drainage nursing

Nurses need to master the application scheme of non-invasive ventilator. When carrying out non-invasive ventilator treatment, they need to focus on guiding patients to cough and expectorate independently and maintain smooth respiratory tract. It is generally recommended that the patient be in a semi recumbent position to promote sputum discharge. At the initial stage of non-invasive ventilator treatment, medical staff should encourage patients to increase the amount of drinking water, encourage patients to discharge sputum autonomously and intermittently, and carry out effective cough. It is recommended to use two-step expectoration. First, breathe deeply for 4-5 times, maintain the open mouth state after deep inhalation, and then cough gently to make the sputum cough to the pharynx and throat, and then cough up the sputum. For those who have difficulty in expectoration, percussion on the back can be given to promote the excretion of sputum. For example, percussion on the back at acupoints of traditional Chinese medicine can effectively excrete sputum. Key percussion points such as Feishu point, Xinshu point, Gaohuang point and Dazhui point can be selected. It is appropriate for patients to tolerate the strength and speed up the frequency of percussion. In addition, acupoint massage can also be adopted to promote sputum excretion. For example, press Zusanli clockwise, twice a day. Pay attention to moderate strength and slow frequency, and press 20 times each time. Continuous back tapping massage can effectively promote sputum excretion and improve respiratory symptoms.

4.4. Flatulence

During the non-invasive ventilator ventilation treatment, it is necessary to closely observe the man-machine cooperation status, pay attention to the coordination between the patient and the ventilator, and whether there is man-machine confrontation. At the same time, the medical staff should guide the patient to breathe scientifically and efficiently, inhale through the nose, avoid mouth opening breathing, and instruct the patient not to speak during the treatment. If necessary, they can use gestures to express their inner needs, to reduce the risk of flatulence during speech. For those with flatulence, abdominal massage and acupoint massage of traditional Chinese medicine can carry out, hot compress mirabilite on the abdomen and oral morpholine can also be used to alleviate it. In addition, it is also necessary to instruct patients to avoid gas producing foods such as bean products and milk during non-invasive ventilator ventilation. When the patient's condition is stable, they can exercise appropriately to promote gastrointestinal activities and avoid abdominal distention.

4.5. Nose and cheek care

During the treatment of non-invasive ventilator, in addition to selecting the size of the nasal mask, it is also necessary to select different shapes in combination with different patient faces, adjust the position and tightness of the ventilator, and determine whether the tension of the fixed belt is suitable. After fixing the fixed belt, when connecting the nasal mask, it is necessary to stick skin protective stickers on both sides of the nasal wing and the nasal root to fully protect the skin. Cotton cloth can also be used to make a remove protective pad around the nasal mask to reduce the pressure and improve the treatment comfort of patients. At the same time, pay close attention to the patient's skin compression during treatment, and relax for 15-20min every 4h. For those with local skin ulceration, Bactroban application can be used to alleviate, while various flavors can maintain local skin cleanliness and avoid the risk of secondary infection.

4.6. Oropharyngeal care

During the treatment of non-invasive ventilator, medical staff should patiently interpret and explain the use scheme of ventilator, and guide patients to inhale through nose to alleviate oropharyngeal dryness. At the same time, enhance airway humidification, use humidifier to humidify regularly, and maintain humidification temperature of 28-35°C. Guide patients to increase the amount of drinking water, assist patients to take off the face mask to drink water, and give clear cod liver oil or normal saline to reduce the dryness of mouth and nose when necessary [3].

4.7. Keratitis care

During non-invasive ventilator treatment, the mask is easy to shift with the patient's body position, resulting in air leakage. Therefore, it is necessary to select a comfortable nose mask, and make a protective layer around the nose mask with cotton cloth close to the skin, so as to avoid air leakage through the nose bridge root during non-invasive ventilation, and then avoid irritating keratitis. In addition, the nursing staff should strengthen the inspection, adjust the position of the nasal mask in combination with the actual condition of the patient, and give antibiotic eye drops to alleviate the patients with irritating keratitis.

4.8. Provide dietary guidance

During the use of non-invasive ventilator, reduce the consumption of soup, rest for more than 30 minutes after eating, and then use non-invasive ventilator. At the same time, reduce the intake of indigestible foods such as glutinous rice, and eat more foods rich in crude fiber. If the patient feels thirsty during using the ventilator, drink water appropriately. The patient can use methods such as cucumber slices and ice to alleviate his thirst and reduce the amount of drinking water [4].

4.9. TCM nursing skills

Guide patients to massage acupoints, relax their abdomen, bend their legs, massage Shenque, Zhongwan and Qihai clockwise with both hands, and massage for 5-10 minutes each time, or take Pi, Dachangshu, Neiguan, Zusanli, Sanyinjiao, Hegu and other acupoints to promote gastrointestinal functional activities.

4.10. For patients with open mouth breathing

During the use of non-invasive ventilator, shut up paste (open mouth breathing correction tape can be used for those with adhesive tape allergy) is used to prevent and improve abdominal distension caused by open mouth breathing.

5. Conclusion

Noninvasive ventilator therapy is an effective treatment for patients with chronic obstructive pulmonary

disease, but there is a certain risk of complications during the treatment. In the theory of traditional Chinese medicine, gastrointestinal flatulence after noninvasive ventilation treatment is classified into the categories of “intestinal obstruction” and “glomus and fullness.” It is considered that the pathogenesis of this disease is gradual depletion of lung Qi, long-term illness and weakness, resulting in lung depression and weakness. After non-invasive positive pressure ventilation, the Qi is blocked in the middle energizer, resulting in loss of function of spleen and stomach, resulting in flatulence [5]. Relevant literature reports that during the treatment of non-invasive positive pressure ventilation, those with oxygen sum index lower than 300mmHg, positive end expiratory pressure greater than 12cm H₂O and airway pressure greater than 28cmH₂O are more likely to have intra-abdominal hypertension [6]. Combined with modern theory, the pathogenesis of gastrointestinal flatulence in patients treated with non-invasive ventilator is analyzed. Positive pressure ventilation of ventilator indirectly transmits gas to the abdominal cavity, causing the increase of intra-abdominal pressure and blocking intestinal peristalsis. Once man-machine resistance occurs, the gas transmitted by ventilator enters the intestine, which will lead to intestinal flatulence. In addition, most of the patients receiving non-invasive positive pressure ventilation are severe patients. They often take antacids, antibiotics or sedatives, which is very easy to cause intestinal flora disorder, gastrointestinal dysfunction and abdominal distention. In addition, there is a risk of excessive ventilation during non-invasive mechanical ventilation, which can affect the balance of water and electrolyte, cause intestinal paralysis and increase the risk of intestinal flatulence.

Combined with the analysis of clinical practice, patients with non-invasive ventilator assisted therapy complain of gastrointestinal flatulence and are unwilling to cooperate with long-term use. Therefore, it is necessary to do well in advance intervention and nursing, prevent and improve the uncomfortable symptoms of gastrointestinal flatulence, increase the comfort of patients, actively cooperate with treatment, improve the effect of non-invasive assisted ventilation, and finally make the patients recover [7]. In this paper, humanized nursing is adopted to carry out nursing intervention for patients with non-invasive ventilator assisted therapy, so as to meet the needs of different patients. Through ventilator knowledge education, patients and their families can be assisted to understand the purpose of ventilator treatment and relevant precautions; Through expectoration nursing, guide and encourage patients to expectorate correctly, which is conducive to improve respiratory symptoms; Through the care of gastrointestinal flatulence, inform patients not to speak or breathe with open mouth during ventilation treatment by ventilator, and carry out abdominal massage or acupoint massage. If necessary, drug intervention can stimulate gastrointestinal activities and reduce the risk of flatulence; Through nose and cheek care, local skin can be protected and the risk of infection can be reduced; Through oral and pharyngeal nursing, it can alleviate the dryness of oral and nasal cavity; The nursing of keratitis can reduce the eye injury during the treatment of positive pressure ventilation; Through dietary guidance, the body can maintain nutritional balance; Through the skill nursing of traditional Chinese medicine, it can promote gastrointestinal movement; The risk of flatulence caused by open mouth breathing can be avoided by reasonable application of shut up paste [8].

To sum up, patients have a high risk of gastrointestinal flatulence during non-invasive ventilator treatment, which is related to a variety of incentives. Gastrointestinal flatulence can be prevented and improved through humanized nursing mode, which has promotion value.

Disclosure statement

The author declares no conflict of interest.

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