

Decisional conflict scale for elective thoracic surgery

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Abstract

Background The relationship between patients and physicians in medical decision-making has changed in recent times. Although patients understand essential medical information, the estimation of risk/benefit of planned treatments is a difficult decision-making process for them. The research of decisional conflict targeted decision at surgery has been rarely performed. We prospectively researched decisional conflict using a questionnaire survey for patients with elective thoracic surgery and retrospectively reviewed the quantified and subcategorized data to examine clinical factors related with the decisional conflict scale (DCS) and the quality of life (QOL).

Methods For patients with thoracic surgery, self-administered questionnaire surveys regarding decisional conflict and QOL were conducted at three time points: the day before surgery, at discharge, and at 3 months after surgery. The questionnaire survey of DCS is composed of five categories (uncertainty, informed, values clarity, support, and effective decision making) that use a five-point Likert-type response. QOL was measured in the Japanese version of the M.D. Anderson Symptom Inventory.

Results The questionnaire surveys were performed from April 2017 to March 2019. Eighty six patients were analyzed in this study. The total DCS scores did not differ among pre-surgery, post-surgery, and 3 months after surgery (21.8, 20.3, 19.2, respectively; $P = 0.48$). The effective decision subscores significantly decreased after surgery (19.2, 13.4, 13.7, $p = 0.041$). The pain scores at discharge were significantly higher in patients who underwent thoracotomy surgeries than VATS (6.5 vs. 4.0, $p = 0.013$). However, the DCS scores did not show any significant difference between the surgical approaches at discharge (thoracotomy: 12.5, VATS: 13.5, $p = 0.86$) and at 3 months after surgery (thoracotomy: 22.5, VATS: 12.5, $p = 0.11$). The effective decision subscores did not show significance to post-operative complications at post-surgery before discharge and at 3 months after surgery ($p = 0.94$ and $p = 0.40$). At 3 months after surgery, the most QOL scores were significantly related to the total scores of DCS.

Conclusions Patient's own experience of thoracic surgery and post-operative management may decrease patient dissatisfaction. The findings suggest that decisional support for patients to organize their concrete perioperative management would ameliorate their satisfaction.

Background

The relationship between patients and physicians in medical decision-making has changed in recent times. Regardless of the increasing awareness of patients' rights, healthcare service should essentially focus on the intension of insured people: potential patients with health insurance, considering they bear the source of healthcare service. Informed consent, the part where patients commit, is a crucial aspect in medical decision-making. Then, the concept of shared decision-making has then become popular, bridging the gap of medical information between patients and medical staff. Although patients understand essential medical information, the estimation of risk/benefit of planned treatments is a

difficult decision-making process for them. Thus, the social conscience of medical staff is crucial, as they take the responsibility to estimate patients' uncertainty to guarantee for their autonomy and justice.

The Decisional Conflict Scale (DCS) was developed in 1995 to measure patient perceptions of their uncertainty concerning which course of action they should take in decisional conflict [1]. Recent reviews on decision support interventions and shared decision making in health care showed that the DCS is the most commonly used measure related to decision making [2]. The traditional DCS is divided into five categories of uncertainty, informed, values clarity, support, and effective decision-making, and is composed of 16 items using a five-point Likert-type response [3]. Since its development, the DCS has been translated into numerous languages [4, 5].

In clinical practice, decisional conflict is addressed typically in clinical oncology. However its application is usually limited in patients with advanced stage cancers and palliative care. Informed consent for surgical treatment is accredited with explanation of the potential alternative treatment. Therefore, decisional conflict is expected to occur also in the surgical field [6]. However, the research targeted decision at surgery has been rarely performed. Here, we prospectively researched the decisional conflict using a questionnaire survey for patients who underwent elective thoracic surgery and retrospectively reviewed and analyzed the quantified and subcategorized their data to examine the clinical factors related to their decisional conflict and quality of life (QOL).

Methods

The program to evaluate the decisional conflict in patients who underwent elective thoracic surgery was planned in April 2016 at the Kansai Medical University Medical Center. For patients whose consent was obtained with written information of the study, self-administered questionnaire surveys regarding the decisional conflict and QOL were conducted at three time points: the day before surgery, at discharge, and at 3 months post-surgery. Additionally, patients' background and perioperative laboratory, surgical, and pathological data were prospectively collected. The study was conducted in accordance with the Japanese Ethical Guidelines for Epidemiological Research and the World Medical Association Declaration of Helsinki. The study was approved by the Institutional Review Board of the Kansai Medical University (approval date: July 13, 2016; approval number: 2016403).

Decision making for thoracic surgery

Patients referred to our division were consulted by thoracic surgeons (HK or TN) regarding the treatment approach for the diseases and the applicable thoracic surgery. To decide whether patients should perform thoracic surgery or not, all patients received individualized oral information and written documents as follows: appropriate strategy for the disease, oncological and physiological indication of thoracic surgery, approach and extent of the pulmonary resection and mediastinal surgery, risks and benefits of the applicable surgeries, alternative treatments, surgical mortality and morbidity, and the prognosis with and without undergoing surgery. Counseling for decision making between patients and surgeons was

performed with the intention and view of patients and their families at two time points, in the outpatient clinic and finally after hospital admission.

Measurements of decisional conflict

After April 2016, two different versions of the DCS questionnaires were used for the patients. The Japanese translated version of the original DCS (J-DCS) with the statement format composed of 16-item five-response categories, was developed and validated by Kawaguchi and colleagues.[7] The DCS was divided into five subscales, namely uncertainty, informed, values clarity, support, and effective decision making, and is composed of 16 items that use a five-point Likert-type response: strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree. Decisional conflict was calculated from calculating the total scores obtained on these 16 items. The uncertainty subscale estimated the degree of uncertainty that a patient faces in decision-making. Informed, values clarity, and support subscales considered the modifiable factors that contributed to uncertainty and represented feelings of being uninformed, the clarity of personal values, and feelings of being unsupported, respectively. The effective decision subscale measured the combination of informed choice, patient response value, and satisfaction. The total score and the score on each subscale were calculated according to the DCS user's manual and both ranged from 0 to 100, with the latter indicating extremely high decisional conflict. The J-DCS was used from September 2016 to March 2017. After that period, to address patients' request for a more simplified questionnaire, we modified the J-DCS and the question format composed of five items in five response categories (mJ-DCS), based on the questions of the SURE test, which is a four-item (Sure of myself, Understanding information, Risk-benefit ratio, Encouragement) quick screening tool.[4] We previously reported a study to validate the mJ-DCS compared to the J-DCS in the academic meeting of the Japan Lung Cancer Society on October 2017.

The five questions in the mJ-DCS were described in Japanese followed by the corresponding translations in English, as follows: #1) Do you know the benefits and risks of each option?; #2) Are you clear about which benefits and risks matter most to you?; #3) Do you have enough support and advice to make a choice?; #4) Do you feel sure about the best choice for you?; #5) Are you satisfied with your decision? Of the five questions of the mJ-DCS, four (#1–4) questions were similar to those in the SURE tool version of the original DCS. The last one (#5) was the same with the final question of the original 16-item five-response categories, which were added to the mJ-DCS to compare the set subscores between the J-DCS and mJ-DCS. The mJ-DCS was introduced to patients from April 2017 to March 2019 and was used in this study's analysis.

Measurements of quality of life

QOL was measured to examine its relationship with the decisional conflict scale in the Japanese version of the M.D. Anderson Symptom Inventory (MDASI-J) [8]. The original MDASI, developed in English, is a brief, self-rating, multiple symptom assessment scale [9]. The MDASI is a two-page questionnaire containing 19 0–10 numeric scale items. The first 13 items describe the patient's symptoms during the last 24 h, with 0 and 10 representing "not at all" and "as bad as you can imagine", respectively.

Symptoms assessed on this scale were carefully chosen using cluster analysis and the best-subset regression model, combined with clinical judgment, to avoid overwhelming very ill, or boring patients who were less severely ill, with too many questions. The last six items assess the degree in which the symptoms interfered with various aspects of the patient's life during the past 24 h; general activity, mood, waking ability, normal work, relationships with others, and enjoyment of life, where 0 and 10 correspond to "does not interfere" and "completely interferes", respectively. The consistency of the statistical structure of the English and Japanese versions was validated by Okuyama T and colleagues [8].

Surgery procedures and comorbidities

The approach of surgery was analyzed as binary data; video-assisted thoracoscopic surgery (VATS) defined as video-assisted surgery with skin incision of less than 8 cm, and open included thoracotomy with skin incision of more than 10 cm and median sternotomy. Comorbidities were analyzed as binary data: with any of them or none. Post-operative complications were counted with the definition of the National Clinical Database of Japan, adopted in the annual web-based data collection system.

Statistical Analysis

To analyze patient backgrounds and clinical factors related to DCS scores, the diseases for thoracic surgeries were categorized in four groups: malignant lung tumors, benign lung diseases, mediastinum tumors, and others. The malignant lung tumors included lung cancer and metastatic lung tumors. The benign lung diseases included benign lung tumors, lung abscesses, and lung cysts. The mediastinum tumors included thymomas, other thymic tumors, mediastinum cysts, and neurogenic tumors. The other diseases included pleural tumors and diseases; none of these categories were included in the analysis of DCS values.

The data are presented as numbers (%) or means unless otherwise stated. The Student *t*-tests and ANOVA were used for continuous data between two groups and among three groups. The association between the continuous variables was analyzed using the Pearson's correlation tests. The statistically significant level was set at $p < 0.05$. All statistical analyses were performed using JMP Pro software version 13.2.1 (SAS Institute, Inc., Cary, NC, USA).

Results

The mJ-DCS and MDASI-J questionnaire surveys were performed from April 2017 to March 2019. The total number of patients who would undergo elective thoracic surgeries in the study period was 289. Those questionnaires were not completed by all patients and many of them had missing data in any of the decisional conflict scales and QOL scores. After comparing the scores among the three time points (pre-surgery, post-surgery before discharge, and at 3 months after surgery), many cases were excluded from the analysis due to incomplete data of the questionnaires, and finally the data of 86 patients (sex, 55 men and 31 women; mean age, 67 years) were analyzed. Patients included in this study did not have

difference with the excluded patients (n = 203) in terms of age (p = 0.38), sex (p = 0.66), comorbidities (p = 0.38), and approach of surgery (p = 0.22). More patients with malignant lung tumors than without were included in the factor analysis (80% vs. 48%, p < 0.0001).

Change over time of the mean decisional conflict scales and QOL scores

The total DCS scores did not differ among pre-surgery, post-surgery, and 3 months after surgery (21.8, 20.3, and 19.2, respectively; p = 0.48) as shown in Table 1. Of the five subscores, the effective decision subscores significantly decreased after surgery (19.2, 13.4, 13.7, p = 0.041); the other subscales also decreased over time, but did not show statistical significance. All factors of QOL scores (pain, fatigue, sleeping disorder, shortness of breath, anorexia, and difficulty in daily life) increased after surgery and showed significant differences among the three time points.

Table 1

Decisional conflict scales and QOL scores at pre-surgery, post-surgery before discharge, and 3 months after surgery

	Pre-surgery	Post-surgery before discharge	3 months after surgery	p-value
Decisional conflict scale (0–100), mean				
Informed subscore	22.1	22.7	20.6	0.73
Values clarity subscore	26.2	25.0	23.5	0.69
Support subscore	17.4	17.4	15.7	0.72
Uncertainty subscore	24.1	23.0	22.4	0.86
Effective decision subscore	19.2	13.4	13.7	0.041
Total score	21.8	20.3	19.2	0.48
QOL score (0–10), mean				
Pain	0.6	4.3	3.1	< 0.0001
Fatigue	0.7	2.9	2.9	< 0.0001
Sleeping disorder	1.1	3.3	2.3	< 0.0001
Shortness of breath	0.9	2.5	2.8	< 0.0001
Anorexia	0.7	2.2	2.1	0.0002
Difficulty in daily life	1.1	2.6	2.5	0.0004
QOL, quality of life				

Background factors related to decisional conflict scales

In univariate analysis, backgrounds of patients in age, sex, disease, and comorbidities did not affect the total scores of DCS at pre-surgery and post-surgery before discharge, as shown in Table 2. At 3 months after surgery, age and disease showed significant relationship with the total scores of DCS ($p = 0.043$ and $p = 0.027$). The DCS values at post-surgery before discharge and at 3 months after surgery in patients

with malignant lung tumors (21.2, 20.9) were almost similar to those at pre-surgery (22.5, $p = 0.80$). Conversely, the corresponding values in patients with benign lung diseases and mediastinal tumors decreased by approximately 5 and 10 points after surgery (benign lung diseases: 21.7, 16.1, 16.7, $p = 0.66$; mediastinal tumors: 16.3, 16.9, 6.8, $p = 0.23$). Moreover, none of the DCS subscores showed any significant relationship with age and disease.

Table 2
Univariate analysis on factors influencing the decisional conflict

	Pre-surgery		Post-surgery before discharge		3 months after surgery	
	Total scores of DCS	p-value	Total scores of DCS	p-value	Total scores of DCS	p-value
Age	r = 0.041	0.71	r = 0.076	0.48	r = 0.22	0.043
Sex		0.57		0.26		0.87
Male	22.4		21.7		19.0	
Female	20.8		17.7		19.5	
Diseases		0.40		0.53		0.027
Malignant lung tumors	22.5		21.2		20.9	
Benign lung diseases	21.7		16.1		16.7	
Mediastinu m tumors	16.3		16.9		6.8	
Comorbidit ies (n = 58)	21.2, 23.0	0.52	19.3, 22.3	0.40	20.9, 15.7	0.12
Approach of surgery		0.74		0.96		0.52
VATS	21.6		20.3		18.8	
Open	23.0		20.5		22.2	
QOL score (0–10)						
Pain	r = 0.12	0.26	r = -0.034	0.76	r = 0.22	0.044
Fatigue	r = 0.13	0.22	r = -0.018	0.87	r = 0.34	0.0012
Sleeping disorder	r = 0.023	0.84	r = 0.083	0.45	r = -0.0063	0.95

NA, not applicable; QOL, quality of life; DCS, Decisional Conflict Scale; VATS, Video-assisted thoracoscopic surgery

	Pre-surgery		Post-surgery before discharge		3 months after surgery	
	Total scores of DCS	p-value	Total scores of DCS	p-value	Total scores of DCS	p-value
Shortness of breath	r = 0.23	0.033	r = 0.074	0.50	r = 0.39	0.0002
Anorexia	r = 0.15	0.15	r = 0.16	0.14	r = 0.28	0.0099
Difficulty in daily life	r = 0.18	0.093	r = 0.017	0.88	r = 0.34	0.0012
Post-operative complications (n = 2)	NA	NA	17.5, 20.4	0.80	25.0, 19.0	0.57
NA, not applicable; QOL, quality of life; DCS, Decisional Conflict Scale; VATS, Video-assisted thoracoscopic surgery						

Surgical factors related to decisional conflict scales and QOL scores

The DCS scores did not show any significant difference between the surgical approaches (thoracotomy or VATS) whether it was examined at pre-surgery, post-surgery before discharge, and at 3 months after surgery. The effective decision subscores also did not show a significant relationship with surgical approach at discharge (thoracotomy: 12.5, VATS: 13.5, $p = 0.86$) and at 3 months after surgery (thoracotomy: 22.5, VATS: 12.5, $p = 0.11$). The pain scores at discharge were significantly higher in patients who underwent thoracotomy surgeries than VATS (6.5 vs. 4.0, $p = 0.013$). At 3 months after surgery, the pain scores in patients who underwent thoracotomy surgeries remained higher, but did not reach statistical significance (4.4 vs. 3.0, $p = 0.15$). Post-operative complications of the included 86 patients occurred in two cases, where arrhythmia and chylothorax were observed. The relationship between DCS and post-operative complications did not show any significance at post-surgery before discharge and at 3 months after surgery ($p = 0.80$ and $p = 0.57$). Moreover, the effective decision subscores did not show significance to post-operative complications at post-surgery before discharge and at 3 months after surgery ($p = 0.94$ and $p = 0.40$).

Relationship between the decisional conflict scales and QOL scores

The QOL scores at pre-surgery and post-surgery before discharge did not show significant relationship with the total scores of DCS at each time point. However, at 3 months after surgery, all QOL scores apart

from the sleeping disorder were significantly related to the total scores of DCS, shown in Table 2. Moreover, the effective decision subscores showed significant relationship with the QOL scores; fatigue ($p = 0.0013$), shortness of breath ($p = 0.0004$), anorexia ($p = 0.0028$), and difficulty in daily life ($p = 0.0001$). Furthermore, pain at 3 months after surgery did not show statistical significance in relation to the effective decision subscores ($p = 0.11$).

Discussion

The decisional conflict was calculated from the total scores, which were calculated from the five subscales: uncertainty, informed, values clarity, support, and effective decision making. The subscale of uncertainty measured the degree of patient's uncertainty in decision-making. The subscales of informed, values clarity, and support considered patient's factors that lead uncertainty and represent the feelings of being uninformed, the clarity of personal values, and feelings of being unsupported, respectively. The subscale of effective decision showed the combination of informed selectable choice, patient response value, and patient's satisfaction. Total scores of < 25 and ≥ 37.5 were associated with decision implementation and decision delay or indecision. In this study, the mean scores of decisional conflict scale in pre-surgery was 21.8, a relatively low score compared to previous reports, including patients who underwent chemotherapy for cancer [7] and treatment for asthma [10]. The total scores of DCS were lower than 25 at any of the three time points and were considered to be feasible for invasive treatment.

Patient anxiety for surgical morbidity and mortality enforced uncertainty of decision making in patients with elective thoracic surgeries. Besides studying the decisional conflict before surgery, we examined the DCS score change over time after surgery. The DCS score after surgery was supposed to be affected by the post-operative complications, which would strengthen remorse for decision-making of surgical treatment and unselecting potential alternative options. The decision support for interventional treatment could ameliorate decisional conflict [11]. Therefore, we expected that a patient's own experience of surgery may reduce the DCS score. The scores post-surgery before discharge and at 3 months after surgery were gradually decreased, although the differences did not show any statistical significance. Of the subscores of DCS, the effective decision subscores that show patient dissatisfaction of selected treatment significantly decreased after surgery (Table 1). The effective decision subscores were not related to post-operative complications in this series of patients. At 3 months after surgery, the most QOL scores at that time were more related to the total scores, especially effective with the decision subscores of DCS.

In this study, the thoracic surgeries were performed for lung tumors, lung diseases, mediastinum diseases, and chest wall tumors. In recent years, VATS have been performed worldwide. In this analysis, 88% of the performed thoracic surgeries were VATS. The pain scores at discharge were significantly lower in patients who underwent VATS than in those who underwent thoracotomy. At 3 months after surgery, analysis of DCS showed that patient satisfaction was significantly related to most of the patient symptoms. In contrast with our expectations, pain after surgery was not related to patient satisfaction. Although patients who underwent thoracotomy experienced more pain than those who underwent VATS,

the irrelevant relationship between pain and patient satisfaction may cause the nonsignificant impact of differences in surgical approach between VATS and thoracotomy on patient satisfaction.

The effective decision subscale of DCS represents patient satisfaction. In pulmonary resection, there were some reports regarding patient satisfaction. Barlesi and colleagues examined the patient satisfaction by self-administered questionnaires with different deliberation of medical information to patients and reported difficult interpretation of satisfaction assessment [12]. Pompili and colleagues reported that patient satisfaction was different among centers of thoracic surgery units, mainly due to physician-related scales: technical skill, interpersonal skills, availability, and information provision [13]. In our study, factors directly addressed to the ability of medical staff and institutions potentially related to patient satisfaction were not planned to be examined because there were no related items in the DCS questionnaire. However, the informed and support subscores in the DCS represented patient's acceptance of medical information and support related to the ability of medical staff and institutions. In this study, among the subscores in the DCS, the support subscore indicated the lowest values and the informed subscore was similar to the total score (Table 1). Therefore, in our study, the medical staff and institution ability was considered insignificant in patient decisional conflict.

The limitation of this study was that several patients in the study period were excluded from the analysis because of their missing data. There was no difference between the patients included in this analysis and those not analyzed in the study period in terms of age, sex, comorbidities, and approach of surgery. However, the most patients with lung malignant tumors were included in this analysis. Therefore, the DCS values of the included patients were presumed to be higher than the corresponding of the background population. In the univariate analysis, the DCS scores of individuals with malignant lung tumors did not decrease over time. Relatively many patients with malignant lung tumors in this analysis might have affected the result of DCS, especially at 3 months after surgery.

Conclusions

We examined the DCS values in patients who underwent elective thoracic surgery. The mean DCS score at pre-surgery was 21.8, which was a relatively low score. The total scores of DCS decreased after surgery; of the subscores of DCS, the effective decision subscores that represented the patient dissatisfaction significantly decreased after surgery. Furthermore, the surgical approach between thoracotomy and VATS did not have any impact on the DCS score, as the pain after surgery was not related to the DCS score. Patient's own experience of thoracic surgery and post-operative management may decrease patient dissatisfaction. Therefore, the findings of this study suggest that decisional support for patients to organize their concrete perioperative management would ameliorate their satisfaction.

Abbreviations

QOL: Quality Of Life; DCS: Decisional Conflict Scale

Declarations

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Authors' contributions

KH designed the study, collected and analyzed the data, and drafted the article. TN helped the data collection. MT supervised the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

The present study was approved by the Institutional Review Board of the Kansai Medical University (approval date: July 13, 2016; approval number: 2016403) and performed according to the principle of the Declaration of Helsinki. The written informed consent to participate was provided by all patients.

Consent for publication

The written informed consent to publish was provided by all patients.

Competing interests

The authors declare that they have no competing interests.

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