ORIGINAL ARTICLE

Investigation of quality of life and relevant influence factors in patients awaiting lung transplantation

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ABSTRACT

Purpose: To investigate the quality of life and influence factors in patients awaiting lung transplantation.

Methods: Fifty five participants who waited for lung transplantation were enrolled and received multiple surveys including Short Form 36 Health Survey Questionnaires (SF-36), Self-rating Anxiety Scale (SAS), Self-rating Depression Scale (SDS) and Perceiving Social Support Scale (PSSS).

Results: The subjects awaiting lung transplant scored ranging from (23.18±37.53) to (74.57±26.02) regarding SF-36, significantly lower than norms (p<0.01); they scored (48.09±9.06) and (52.18±9.98) in SAS and SDS respectively, which were significant higher compared with norms (p<0.01), the patients scored (5.56±1.04) regarding social total support factor in PSSS questionnaire, and the scores of family support factor was significantly higher than that of outside family support factor (p<0.05). Single factor analysis revealed that the factors affecting quality of life included monthly family per capita income, medical cost source, dyspnea, BMI, anxiety, depression, and social support (p<0.05). Multiple factor analysis screened dyspnea (p<0.001) and depression (p<0.05) as influence factors of quality of life in patients awaiting lung transplantation.

Conclusion: Affected by various factors, the quality of life in patients awaiting lung transplant surgery is relatively poor, among which dyspnea and depression are dominant influence factors. Therefore, clinicians should take psychological and physiological measures to effectively enhance the quality of life in patients awaiting lung transplantation.

KEY WORDS   lung transplantation; quality of life; anxiety; social support; influence factors

Introduction

Lung transplant has become one of the commonly employed methods in treating end-stage lung diseases (1). In 1963, Doctor Hardy conducted the first lung transplantation surgery worldwide. Since 1990s, lung transplant has been applied spreading the world. A total of 32 652 cases of lung transplant have been registered in OSHLT until 2009, and the 1-, 3-, and 5-year survival rates were 79%, 63%, 52%, and 29%, respectively (2). Professor Yuling Xin, from Beijing Turberculosis Institute, performed the first lung transplantation in China in 1979. By the end of 2005, over 10 hospitals had carried out lung transplant, totaling more than 50 cases across China, and the survival rate ranged from 50% to 60% (3). However, the patients needed to wait for 12 to 18 months for matched donors because of the uncertainty of donor source. What's worse, 16% of the patients died during the period awaiting suitable donors (4). The quality of life of those patients awaiting lung transplantation decreased due to long waiting time, exaggerated dyspnea, and social role transformation. This study aims at investigating the quality of life of patients awaiting lung transplant and identifying the factors influencing quality of life, and providing scientific evidence for enhancing the quality of life in patients awaiting lung transplantation, reported as herein.

Patients and methods

Study subjects

A total of 55 patients, who registered for awaiting lung transplant

in certain hospital in Guangzhou from July 2009 to December 2010, were enrolled in this investigation, 46 males and 9 females, aged between 38 and 75 years old averagely (54.23±8.85) years old. Primary disease included 32 cases of chronic obstructive pulmonary disease (COPD), 10 cases of pulmonary fibrosis, 4 cases of pulmonary hypertension, and remaining 9 cases (2 cases of bronchiectasia, 3 cases of pulmonary liomyoma, and 2 cases of pneumoconiosis, and 2 cases of pulmonary fibrosis interstitial pneumonia). Dyspnea grading scale ≥ grade II. BMI ranged from 15.94 to 23.38, averagely (19.64±1.83). Family monthly per capita income: 19 cases < 2 000 yuan, 16 cases between 2 000 and 3 000 yuan, and 20 cases > 3 000 yuan. Source of medical cost coverage: 22 families paid at their own expenses, 12 families partially covered at public expenses, 3 cases totally covered at public expenses, and 18 cases paid by medical insurance. Highest education level: 10 cases of illiteracy, 13 cases of elementary school, 30 cases of junior and senior high schools, and 2 cases of college and university or above. Fifty two married cases, 2 unmarried cases, and 1 divorce case. Waiting time for lung transplantation: 0 to 8 months, averagely (3.24±1.13) months.

Methods

Investigation tools
(i) Short Form 36 Health Survey Questionnaires (SF-36) (5) included 36 clauses, 8 domains of PF, RP, SF, VT, RE, MH, BP, and GH. Score scale ranged from 0 to 100, and a higher score represented a better quality of life. Ningxiu Li et al. (6) previously measured the norm scores by Chinese population in SF-36. (ii) Self-rating Depression Scale (SDS) (7) contained 20 clauses reflecting the subjective feelings of depression individuals. Each item was classified into 4 grades according to the frequency of related occurring symptoms. The limited values for standard score was 50, 50 to 59 representing mild depression, 60 to 69 representing moderate depression, 70 above indicating severe depression. (iii) Self-rating Anxiety Scale (SAS) (8) included 20 clauses reflecting the subjective feelings of anxious individuals. Each item was classified into 4 grades according to the frequency of related occurring symptoms. The limited values for standard score was 50, 50 to 59 representing mild anxiety, 60 to 69 representing moderate anxiety, 69 above indicating severe anxiety. (iv) Perceiving Social Support Scale (PSSS) (9)

covered 12 self-evaluating clauses. The score scale for each item ranged from 1 to 7. The experts in China categorized 12 clauses into family support and outside family support by using factor analysis. The score scale of each factor ranged from 1 to 7, and a higher score represented a higher social support. (v) Common questionnaire included age, gender, marital status, education level, family monthly per capita income, source of medical cost, grading of dyspnea, BMI, and awaiting time, etc.

Investigation methods
All questionnaires were distributed to the patients and their relatives registered in lung transplant center during time awaiting lung transplantation. Full-time nurses in lung transplant center and the writers of this study were responsible for explaining the purpose, method to patients and their relatives, and ensuring the informed consents were obtained from all participants. All the questionnaires were spread out to patients at a time. Assisted by further explanations, the patients finished the questionnaires independently. For those unable to complete self-evaluation, the investigators repeated the questions and available answer choices to them who made a choice by independently. Finally, the investigators helped the patients record their answers. All questionnaires were collected, immediately reviewed, and the missed questions were supplemented to make sure the effectiveness of the questionnaires. A total of 55 questionnaires were distributed and all were effective, with an effective collection rate of 100.0%.

Statistical analysis
SPSS 13.0 software was employed for statistical analysis. The quality of life in patients awaiting lung transplantation and its relevant influence factors were analyzed by using t-test and multiple linear regressions (stepwise method).

Results

Comparison on scores in quality of life between patients awaiting lung transplantation and norms

The comparison on quality of life scores between the subjects awaiting lung transplant and norms were shown in Table 1. As shown in Table 1, significant differences were noted between

Table 1. comparison on quality of life scores between awaiting subjects and norms. (N=55, x±s)

Groups	PF	RP	RE	SF	MH	Energy	BP	Overall health condition
Norm group	90.62±15.40	79.51±34.70	76.45±38.47	86.85±17.28	72.65±16.81	70.29±17.07	85.61±18.37	69.55±21.32
Awaiting	41.45±26.98	23.18±37.53	56.30±23.91	45.95±26.44	61.31±17.35	51.27±19.08	74.57±18.83	42.00±18.83
t	25.43	11.87	4.93	18.93	4.85	8.14	4.35	10.18
P	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

246

Chen et al. Quality of life in patients awaiting lung transplantation

awaiting patients and normal controls in terms of scores of quality of life (all p<0.05).

Comparison on scores in anxiety and depression between patients awaiting lung transplantation and norms

In this study, 14 cases (25.5%) suffered from mild anxiety and 6 cases of moderate anxiety. Twenty cases (36.4%) had mild depression, 8 cases (14.5%) of moderate depression, and 2 cases (3.6%) of severe depression. The comparison on anxiety and depression indices scores between awaiting patients and normal controls were shown in Table 2. The scores of anxiety and depression indices obtained by awaiting patients were significantly lower compared with norms (p<0.01).

Scores in social support in patients awaiting lung transplantation

The social support scores obtained by awaiting patients were shown in Table 3. As table 3 shown, significant differences were noted among family support, outside family support and social total support in patients awaiting lung transplant (P<0.05).

Single-factor analysis upon quality of life in patients awaiting lung transplantation

Total score of SF-36 was deemed as dependent variable, and the total score of age, gender, marital status, family monthly per capita income, source of medical cost, dyspnea, having complication or not, BMI, SAS, SDS, PSSS was regarded as independent variable. A simple linear regression analysis was performed to screen independent variables, as shown in Table 4. All the independent variables influenced upon the quality of life in patients awaiting lung transplantation, with significant differences (all p<0.05).

Multiple-factor analysis upon quality of life in patients awaiting lung transplantation

Total score of SF-36 was deemed as dependent variable. Single factors were screened as meaningful independent variables. The total score of family monthly per capita income, source of medical cost, dyspnea, BMI, SAS, SDS, PSSS was integrated into regression formula for multiple-factor analysis, as shown in

Table 2. Comparison on anxiety and depression indices scores between awaiting patients and norms (N=55)

Group	SAS	SDS
Norm group	33.55±10.59	41.88 ±10.57
Awaiting group	48.09±9.06	52.18±9.98
t	-17.16	-7.10
P	<0.01	<0.01

Table 3. Social support scores obtained by patients awaiting lung transplantation (N=55)

Social support	Family support	Outside family support	Social total support	F	P
score	5.62±1.07	5.39±1.10	5.56±1.04	2.52	0.013

Table 4. Single factor analysis of the influence factors of quality of life in patients waiting lung transplant (N=55)

Independent variable	Regression coefficient	Standard error	Standard regression error	t	P
Family monthly income per capita	63.02	26.11	0.32	2.41	0.02
Source of medical cost	35.44	17.26	0.27	2.05	0.04
Dyspnea	-144.20	20.13	-0.70	-7.16	<0.001
BMI	25.86	12.27	0.28	2.11	0.04
SAS	-13.12	1.85	-0.70	-7.11	<0.001
SDS	-12.23	1.63	-0.72	-7.49	<0.001
PSSS	7.43	1.57	0.55	4.75	<0.001

Table 5. Multiple-factor linear regression analysis of quality of life in patients awaiting lung transplantation (N=55)					
Variable	Regression coefficient	Standard error	Standardized partial regression coefficient	t	P
Dyspnea	-90.02	21.15	-0.44	-4.3	<0.001
Depression	-5.06	2.45	-0.30	-2.07	0.04

Table 5. More severe dyspnea and depression represented poorer quality of life in patients.

Discussion

Analysis of quality of life in patients awaiting lung transplantation

This study revealed that the quality of life in those patients awaiting lung transplant was relatively poor. The scores of 8 domains in SF-36 by those participants were significantly lower compared with norms (all P<0.05), indicating an undesirable quality of life in patients waiting for lung transplant. The score of RP was 23.18±37.53, which was the lowest mark among all scores, followed by PF score of 35.96±26.45. The obtained results are consistent with those by foreign investigations (10-14). RP serves to measure the functional constraints caused by health problems, including whether presenting constraints and reduction during work and activity, decreases in time and types of activity, or increases in difficulty in completing work and daily activities. RP score was the lowest, suggesting that RP was subject to the most evident constraints because the patients awaiting transplant surgery had end-stage disease, and their lung function deteriorated and dyspnea symptoms were exaggerated as waiting time prolonged. Most patients had to stay in bed or take some minor limb movements to avoid dyspnea by reducing the oxygen consumption. Thus, the work and activity were significantly limited, time and type of activity was reduced, and the difficulty in finishing work and activity was elevated accordingly for patients. PF measures whether health condition negatively affects normal physiological activities including movement, moving stuff, step climbing, working, wearing clothes, and bathing, etc. A relatively low PF score indicated that the physiological activities were extremely constrained for patients, probably caused by dyspnea-induced decline in activity tolerance and self-care ability, thus limiting the patients' PF.

Analysis of psychological status and social support in patients awaiting lung transplantation

The patients waiting for lung donors presented certain degree of anxiety and depression. The results in this study indicated that 36.4% of these patients had mild-moderate anxiety, 54.5% presented depression, which were consistent with foreign findings (15-17). The reasons were stated as below. (i) The patients experienced an comforting phase at the initial waiting period. As waiting time prolonged, they started to think and ask "shall I receive organ donor timely?" Therefore, the patients would be tortured by the uncertain probability of donor supply besides deteriorated physical conditions, leading to mental disorder, such as, anxiety and depression to the patients. (ii) In addition, the patients awaiting lung transplant came from every corner of the country. Long distance from hospital to home, long treatment period, repeated stay in hospital, and reduced social interaction led to mental barriers. (iii) Lung transplant was a complicated and high-risk operation. The patients had to take anti-rejection drugs for a long period postoperatively, causing heavy mental burdens to patients including anxiety and depression.

The results in this study showed that the social total support of the patients awaiting lung transplant was relatively high, gaining more support from family than that from outside family (P<0.05). It may be mainly explained that the patients awaiting transplant stayed in severe course of disease. The lung transplant was a complicated and costly operation. Only those patients who gained much social support and actively took measures would choose receiving lung transplantation. Thus, the social total support of these patients was high. In addition, family support surpassed outside family support due to severe end-stage disease, deteriorated physiological function, and reduced social interactions.

Analysis of factors influencing quality of life in patients awaiting lung transplantation

The results in this investigation indicated that the regression coefficient of dyspnea was -90.015 (p<0.05), hinting that more severe dyspnea caused poorer quality of life, which was consistent with previous findings (18). The reason may be more serious dyspnea reduced the self-care ability, shortened time and diversity of activities, increased the difficulty in finishing work and activity, decreased social interactions, caused mental disorders of various degree, thus causing significant influence upon patients physiologically, socially, and psychologically and leading to poor quality of life. Meantime, multiple-factor analysis noted that the regression coefficient of depression was -5.052 (p<0.05). Both domestic and abroad studies revealed that the depression symptoms presented by transplant patients

decreased the quality of life, increased the incidence and death rate of diseases (18-22). These may be explained by the fact that the depression patients tended to seldom take active measures, present poor compliance, leading to deteriorated quality of life (23-24).

Conclusions

This survey indicated that the scores in various domains of quality of life by patients awaiting lung transplant were lower compared with norms. The overall quality of life in awaiting patients was not optimistic. Dyspnea and depression mainly contributed to decline in quality of life, suggesting that special attention and prevention should be provided regarding these two aspects to enhance the quality of life in patients awaiting pulmonary transplantation.

References

1. Jiang GN. Lung transplantation. Shanghai Scientific and technical publishers 2008:3-13.

2. Aurora P, Edwards LB, Kucheryavaya AY, Christie JD, Dobbels F, Kirk R, et al. The Registry of the International Society for Heart and Lung Transplantation: thirteenth official pediatric lung and heart-lung transplantation report-2010. J Heart Lung Transplant 2010;29:1129-41.

3. Chen JY. Development and experience of lung transplant in China. Chin J Lung Transplant 2006;27:67.

4. Hertz MI, Mohacsi PJ, Taylor DO, Trulock EP, Boucek MM, Deng MC, et al. The registry of the International Society for Heart and Lung Transplantation: introduction to the Twentieth Annual Reports--2003. J Heart Lung Transplant 2003;22:610-5.

5. Ware JE Jr, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med Care 1992;30:473-83.

6. Li N, Liu C, Li J, Ren X. The norms of SF-36 scale scores in urban and rural residents of Sichuan province. Hua Xi Yi Ke Da Xue Xue Bao 2001;32:43-7.

7. Zhang MY. Handbook of rating scales in psychiatry. Changsha: Hunan science and technology press 1998:39-41.

8. Wang XD, Wang XL, Ma H. Handbook of rating scales in mental health. Chin Ment Health J 1999:194-6.

9. Fang JQ. Perceiving social support scale. Chinese Journal of Behavioral Medical Science 2001;10:41-2.

10. Gross CR, Savik K, Bolman RM 3rd, Hertz MI. Long-term health status and quality of life outcomes of lung transplant recipients. Chest 1995;108:1587-93.

11. Cohen L, Littlefield C, Kelly P, Maurer J, Abbey S. Predictors of quality of life and adjustment after lung transplantation. Chest 1998;113:633-44.

12. TenVergert EM, Essink-Bot ML, Geertsma A, van Enckevort PJ, de Boer WJ, van der Bij W. The effect of lung transplantation on health-related quality of life: a longitudinal study. Chest 1998;113:358-64.

13. Limbos MM, Joyce DP, Chan CK, Kesten S. Psychological functioning and quality of life in lung transplant candidates and recipients. Chest 2000;118:408-16.

14. Kugler C, Strueber M, Tegtbur U, Niedermeyer J, Haverich A. Quality of life 1 year after lung transplantation. Prog Transplant 2004;14:331-6.

15. Burker EJ, Carels RA, Thompson LF, Rodgers L, Egan T. Quality of life in patients awaiting lung transplant: cystic fibrosis versus other end-stage lung diseases. Pediatr Pulmonol 2000;30:453-60.

16. Parekh PI, Blumenthal JA, Babyak MA, Merrill K, Carney RM, Davis RD, et al. Psychiatric disorder and quality of life in patients awaiting lung transplantation. Chest 2003;124:1682-8.

17. Goetzmann L, Scheuer E, Naef R, Vetsch E, Buddeberg C, Russi EW, et al. Psychosocial situation and physical health in 50 patients > 1 year after lung transplantation. Chest 2005;127:166-70.

18. Lutogniewska W, Jastrzebski D, Wyrwol J, Ksiazek B, Ochman M, Kowalski K, et al. Dyspnea and quality of life in patients referred for lung transplantation. Eur J Med Res 2010;15:76-8.

19. Coons SJ, Sheahan SL, Martin SS, Hendricks J, Robbins CA, Johnson JA. Predictors of medication noncompliance in a sample of older adults. Clin Ther 1994;16:110-7.

20. Dew MA. Behavioral factors in heart transplantation: quality of life and medical compliance. J Appl Biobehav Res 1994;2:28-54.

21. Chen Q, Wang G, Huang J. Survey on depression of liver transplant recipients and Countermeasures. J Nurs Sci 2009;6:89-91.

22. Xu LC, Zhang JH, Jiang XY. Effects of social support and coping style on quality of life in heart transplantation recipients. J Nurs Sci 2009;9:18-20.

23. Dew MA, Kormos RL, Roth LH, Murali S, DiMartini A, Griffith BP. Early post-transplant medical compliance and mental health predict physical morbidity and mortality one to three years after heart transplantation. J Heart Lung Transplant 1999;18:549-62.

24. Burker EJ, Evon DM, Sedway JA, Egan T. Appraisal and coping as predictors of psychological distress and self-reported physical disability before lung transplantation. Prog Transplant 2004;14:222-32.