

# Donor quality of life in living-donor lobar lung transplantation

Mai Nishioka, RN, Chie Yokoyama, RN, Mitsua Iwasaki, RN, Michiko Inukai, RN, Naomi Sunami, RN, and Takahiro Oto, MD

From the Lung Transplant Unit, Okayama University Hospital, Okayama, Japan.

## KEYWORDS:

living donor;  
lung transplantation;  
quality of life;  
short-form 36

**BACKGROUND:** Living-donor lobar lung transplantation has been established as a life-saving option for end-stage pulmonary diseases. However, factors associated with quality of life (QOL) of living lung donors have not been fully investigated.

**METHODS:** A cross-sectional study was performed at Okayama University using the version 2 questionnaire of the 36-item Short Form (SF-36) Health Survey. Linear regression analysis was used to estimate the relationship of donor factors and recipient outcomes using the SF-36 component summary scores.

**RESULTS:** Of 65 donors, 42 (65%) agreed to participate in this study; the mean age was  $42 \pm 1$  (range 25 to 59) years. Mean time from the operation to questionnaire was  $39 \pm 4$  (range 1 to 78) months. Donor-recipient relationships were as follows: sibling (18 cases); spouse (9 cases); parent (11 cases); and child (4 cases). Thirty-four of 42 donors were paired with those who donated their organ to the same recipient. Both physical and mental health scores in donors were higher than those in the general Japanese population. Lower mental health scores were seen in those who donated to their child or parent. There was a significant correlation in mental health scores between the paired donors. In the univariate analysis, donor age ( $r = -0.35, p = 0.02$ ), donor-recipient relationship ( $r = 0.38, p = 0.01$ ) and recipient death ( $r = -0.42, p = 0.006$ ) were factors significantly associated with donor mental health scores.

**CONCLUSIONS:** The average QOL in the living lung donors was better than that of the general population. However, a fatal outcome in the recipient significantly impacted donor mental health QOL. Ensuring that donor candidates consider both the risks/benefits of donation, and the potential recipient outcomes may be critical in the informed consent process.

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Living-donor lobar lung transplantation has been established as a life-saving option for small children and critically ill patients.<sup>1</sup> However, there are potential surgical risks in donor operation. The literature indicates that living lung donation is a procedure with acceptable morbidity and mortality.<sup>2,3</sup> Many quality-of-life (QOL)-related studies have demonstrated acceptable QOL in living-donor kidney and liver transplantation.<sup>4-7</sup> In lung transplantation, Prager et al demonstrated satisfactory physical and emotional health in 15 living donors.<sup>8</sup> How-

ever, the factors associated with a better QOL of living lung donors have not been fully investigated. Because of ethical concerns, ensuring an acceptable QOL for lung donors is highly important.<sup>9,10</sup> In this study we examine the donor and recipient factors associated with donor QOL in living-donor lung transplantation.

## Methods

A cross-sectional study was performed on living lung donors at Okayama University Hospital using the version 2 questionnaire 36-item Short Form (SF-36) Health Survey.<sup>11</sup> From December 2002 to November 2009, 34 living-donor lobar lung transplants, including 31 bilateral and 3 unilateral transplants, were performed.

Reprint requests: Takahiro Oto, MD, Lung Transplant Unit, Okayama University, 2-5-1 Shikata-cho, Kita-ku, Okayama 700-8558, Japan. Telephone: +81-86-235-7265. Fax: +81-86-235-7269.

E-mail address: [oto@md.okayama-u.ac.jp](mailto:oto@md.okayama-u.ac.jp)

**Table 1** Pearson's Correlation Analysis for Component Summary Scores for the 36-item Short Form Health Survey

	Physical component score		Mental component score	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Age	-0.13	0.4	-0.35	0.02
Gender (male)	-0.006	0.9	0.04	0.8
Months since donation	0.30	0.05	0.05	0.2
Operation site (right)	0.07	0.7	0.20	0.2
Donor/recipient relationship	0.20	0.2	0.38	0.01
Recipient death	0.12	0.5	-0.42	0.006

Donor/recipient relationship: constant (sibling), in (spouse), in (parent and child).

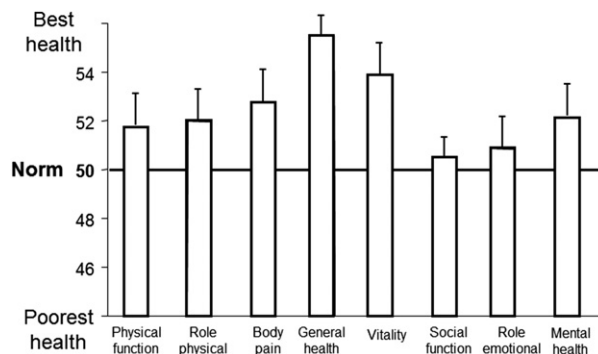
A total of 65 living donors were invited to participate in this study. The generic questionnaire measured 8 domains of their QOL including: physical functioning; physical role; bodily pain; general health; vitality; social functioning; emotional role; and mental health. These were summarized into overall physical component summary and overall mental component summary scores. The raw scale scores for all multi-item scales were transformed to norm-based scores. Norm-based scores achieved the same mean values of 50 and a standard deviation of 10 in the general Japanese population for all 8 scales and 2 summary scores. This study was approved by the institutional review board of Okayama University.

All donors received mailed questionnaires, a letter describing the study and informed consent forms. Informed written consent was obtained after a telephone explanation. Donor and recipient characteristics and outcome data were obtained from an institutional transplant database. Recipient outcome was measured as survival status at the time of survey. Pearson's correlation analysis was used to estimate the relationship of individual factors with the SF-36 component summary scores. All variables (Table 1) suggested by the univariate analysis with a level of significance defined as  $p < 0.05$  were included in the validation analysis (Table 2). In the validation analysis, paired donors were divided into left- and right-side donor groups and were included in a separate model to avoid the risk of Type I error. Values were expressed as the mean with standard error (SE), and statistical analysis was performed using statistical software (JMP, version 5.1; SAS Institute, Raleigh, NC).  $p < 0.05$  was considered significant.

**Table 2** Validation Analysis in Paired Donor Mental Component Summary Scores

	Right-side donors		Left-side donors	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Age	-0.09	0.7	0.13	0.6
Donor/recipient relationship	-0.21	0.3	-0.35	0.12
Recipient death	-0.59	0.004	-0.62	0.004

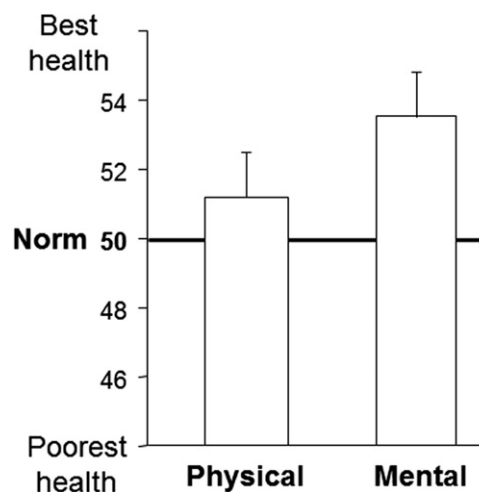
Donor/recipient relationship: constant (sibling), in (spouse), in (parent and child).

**Figure 1** Norm-based scoring of the 36-item Short Form (SF-36) Health Survey (norm 50 = average of general Japanese population).

## Results

Of 65 donors, 42 (65%) agreed to participate in this study; these 42 donations resulted in 25 lung transplants, including 22 bilateral and 3 unilateral transplants. Thirty-four of 42 donors were paired with those who donated their organ to the same recipient. In 5 of 42 cases, one member of a bilateral transplant pair did not participate in this study. Of the 42 cases, 3 were donors for a unilateral transplant. Twenty-two female and 20 male donors were included in this study, and the mean donor age was  $42 \pm 1$  (range 25 to 59) years. Twenty donors donated their right lower lobe, and 22 donors donated their left lower lobe. Mean time from operation to completion of the questionnaire was  $39 \pm 4$  (range 1 to 78) months.

Donor-recipient relations comprised the following: sibling (18 cases); spouse (9 cases); parent (11 cases); and child (4 cases). No major post-operative complications, including bronchial stump dehiscence, empyema or pneumonia, were seen in the living donors. In norm-based scoring of the SF-36 profile, all dimension scores of the living donors were higher than that of the general Japanese population (Figure 1). The physical component and the mental component summary scores are shown in Figure 2. Both

**Figure 2** Physical and mental component summary scores of the SF-36.

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