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Summary of the Best Evidence for Preoperative Pre-Rehabilitation in Patients with Lung Cancer Complicated with COPD

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Abstract

Objective: To search, evaluate and integrate the best domestic and foreign evidence on the preoperative pre-rehabilitation of lung cancer patients with COPD, and summarize the best evidence. **Methods:** Cochrane Library, BMJ Best Practice, JBI Center for International Cooperation in Evidence-Based Health Care Library, and Up to were searched by computer system Date, Embase, CINAHL, PubMed, Evidence-Based Health Care Center Database (JBI), American Guidenet, Global Guidenet, CNKI, CMBM, Wanfang, and VIP databases on preoperative pre-rehabilitation of patients with lung cancer and COPD. Literature screening and quality evaluation were conducted independently by two researchers, and evidence was extracted, summarized and summarized according to the theme. **Results**: A total of 13 kinds of literature were included, including 4 guidelines, 4 systematic reviews, 3 evidence summaries, and 2 expert consensus articles. This paper summarizes 44 best evidence on pre-rehabilitation of lung cancer patients with COPD, including 8 aspects: pre-rehabilitation content and principle, pre-rehabilitation assessment, exercise rehabilitation, nutrition management, psychological guidance, health education, multidisciplinary cooperation, quality control and follow-up. **Conclusion**: The best evidence of preoperative pre-rehabilitation for patients with lung cancer complicated with COPD is rich in content, and needs to be selected according to the characteristics of the hospital and the clinical environment. Some of the evidence still needs to be confirmed by higher-quality studies.

Keywords

Lung Cancer, COPD, Chronic Obstructive Pulmonary Disease, Preoperative Pre-Rehabilitation, Summary of Evidence

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1. Introduction

Lung cancer is one of the most common malignant tumors in our country. According to the data released by the National Cancer Center in 2015, the five-year prevalence rate of lung cancer in China from 2006 to 2011 was 130.2 (1/100,000), of which 84.6 (1/100,000) were male, ranking second in malignant tumors. Females were 45.6 (1/100,000), ranking fourth in malignant tumors [1]. Surgical resection of the tumor has become one of the most important treatment methods for this disease, mainly for early-stage lung cancer and those who have sufficient cardiopulmonary reserve and can tolerate surgical treatment. Chronic obstructive pulmonary disease (COPD), as a common lung disease, is mainly characterized by a series of lung function impairments such as insufficient ventilation and decreased exercise endurance. Studies have shown that the incidence of COPD in lung cancer patients can be as high as 71.6%, and the combination of COPD can easily increase the surgical risk and prognostic risk of these lung cancer patients. The timing of surgical treatment for these patients has gradually become the focus of research in the industry [2] [3].

Prehabilitation, as a new preoperative management concept proposed on the basis of ERAS, refers to the intervention means that patients receive cardiopulmonary function exercise mainly composed of aerobic exercise and resistance exercise, nutritional support mainly supplemented with whey protein, and psychological support before surgery [4] [5]. The aim is to alleviate the physical and mental stress of patients during perioperative period and optimize the surgical effect by means of a series of optimization measures [6]. At present, there is a lack of clear recommendations on the content of pre-operation rehabilitation for patients with lung cancer complicated with COPD at home and abroad. This study extracted the best evidence of pre-operation rehabilitation for patients with lung cancer complicated with COPD through systematic retrieval and evidence-based medicine research methods, aiming to provide references for clinical staff when formulating corresponding pre-rehabilitation measures.

2. Data and Methods

2.1. Literature Retrieval Strategy

Each "S" in the 6S evidence resource pyramid model represents one resource type, which are systems, summaries, synopses of syntheses, syntheses, synopses of studies, and studies. The "6s" pyramid model of evidence resources (from low to high) consists of original research, abstract and evaluation of original research, systematic evaluation, abstract and evaluation of systematic evaluation, evidence-based knowledge base, and system. From the top of the tower to the bottom, the level of evidence goes from high to low. The search starts at the top level of the pyramid, the computer decision support system, and works its way down. In this article, the "6S" model [7] was used to search Cochrane Library, BMJ Best Practice, JBI Center for International Cooperation in Evidence-Based Health Care Library, and Up to Date, Embase, CINAHL, PubMed, Evidence-Based

Health Care Center Database (JBI), American Guidenet, Global Guidenet, CNKI, CMBM, Wanfang, and VIP databases on preoperative pre-rehabilitation of patients with lung cancer and COPD. The Chinese database was taken as an example from CNKI, and the search methods were (lung cancer or lung tumor) and (Chronic obstructive pulmonary disease or COPD) and (guidelines or evidence summary or expert consensus or systematic review or meta-analysis). The English database takes PubMed as an example. The retrieval formula is ("lung cancer" [Mesh]/"lung tumor" [Mesh]/"lung neoplasm" [Mesh]) and ("chronic obstructive pulmonary disease" [Mesh]/"COPD" [Mesh]) and ("guideline" [Mesh]/"consensus" [Mesh]/"summary of evidence" [Ti/Ab]/"systematic review" [Mesh]/"Meta-analysis" [Ti/Ab]). The retrieval period is from the establishment of the database to June 2023. In this article, the meanings of abbreviations are described as follows. The full name of Mesh is Medical Subject Headings, that is, subject word retrieval. The full name of Ti is Title, that is, title search, which is a way to search by searching the title of the literature. The full name of Ab is Abstract, that is, abstract retrieval, which is a way to retrieve literature abstracts.

2.2. Reference Inclusion and Exclusion Criteria

Inclusion criteria: 1) The subjects were patients with lung cancer complicated with COPD and elective surgery; 2) The research contents include evidence of pre-rehabilitation; 3) Types of evidence include guidelines, expert consensus, evidence summary and systematic review. Exclusion criteria: a) Incomplete information; b) Research proposals, reports and meeting abstracts; c) Non-Chinese and English literature.

2.3. Literature Screening and Quality Evaluation

Two researchers read, screened and extracted evidence related to this study independently. If there is any disagreement, the third researcher is invited to participate in the discussion. This study follows the principle of giving priority to high-quality, high-level and newly published authoritative literature [8]. The guidelines were independently evaluated using the appraisal of guidelines for research and evaluation II, AGREE II, which was updated in 2017 [9]. The scale consists of 6 areas, 23 main items, and 2 overall evaluation items. According to the scores in each field, the recommendation level is rated. The systematic review and meta-analysis were conducted using the Systematic review tool [10] updated in 2017 by JBI Evidence-Based Health Care Centre of Australia. The evaluation tool consists of 11 items, each of which is evaluated on the "yes, no, unclear, not applicable" criteria. Expert consensus was evaluated using the Expert Consensus Evaluation tool [11], which was updated in 2017 by JBI Centre for Evidence-Based Health Care in Australia. The evaluation tool consists of six items, each of which is evaluated on the criteria of "yes, no, unclear, not applicable". The quality evaluation of the evidence summary should trace back to the original literature on which the evidence is based, and select the corresponding

evaluation criteria according to the type of literature for quality evaluation.

2.4. Principle of Evidence Extraction

Two personnel trained in evidence-based training will initially extract and integrate relevant evidence. When there is a conflict in evidence conclusions from different sources, the screening principles are evidence-based evidence, high-quality evidence and newly published authoritative literature. If there is any disagreement, please ask the third evidence-based researcher to evaluate and finally reach an agreement. When evidence from different sources contradicts each other, this study follows the principle of high-quality evidence, high-level evidence, and newly published authoritative literature.

3. Results

3.1. General Features of the Included Literature

After preliminary search, 1048 relevant literature was obtained, and repeated publication, inconsistent with the subject and low-quality literature was excluded. Finally, 13 kinds of literature were included, including 4 guidelines, 4 systematic reviews, 2 expert consensus articles and 3 evidence summaries. The general characteristics of the included literature are shown in **Table 1**.

3.2. Quality Evaluation Results of the Included Literature

3.2.1. Quality Evaluation Results of the Guidelines

A total of 4 guidelines were included in this study. The results of standardization and quality evaluation in various fields of the guidelines are shown in **Table 2**.

3.2.2. Quality Evaluation Results of Systematic Evaluation

A total of four systematic reviews were included in this study from the Cochrane Library and Pubmed. Among them, the evaluation results of 11 items in Ya-Qing W *et al.* [21], Chan-Yeu P *et al.* [22] and Carlotta Mainini *et al.* [23] were all "Yes", and the overall quality was high, so they were allowed to be included. LIU W *et al.* [18] studied 11 items except item 10, "Is the possibility of publication bias assessed? which is evaluated as "unclear", the evaluation results of other items are all "Yes". The overall quality of the study is high, so it is allowed to be included.

3.2.3. Quality Evaluation Results of Expert Consensus

The two expert consensus articles evaluated in this study, one Liu ZJ *et al.* [12] from China Guide network, the other expert consensus CAMPBELL *et al.* [17] from PubMed, the evaluation results of all items of the two expert consensus articles are "yes", the research design is complete, the overall quality is high, approved.

3.3. Evidence Description and Summary

The evidence included 8 aspects including pre-rehabilitation content and principle,

Table 1. General information is included in the literature.

Included Literature	Document Source	Document Property	Document Theme	Date of Publication (year)
Liu ZJ *et al.* [12]	CNKI	Expert Consensus	Expert consensus on pre-rehabilitation management of thoracic surgery based on accelerated postoperative rehabilitation	2022
Zhi XY *et al.* [13]	CNKI	Guide	Chinese guidelines for perioperative airway management in thoracic surgery	2021
Andrew L *et al.* [14]	Yimai Tong	Guide	Pulmonary rehabilitation: Combined ACCP/AACVPR evidence-based Clinical Practice Guidelines	2007
Gao S *et al.* [15]	Pubmed	Guide	Clinical guidelines for perioperative management strategies to enhance recovery after lung surgery	2019
Cao H *et al.* [16]	CNKI	Guide	Chinese Clinical Practice guide for Accelerated rehabilitation surgery	2021
Campbell *et al.* [17]	Pubmed	Expert Consensus	Exercise Guidelines for cancer survivors: a consensus statement from an international multidisciplinary Roundtable	2019
Liu W *et al.* [18]	Pubmed	Systematic Review	Breathing exercises improve lung function and quality of life in patients with lung cancer after surgery: a meta-analysis	2013
Li F *et al.* [19]	CNKI	Summary of evidence	Summary of the best evidence for perioperative exercise management interventions in lung cancer patients	2020
Yin JJ *et al.* [20]	CNKI	Summary of evidence	Summary of best evidence for preoperative respiratory training management in patients with lung cancer	2020
Ya-Qing W *et al.* [21]	Cochrane Library	Systematic Review	Effects of breathing exercises on patients undergoing surgical resection of lung cancer: a systematic review and meta-analysis	2019
Chan-Yeu P *et al.* [22]	Cochrane Library	Systematic Review	Effect of preoperative respiratory exercise on postoperative outcomes in patients with therapeutic pneumonectomy for lung cancer: a meta-analysis	2021
Carlotta Mainini *et al.* [23]	Pubmed	Systematic Review	Perioperative physical activity intervention in patients undergoing lung cancer surgery: What is the evidence?	2016
Zhang XM *et al.* [24]	CNKI	Summary of evidence	Summary of best practice evidence for pulmonary rehabilitation exercise in patients with chronic obstructive pulmonary disease	2020

Table 2. Methodological quality evaluation of the guidelines included in this study.

Included literature	Standardized percentage of each field (%)						Number of fields (PCS) ≥ 60%	Number of fields (PCS) ≥ 30%	Recommendation level
	Scope and purpose	participant	Guideline rigor	Guidance clarity	Applicability of guidelines	Guide editorial independence			
Zhi XY *et al.* [13]	88.89	77.78	60.42	50.00	41.67	83.33	5	6	B
Andrew L *et al.* [14]	88.89	77.78	60.42	50.00	41.67	83.33	4	6	B
Gao S *et al.* [15]	83.33	80.56	75.00	77.78	75.00	79.17	6	6	A
Cao H *et al.* [16]	83.33	61.11	72.92	83.33	62.50	66.67	6	6	A

pre-rehabilitation assessment, exercise rehabilitation, nutrition management, psychological guidance, health education, multidisciplinary cooperation, quality control and follow-up, and a total of 44 pieces of the best evidence on pre-rehabili-tation of lung cancer patients with COPD. The summary results of evidence are shown in **Table 3**.

Table 3. Summary of the best evidence for preoperative pre-rehabilitation of lung cancer complicated with COPD

Evidential dimension	Content of evidence	Level of evidence	Recommended strength
Contents and principles of pre-rehabilitation	1. The pre-rehabilitation time starts from the joint decision of the surgeon and the patient 1 day before the operation [12].	1b	A
	2. The pre-rehabilitation time should be 2-4 weeks before surgery. It is not recommended to delay tumor surgery for more than 4 weeks to perform a pre-rehabilitation program. However, if the time from the decision to start surgery is less than 2 weeks, pre-rehabilitation should be carried out as far as possible [12].	1a	A
	3. Preoperative patients with high-risk factors should receive at least 1 week of comprehensive pulmonary rehabilitation training before surgery [13].	2b	B
	4. Pre-rehabilitation is a multi-mode intervention including assessment, exercise, education, nutrition intervention and psychosocial support, among which exercise is the core [14].	1a	A
	5. All patients undergoing elective and limited thoracic surgery can be pre-rehabilitated, especially for the elderly, patients with poor basic functional status, malnutrition, and patients with extensive surgical resection [12].	1b	A
	6. The main content of thoracic surgery pre-rehabilitation is to formulate an individualized multi-mode pre-rehabilitation program, which should include smoking cessation, anemia correction, aerobic exercise, resistance strength training, inspiratory muscle training, nutrition optimization and psychological support [12].	1b	A
	7. For high-risk patients, airway preparation should be made before surgery, including drug therapy combined with physical rehabilitation [14] [15].	2c	B
Pre-rehabilitation assessment	8. Comprehensive assessment of patients must be carried out before pre-rehabilitation, including general state assessment, lung function assessment, physical fitness assessment, nutritional assessment, psychological assessment, etc. [12] [15].	1a	A
	9. A general status assessment is recommended at the time of the outpatient decision to perform surgery, including the patient's age, body mass index (BMI), comorbiditions and their treatment, the American Society of Anesthesiologists, ASA) grading, etc., and preliminary risk stratification of patients [12].	1a	A
	10. Frailty scale, physical function and fall risk assessment should be conducted for elderly or suspected frailty patients [12].	1b	A
	11. Exercise tests are recommended to assess cardiorespiratory fitness [12].	2c	B
	12. Preoperative nutritional risk screening and assessment should be routinely performed on patients [12].	2b	A
	13. Preoperative psychological status and sleep assessment should be performed on patients, and cognitive function assessment should be performed on elderly patients [12].	1c	A

Continued

	14. Preoperative activity tolerance assessment is recommended, exercise plans are developed, and functional reserve is improved [16].	3a	B
	15. It is recommended that the mini-mental state examination (MMSE) and Montreal cognitive assessment (MoCA) be used to assess cognitive function before surgery. It can be used as the baseline reference value for postoperative evaluation. Specialist intervention if necessary [16].	1b	B
Exercise rehabilitation	16. Rehabilitation evaluation should be emphasized before pre-rehabilitation exercise training for patients with lung cancer complicated with COPD. Under the premise of ensuring individualization, effectiveness and safety, the training principles are basically the same as those of people without COPD [12].	5b	B
	17. There are many forms of exercise intervention, and a rehabilitation program combining multiple modes should be designed [17].	5a	A
	18. The exercise rehabilitation of patients should not be limited to the hospital, and preoperative physical exercise should be implemented in a multidisciplinary environment [17].	5b	B
	19. Aerobic exercise training is recommended for all pre-recovery patients [12].	2b	B
	20. Resistance strength training is particularly important for the elderly, the frail, the sedentary, the malnourished, the chronic cardiopulmonary disease and other people [13].	2b	B
	21. Elderly patients have various risks, and their physical condition should be comprehensively assessed before starting exercise [17].	5a	A
	22.In order to reduce the risk of exercise, patients with cardiovascular and kidney diseases should first evaluate their fitness level [17].	5a	A
	23. Patients with poor baseline lung function are at high risk of surgery, and their surgical tolerance should be improved through preoperative exercise management [18] [19].	1a	A
Nutrition management	24. The duration of preoperative exercise should not be too long and should be set at 2 to 4 weeks to avoid affecting the patient's compliance [17] [19].	5b	B
	25. Preoperative breathing training is recommended for patients with normal lung function or exercise capacity or at risk of postoperative lung complications [20] [22].	3a	B
	26. Preoperative respiratory training is recommended for a total intervention time of at least 2 weeks [20] [23].	1b	B
	27. Nutritional risk screening 2002 (NRS2002) should be used to assess nutritional risk before surgery [16].	1a	A
	28. Preoperative intervention should be given to patients with combined nutritional risk [16].	1a	A
	29. It is recommended to conduct routine preoperative anemia-related examination, evaluation and timely intervention [16].	2b	B
	30. In pre-rehabilitation management, iron supplementation is preferred for iron deficiency anemia patients [12].	1b	A
	31. It is recommended that obese patients optimize their diet structure and lose weight appropriately [12].	1c	A

Continued

	32. For patients without chronic kidney disease, appropriate amounts of high-quality protein can be added after pre-rehabilitation exercise training [13].	1a	A
Psychological guidance	33. The hospital anxiety and depression scale (HADS) was used to assess the psychological status of patients and conduct effective interventions [16].	2b	B
	34. Patients are encouraged to adopt various forms of psychological relaxation adjustment before surgery. Patients with anxiety and depression risk should be treated with intervention when necessary [12].	1a	A
Health education	35. Preoperative patient education includes patient self-preparation, introduction of relevant policies, postoperative bed arrangement, postoperative cooperation, postoperative symptom management, individualized guidance, etc [15].	1b	B
	36. Before operation, cards, manuals, multimedia, display boards and other forms should be used for different patients to focus on the introduction of anesthesia, surgery and perioperative management and other diagnosis and treatment matters, so as to relieve patients' anxiety and fear [16].	1c	B
	37. Quit smoking for at least 4 weeks before surgery [13].	1a	A
	38. Abstain from alcohol for 4 weeks before surgery [12] [16].	2b	B
	39. Preoperative venous thromboembolism (VTE) risk education, medication and mechanical VTE prophylaxis are recommended for patients who plan to undergo thoracic surgery [13].	1b	B
Multidisciplinary cooperation	40. The development of pre-rehabilitation is based on multi-disciplinary collaboration and is led by the pre-rehabilitation comprehensive clinic. Medical resources should be fully optimized and integrated to gradually form a multi-disciplinary, hierarchical and optimized pre-rehabilitation management model [12].	1b	A
	41. Establish interdisciplinary teams of professionals including doctors, nurses, respiratory and physical therapists, rehabilitators, exercise specialists, nutritionists, psychologists, occupational therapists and social workers [14].	5b	B
Quality control and follow-up	42. Encourage monitoring and follow-up during multi-mode pre-rehabilitation according to local conditions, including application of wearable devices, community services, telemedicine, etc. [12].	2c	A
	43. Telephone follow-up every 2 weeks [24].	1c	A
	44. Using recovery diaries to promote patient engagement [24].	1b	A

4. Description of Evidence

4.1. Contents and Principles of Pre-Rehabilitation

Pre-rehabilitation refers to taking rehabilitation measures before surgery to help improve the functional reserve of patients, further optimize the physical and mental state of patients before surgery, better adapt to the stress response brought by surgery, reduce postoperative complications, and promote postoperative rehabilitation. The pre-rehabilitation time should be from 1 day before surgery when the surgeon and the patient jointly decide the operation. During this period, on the one hand, patients need to improve preoperative examination

and evaluation; On the other hand, compared with the postoperative stage, the physiological and psychological states of patients are more stable, and most patients have the initiative to actively prepare for surgery, so both objective and subjective factors are conducive to the development of pre-rehabilitation. Previous studies generally recommend more than 4 weeks of pre-rehabilitation exercise for thoracic surgery, and 4 - 8 weeks or even longer pre-rehabilitation is conducive to increasing peak oxygen uptake, increasing skeletal muscle strength, accelerating postoperative rehabilitation, reducing respiratory complications, and improving long-term prognosis [25]. Too short pre-rehabilitation period may lead to the risk of failing to achieve the desired effect, but too long pre-rehabilitation period may delay the operation time and thus increase the risk of tumor progression and stage escalation [26], as well as reduce the patient's compliance and increase the risk of preoperative anxiety.

4.2. Pre-Rehabilitation Assessment

Before the formulation of the pre-rehabilitation program, it is necessary to conduct a comprehensive assessment of the overall situation of the patient, including general condition, lung function, physical fitness, nutrition, psychological, sleep and cognitive assessment, so as to stratify the risk of the patient and formulate an individualized, selective and focused safe pre-rehabilitation program. The results of dynamic evaluation can also be used as the basis to evaluate the effect of pre-rehabilitation. After the outpatient decision to operate, the patient can be pre-rehabilitation education. Before education and education, the patients were preliminarily evaluated, including BMI, smoking history, comorbidities (hypertension, diabetes, cardiovascular and cerebrovascular diseases, COPD, peripheral vascular diseases, bone and joint diseases, etc.), treatment status, and ASA classification. At the same time, the patients were preliminarily stratified according to age, type of surgery and urgency of surgery, and a pre-rehabilitation plan was formulated. Early intervention for patients with high-risk factors.

4.3. Exercise Rehabilitation

Preoperative exercise rehabilitation can improve the exercise endurance of patients waiting for surgery, and promote the recovery of patients with lung cancer and COPD after surgery. It is very important to evaluate exercise ability before exercise rehabilitation. Among them, 6-min walking test (6MWT), shuttle walking test (SWT), stair climbing test (SCT) and cardiopulmonary exercise test (CPET) are often used to evaluate patients' cardiac reserve function and exercise endurance, which is an important basis for formulating exercise prescription. It can also be used to evaluate the effect of sports training. Among them, the 6-min walking test is widely recommended due to its simple operation, good repeatability and good patient tolerance [27]. Exercise rehabilitation includes different types of exercise, among which aerobic training is the basis of individualized ex-

ercise rehabilitation, the form, time and intensity of exercise rehabilitation should follow the FITT principle recommended by the American College of Sports Medicine. For elderly patients, the safety and effectiveness of exercise should be fully evaluated and weighed to prevent the occurrence of accidents such as falls during exercise. Safety protection and prevention should be done in the process of exercise rehabilitation for patients undergoing radiotherapy and chemotherapy. There are no strict requirements for sports rehabilitation places, which can be selected according to the needs and preferences of patients. The study of Wuytack *et al.* [28] pointed out that there was no statistical significance in the improvement of patients' motor ability and quality of life in the sports rehabilitation training conducted with family or community as the main sports venue and hospital outpatient as the main sports venue. The duration of exercise should not be too long, 2 - 4 weeks is recommended, so as not to affect the patient's compliance. However, if the time from the decision to the operation to the start of the operation is less than 2 weeks, pre-rehabilitation should be carried out as far as possible [12].

4.4. Nutrition Management

Patients with lung cancer and COPD often have changes in nutritional status. Studies have shown that 20% - 30% of normal-weight COPD patients have muscle atrophy and relative fat gain, while weight loss and underweight are most common in patients with advanced lung cancer [29]. Weight loss and underweight are associated with increased mortality in patients with lung cancer or COPD. BMI is a simple indicator of nutritional assessment. Timely intervention should be given to patients with nutritional risks. Initial nutritional treatment involves adjusting eating habits and food types, which can be combined with exercise training. If the initial nutritional treatment is ineffective, caloric supplementation can be further increased, even by using enteral nutrition [30].

4.5. Psychological Guidance

Studies have shown that the incidence of preoperative anxiety ranges from 11% to 80%. This is due to the disease itself and worries about the surgical effect and prognosis, and patients are prone to anxiety, fear, depression and other negative emotions, which further aggravate the condition of patients and reduce the therapeutic effect [31]. Studies have found that psychological intervention for lung cancer patients can effectively alleviate their negative emotions and improve their treatment compliance [32]. Psychological rehabilitation can improve patients' understanding of the disease and surgery, relieve patients' negative emotions, enhance patients' treatment confidence, enthusiasm and compliance, and further improve clinical efficacy. Therefore, preoperative evaluation of patients' mental health should be conducted to provide psychological counseling and treatment for patients with anxiety and depression risk.

4.6. Health Education

As an important part of pre-rehabilitation, health education can provide patients with health knowledge, disease management, rehabilitation exercise and other related knowledge and skills, such as physical exercise, smoking cessation and alcohol restriction, nutritional guidance, etc., which can improve patients' compliance with treatment, change adverse lifestyle, and reduce the rate of re-hospitalization [33]. In addition to oral preaching, health education can also be carried out in various forms such as multimedia, broadcast and information brochures. It is worth noting that in the process of health education, patients' age, gender, education level, understanding level, economic level and illness should be considered to carry out individualized education guidance.

4.7. Multidisciplinary Cooperation

At present, there is no uniform regulation on the specific configuration and responsibilities of multidisciplinary team members. It is suggested to set up a multidisciplinary team including but not limited to doctors, nurses and dietitians according to the actual clinical situation and context. Considering that patients may be affected by clinical environment, medical treatment, human resources, patient factors, etc., the possibility of pre-rehabilitation interruption is increased. Therefore, a multidisciplinary team member can be designated to be responsible for the coordination, communication and follow-up of all links to ensure the continuity and effectiveness of pre-rehabilitation training.

4.8. Quality Control and Follow-Up

Effective supervision and follow-up is the key to good patient compliance. In order to ensure quality control, multi-mode monitoring and follow-up measures can be used, including community service, telemedicine, wearable devices, etc., and the appropriate way can be selected according to the actual situation of patients. At the same time, patients' spouses or caregivers are encouraged to participate in the pre-rehabilitation plan, assist in supervising patients' compliance with medical orders and provide necessary nursing care during the pre-rehabilitation period, so as to improve patients' enthusiasm and compliance in participating in the pre-rehabilitation plan [30].

5. Conclusion

This study summarized and summarized the best evidence of preoperative pre-rehabilitation for patients with lung cancer complicated with COPD. Medical and health care personnel can conduct pre-rehabilitation for patients with lung cancer complicated with COPD from eight aspects: content and principle of pre-rehabilitation, pre-rehabilitation evaluation, exercise rehabilitation, nutrition management, psychological guidance, health education, multidisciplinary cooperation, quality control and follow-up. Due to the lack of clear recommendations on the content of pre-operation rehabilitation for patients with lung

cancer complicated with COPD. The evidence in this study mainly comes from the research of different institutions and organizations at home and abroad. It is suggested that the application of evidence should comprehensively consider the regional and cultural differences at home and abroad, comprehensively evaluate the rehabilitation needs and individual differences of patients, so as to formulate scientific, applicable and normative pre-rehabilitation programs, and constantly obtain and update the latest evidence. The evidence-based medicine Evidence Hierarchy pyramid is a tool for evaluating the effectiveness and safety of clinical practice by grading the results of different types of studies according to the reliability and importance of the evidence. The bottom of the pyramid is the lowest level of evidence, which is of relatively low quality, while the top of the pyramid is the highest level of evidence, which is of relatively high quality. In the application of clinical evidence, medical professionals should use these grades in relation to the clinical issues they face.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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