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The Effect of Respiratory Training on Anxiety Level and Sleep Quality in Patients after Transnasal Pituitary Tumour Removal

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Abstract: *To investigate the effects of breathing training on the anxiety status and sleep quality of patients after transsphenoidal pituitary tumor resection, one hundred and two patients with pituitary tumour in the Department of Neurosurgery of the Affiliated Hospital of Jining Medical College were selected as study subjects and randomly divided into a control group and a test group, with 51 cases in each group. The control group underwent routine nursing operations, while the experimental group added breathing training to the routine nursing operations. The study effects were analyzed by the scoring status and grade classification of SAS scale and PSQI scale. By introducing breathing training, the SAS scale and PSQI scale of the two groups were significantly different, and the test group was better than the control group in terms of anxiety status and sleep quality ($p<0.05$). Respiratory training has a significant positive effect on the anxiety status and sleep quality of patients after transsphenoidal pituitary tumour resection, providing a clinical case and reference value for postoperative care after transsphenoidal pituitary tumour removal.*

Keywords: *Transnasal pituitary tumour removal; Respiratory training; Anxiety level; Sleep quality; Postoperative rehabilitation*

1. Introduction

Pituitary tumor is a more common central system tumor today, it mainly has PLR tumor, GH tumor, TSH tumor, ACTH tumor and other conventional forms[1].In recent years, the incidence of pituitary tumors has increased year by year and the social impact is large, and scientific diagnosis and treatment of pituitary tumors has an important impact on the subsequent quality of life and health status of patients. Surgical treatment is the first choice for the treatment of pituitary tumors today, and compared with previous surgical methods, transnasal sphenoid approach pituitary tumor surgery has great advantages in surgical complications, trauma degree and recovery time[2]. However, because nasal tamponade is required after surgery to restore nasal anatomy and help compress hemostasis, it will cause some patients to have anxiety and poor sleep quality [3], which seriously affects the speed of recovery and physical and mental health of patients. Studies have shown that respiratory training can have beneficial effects on postoperative respiratory comfort and anxiety in patients with transnasal pituitary tumor[4], so this study explores the effect of respiratory training on postoperative anxiety and sleep quality in patients based on existing research, and further analyzes the correlation between postoperative anxiety and sleep quality, which provides some reference and reference for clinical pituitary tumor resection care.

2. Information and methodology

2.1 Sample background

A total of 102 surgical patients, aged 27-76 years, 60 males and 42 females, including 21 cases of prolactin adenoma, 45 cases of adenoma without secretory function, 25 cases of growth hormone adenoma and 11 cases of mixed type, were selected for admission to the Department of Neurosurgery of the Affiliated Hospital of Jining Medical College between January 2021 and December 2022. Random sampling was used to group the patients: 51 cases in the pre-surgery trained breathing group (test group) and 51 cases in the pre-surgery untrained breathing group (control group). The differences between the two groups in terms of gender, age and disease history were not statistically significant ($p>0.05$).

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Selection criteria: (1) Patients with clear diagnosis requiring transnasal sphenoid approach surgery. (2) Preoperative cooperation, postoperative consciousness. (3) No respiratory disease. (4) No anxiety, depression and mental illness before surgery

2.2 Classification method

Patients in both groups were given iodoform gauze to stop bleeding after surgery. The control group was given the usual preoperative preparation, i.e. nasal hair clipping, and the patients were not instructed to breathe through the mouth. In the observation group, the patients were instructed to breathe through the mouth with cotton ball stuffing after admission on the basis of the control group. Preoperatively, the patients were instructed to use cotton balls to plug the nose and to explain the purpose, meaning and precautions of using cotton balls to plug the nose and breathing training through the mouth before operation, and the method of breathing training through the mouth was as follows: fill the bilateral nasal cavities with cotton balls, put a piece of wet gauze over the lips of the mouth, tighten the abdomen, place both hands between the ribs, open the mouth and inhale deeply, the thorax is obviously expanded when inhaling, and when exhaling, the lips of the mouth are retracted as if Breathe out slowly through the mouth and retract the thorax during exhalation. 2. Timing of breathing training through the mouth: start training three days before surgery, the first training lasts 15 minutes and gradually extend the training time to three times a day.

2.3 Definition of scale tools and standards

2.3.1 SAS Anxiety Self-rating Scale

The SAS Anxiety Self-Assessment Scale is a commonly used medical-psychological survey tool to assess patients' anxiety symptoms by obtaining statistics based on the patient's answers to set questions about their actual situation and subjective feelings. The full scale is divided into 20 questions describing whether the patient presents with a range of anxiety symptoms, with options categorised into four levels according to frequency of occurrence (none or rarely / sometimes / most of the time / most or all of the time). The study also divided the SAS standard score cut-offs into four levels according to conventional cut-off criteria, with scores below 50 being no anxiety, 50-59 being mild anxiety, 50-69 being moderate anxiety and 70 or more being severe anxiety.

2.3.2 Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI) is a commonly used sleep quality assessment scale, first developed by Buysse et al. at the University of Pittsburgh in the USA. The scale is divided into 7 components with each component scored on a scale of 0-3. The cumulative score for each component is the total PSQI score, with the higher the score from 0-21, the worse the sleep quality. In this study, postoperative patients were classified into four levels of sleep quality according to the PSQI index, with a level 1 score of 0-5 indicating very good sleep quality, a level 2 score of 6-10 indicating good sleep quality, a level 3 score of 11-15 indicating fair sleep quality, and a level 4 score of 16-21 indicating very poor sleep quality [5].

2.4 Statistical Methods

SPSS26.0 was used to statistically analyze the study data, and because the sample observation variables were ordinal variables and appeared in the form of intergroup comparison, the Mann-Whitney U test was selected to analyze the significance of the results.

3. Study results

3.1. Differences in anxiety status

Table 1: Comparison of patients' postoperative SAS ratings.

Constituencies	Number	No anxiety	Mild anxiety	Moderate anxiety	Severe anxiety
Control group	51	2(3.92%)	12(23.53%)	26(50.98%)	11(21.57%)
Experimental group	51	10(19.61%)	21(41.18%)	17(33.33%)	3(5.88%)

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There were 51 patients in the control group, including 2 cases with no anxiety, 12 cases with mild anxiety, 26 cases with moderate anxiety and 11 cases with severe anxiety. In the test group, there were 51 patients, including 10 cases with no anxiety, 21 cases with mild anxiety, 17 cases with moderate anxiety and 3 cases with severe anxiety. The Mann-Whitney U test Z=-3.289, P=0.001<0.05, indicated that the breathing training had a significant effect on the patients' postoperative anxiety. (Table 1)

3.2. Sleep quality difference results

There were 51 patients in the control group, including 1 patient with Grade I sleep quality, 15 patients with Grade II sleep quality, 19 patients with Grade III sleep quality and 16 patients with Grade IV sleep quality. There were 51 patients in the test group, including 9 patients with Grade I sleep quality, 27 patients with Grade II sleep quality, 8 patients with Grade III sleep quality, and 7 patients with Grade IV sleep quality. The Mann-Whitney U test Z=-3.701,P=0.000<0.05, indicated that the breathing training had a significant effect on the improvement of the patients' postoperative sleep quality. (Table 2)

Table 2: Comparison of patients' postoperative PSQI ratings

Constituencies	Number of examples	Grade I	Grade II	Grade III	Grade IV
Control group	51	1(1.96%)	15(29.41%)	19(37.25%)	16(31.37%)
Experimental group	51	9(17.65%)	27(52.94%)	8(15.69%)	7(13.73%)

4. Discussion

Although transnasal pituitary tumour resection has been widely used and is the mainstay of surgical treatment for pituitary tumours, postoperative mood anxiety and sleep disturbances due to abrupt changes in breathing patterns and organic stimuli often occur[6]. Prolonged emotional anxiety and sleep disturbances, both pre- and post-operatively, can seriously affect the patient's recovery outcome[7-8]. Therefore, professional nursing interventions are essential to facilitate postoperative recovery[9]. Respiratory training is a common nursing intervention that has played a significant role in the recovery of patients from respiratory disease, cancer and psychological disorders [10-12]. We introduced the effect of respiratory training on patients' postoperative recovery into pituitary tumour resection surgery, using patients' anxiety level and sleep quality as two observations of patients' recovery process to investigate whether respiratory training affects the status of patients' recovery after transnasal pituitary tumour resection. The results of the study showed that respiratory training had a significant positive effect on patients' postoperative anxiety, as evidenced by the fact that patients who underwent respiratory training experienced significantly less anxiety than those who did not. The number of patients with severe anxiety was 15.69% less than that of the control group. Respiratory training also had a positive effect on the quality of post-operative sleep, as shown by the fact that more patients had better sleep quality after respiratory training than without it, with 15.69% more patients in the test group sleeping at level I than in the control group sleeping at level I, and 17.64% less patients in the test group sleeping at level IV than in the control group. In the actual study, it was found that the patients who underwent call training had a stronger adaptation to the change in breathing pattern after the operation, i.e. better adapted to the method of breathing through the mouth, giving the patients a stronger ability to cope with sudden organismal stimuli. The endocrine disorder itself can lead to psychosocial problems, so our preoperative breathing training, combined with postoperative maintenance of the endocrine disorder and its balance, is more conducive to reducing this postoperative psychosocial disorder. At the same time, the respiratory training provided some mental and emotional expenditure for the patients and helped them to overcome their cognitive fears to a large extent. The overall mental state and adaptation of most of the patients was better, and their anxiety and sleep were better improved. These findings are in line with the results of Zhou Dan and Ran Hui et al. However, the degree of difference between the test and control samples in this study was lower than previous studies due to sample differences and actual training effects.

In conclusion, respiratory training has a significant positive effect on anxiety status and sleep quality in patients after pituitary tumour resection, it is positive for the efficiency of postoperative recovery and life status of patients, and it is worth promoting its application in clinical practice.

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