

〔原著〕

心臓カテーテル検査用クリティカルパスのアウトカム評価： パスにエントリーした患者の満足度調査

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OUTCOME EVALUATION OF A CRITICAL PATHWAY FOR CORONARY ANGIOGRAPHY: SATISFACTION SURVEY OF PATIENTS ENTERING THE CRITICAL PATHWAY

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2001年度に開始された3泊4日の冠状動脈血管造影検査入院用クリティカルパス（以下、パス）を見直し、より適切な医療提供のあり方を検討するために、パスにエントリーした患者（102名）の医療に対する満足度の実態を2002年6月に調査した。方法は、当該パスの目標を達成するためにスタッフによって提供された検査、看護などに対する患者の満足度を、独自に作成した質問紙を用いて郵送法で実施した。回収率は86%（88名）、患者満足度の全体平均値は4.7点（100点中78.3）で、パスの目標間における満足度に有意差がみられた。カテ初回者は、2回目以上者と比較して、外来でのカテの説明において満足度が有意に低値であった。70歳以上の高齢患者は、40～69歳群に比較してカテ中の処置などで満足度が有意に高値であった。カテ結果説明時に待ち時間に対する不満がなかった患者、およびカテ前のパンフレットのわかりやすさや外来でパンフレットを渡す時期に要望のなかった患者は、全体平均満足度得点に有意に影響していた。対象者のニーズや年齢に即した、きめ細やかな医療サービスへの期待が明らかにされた。

キーワード：クリティカルパス、患者満足度、冠状動脈血管造影検査、アウトカム評価

Abstract

The present study evaluated the critical pathway for a three-night hospitalization program for coronary angiography that was initiated in 2001, in order to evaluate more ideal models of providing medical services. In June 2002, we investigated satisfaction of patients who entered the critical pathway regarding the provided services. The questionnaire was mailed to 102 patients who had entered the critical pathway and response rate was 86% (88 patients). The mean score of overall patient satisfaction was 4.7 points (78.3 out of 100 points), and significant differences in the degree of satisfaction were identified between the different goals of the critical pathway. Those who were undergoing their first angiography reported significantly lower levels of satisfaction regarding the explanation of angiography in the outpatient setting and in brochures. Compared to those between 40-69 years old, older patients described significantly higher levels of satisfaction regarding such factors as the procedures during angiography. Dissatisfaction with the waiting time required for explanation of angiography results, with ease of reading and understanding the brochure before undergoing angiography, or with the timing of being given the brochure significantly affected overall mean satisfaction scores. The present study demonstrated that patients anticipate the provision of more sensitive medical services in accordance with their needs and age.

Key words : critical pathway, patient satisfaction, coronary angiography, outcome evaluation

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I. Introduction

In 2000, the Heart Institute of Japan launched a critical-pathway committee at our university hospital in order to respond to the changes in social needs accompanying the prospective-payment system that will be implemented in 2003 at health care organizations, including university hospitals and special-function hospitals, and to standardize medical services and maintain and improve the quality of care. The committee was composed of physicians, nurses, and administrative hospital staff, and evaluated ideal models of efficient care. The first project was to design a critical pathway for coronary angiography, which is performed on approximately 3,000 patients per year in this facility (comprising 5 wards and 2 units) . Because approximately 70% of patients in our ward have ischemic heart disease, coronary angiography is conducted 4 times per week, for the purposes of diagnosing coronary artery disease and to conduct endovascular therapy and 6-month postoperative evaluation following heart surgery. Therefore, since 2001, we have designed and used the "critical pathway for 3-night hospitalization for coronary angiography."

The present study aimed to evaluate the 3-night critical pathway and ideal models of providing medical services. We examined the current state of satisfaction experienced by patients who entered the critical pathway regarding the provided services.

II. Operational definitions of terminology

"Medical services" refers to the testing and nursing services provided by hospital staff in order to achieve the goals of the critical pathway for patients who entered this pathway.

"Degree of patient satisfaction" refers to the subjective evaluation by patients regarding the results and services that they actually received.

III. Goals and outline of the critical pathway

Table 1 shows the goals of the critical pathway. A brief description of the critical pathway of the 3-night hospitalization program is as follows. On the first day of hospitalization, the investigations and pre-procedures necessary for angiography were performed. On the second day, patients underwent angiography. On the third day, patients were provided with explanations of angiography results, as well as changes in medication and areas of caution in their daily lives. On the morning of the fourth day, after completing discharge procedures, patients were discharged. (Table 1)

IV. Subjects and methods

1. Methods of the questionnaire survey

We included 102 patients who were admitted to our ward and entered the critical pathway from July 2001 to March 2002. We mailed self-administered questionnaires to subjects in June 2002, also enclosing a letter requesting cooperation with the survey that described the purpose and ethical considerations. We asked patients to return the questionnaire within four weeks using an enclosed return envelope.

We used a questionnaire designed by our research team to ask patients if the services attained the goals of critical pathway. This was because the purpose of this study was to "evaluate the critical pathway and ideal models of providing medical services", rather than to measure degree of patient satisfaction for such general services as amenities and attitudes of hospital staff. Consequently, answer scales incorporated "excellent-poor" as well as "satisfied- dissatisfied" and "agree-disagree" (Ware & Hays, 1988) .

The questionnaire comprised 40 questions, including (1) basic subject characteristics (6 questions) , (2) degree of satisfaction regarding the goals of the critical pathway before, during, and after testing (26 questions) , (3) presence or absence of requests for improvement in services included in the critical pathway (7 questions) ,

and (4) free comments. Table 2 shows examples of the questions. (table 2, 2pages)

Subject response bias such as "lenient responses" (Eisen & Grob, 1979; Avis, Bond, & Arthur, 1995) and "acquiescent response" (Ware, 1978; Ross, Steward, & Sinacore, 1995) is often an issue in satisfaction surveys. In order to minimize such responses by the subjects, (1) we selected a minimal number of items describing basic characteristics of the subjects (6 items such as age and sex) and conducted the survey anonymously, so that subjects would not be concerned over possible identification, (2) we used a six-point scale (1. very dissatisfied, 2. somewhat dissatisfied, 3. mildly dissatisfied, 4. mildly satisfied, 5. somewhat satisfied, and 6. very satisfied) for the second 26 questions, in order to avoid a tendency for subjects to choose neutral answers, such as "neither agree nor disagree" and "ordinary", (3)

when we needed to use a Yes-No type question, we had the respondents answer the question in relation to their actual desires regarding the medical services they had received. For example, "Was your mobilization following bedrest after angiography conducted on time, as was scheduled?" We asked those who chose "no" about their actual desire using multiple-choice questions. The Yes-No type question was also used for the third question regarding requests for improvement in services included in the critical pathway (7 questions) .

2. Method of analysis

We determined simple statistical calculations for the basic subject characteristics. Testing and nursing care performed during the clinical pathway were divided into 8 items by time course (items A-H shown in Table 2) . The total scores of satisfaction in each group were divided

Table 1. Goals of the critical pathway

Before angiography	
Goal 1	Patients are able to undergo angiography with peace of mind.
Goal 2	Necessary procedures for angiography are reliably provided to patients.
During angiography	
Goal 1	Patients will experience the minimum of physical and psychological pain. Patients are able to undergo angiography safely, comfortably, and quickly without complications.
After angiography	
Goal 1	Patients are able to spend the convalescence period safely.
Goal 2	Complications will be detected at an early stage, and will be treated appropriately.
Goal 3	Patients are able to understand the result of angiography and areas in which they should exercise caution in their daily lives.

Table 2. Examples of questions in the questionnaire

Before angiography	
#Questions regarding the goal 1	
A. Explanation of angiography in the outpatient setting and in brochures	
1 When you were given the brochure at outpatient sites, did the hospital staff at the outpatient window provide you with an easily understandable explanation, including the necessary information and precautions for the 3-night hospitalization?	(4 other questions)
C. Explanation of angiography by and interaction with the hospital staff	
1 When you had worries or questions about angiography, did your attending physician answer them well?	(3 other questions)
D. Consultation by and interaction with physicians working at the angiography suite	
1 The physician working at the angiography visited you to confirm and explain about your dorsalis pedis artery and the incision site for angiography. Was the explanation by the physician easy to understand?	(1 other question)
#Questions regarding the goal 2	
B. Testing and pre-procedures that are necessary for angiography	
1 Was the explanation by the hospital staff about the necessary testing (including blood tests and etc) during hospitalization, easy to understand?	(1 other question)
During angiography	
#Questions regarding the goal 1	
E. Procedures during angiography and interaction with the hospital staff	
1 Did the nurses at the angiography suite make efforts to enable you to undergo angiography with peace of mind?	
2 The physician at the angiography suite made efforts to perform the procedure "safely, accurately, and quickly," in order to minimize your physical and psychological pain. Were you satisfied with the procedures?	(1 other question)

(continued)

Table 2. (continued)

After angiography	
#Questions regarding goal 1	
G. Care by and interaction with nurses in the hospital room after angiography	
1 During your bedrest after angiography, did the nurses show consideration for your pain and for your embarrassment when you moved your bowels or urinated?	(2 other questions)
#Questions regarding goal 2	
F. Examination by and interaction with physicians in the hospital room after angiography	
1 Did your attending physician examine your condition accurately, promptly, and courteously after angiography?	(1 other question)
G. Care by and interaction with nurses in the hospital room after angiography	
1 Did your nurse help to relieve your pain accurately, promptly, and courteously when you experienced symptoms or unpleasant feelings?	(1 other question)
#Questions regarding goal 3	
H. Explanation of angiography results by and interaction with physicians at the time of discharge	
1 Was the explanation of angiography result by your attending physician easy to understand?	
2 Was the explanation about precautions in your daily life easy to understand?	(1 other question)
Presence or absence of requests for improvement in services included in the critical pathway	
Before angiography	
1 Timing of being given the brochure for angiography in the outpatient setting	
2 Ease of reading and understanding the brochure	
3 Interaction with hospital staff during pre-procedures one day before angiography	
After angiography	
4 Time waiting for mobilization following bedrest after angiography —Was your mobilization following bedrest after angiography conducted on time as scheduled?	
5 Time waiting for an explanation of angiography results —Was the explanation of the results given within the time promised by the physician promised?	
6 Interaction with hospital staff at the time of admission and discharge procedures	
7 Duration of three-night hospitalization	

by the number of questions to obtain the mean scores and standard deviations. We also calculated the distribution of responses on the 6-point scale of patient satisfaction. To compare mean satisfaction scores for the eight items, we performed the Levene test to confirm homogeneity, followed by one-way layout ANOVA and Bonferroni test. We also grouped the patients by certain characteristics to compare mean satisfaction scores. T-test with Levene test was performed to compare between two groups. To compare three groups, we performed one-way layout ANOVA. In order to analyze the influence of the presence or absence of requests for improvements in the critical

pathway on patient satisfaction, we performed multiple regression analysis, using the mean satisfaction score for all 26 items as the dependent variable, and the seven items regarding requests as independent variables. For the presence or absence of requests regarding these seven items, we used a "1" for "absence of request," and "0" for "presence of request." Dr. SPSS II for Windows was used for statistical analysis and p-values of less than 0.05 were considered statistically significant.

Regarding the free comments, we classified the contents using KJ methods, and calculated the number of patients according to content.

Table 3. Characteristics of 88 patients

Characteristics	Number of patients (%)	Mean	S. D.
Age (years old)			
40—59	16 (18.2)	67.7	8.4
60—69	34 (38.6)		
≥70	38 (43.2)		
Sex			
Male	72 (81.8)		
Female	16 (18.2)		
Prior experience of angiography (number of times)			
First time	16 (18.2)	3.1	2.0
2	32 (36.4)		
≥3	40 (45.4)		
Prior experience of endovascular therapy			
Presence	72 (81.8)		
Absence	16 (18.2)		
Prior experience of coronary artery bypass grafting			
Presence	26 (29.5)		
Absence	62 (70.5)		
Admissions to our hospital (number of times)			
First time	17 (19.3)	3.2	3.0
2	32 (36.4)		
≥3	39 (44.3)		

V. Results

1. Basic subject characteristics

Eighty-eight patients responded to the survey, giving a response rate of 86.3%. All responses were valid. Table 3 shows basic subject characteristics. (table 3)

2. Distribution of responses on the 6-point scale of patient satisfaction and mean scores

Figure 1 shows the distribution of responses on the 6-point scale of patient satisfaction for each item, mean scores, standard deviations, and results of Bonferroni test. There were significant differences in mean satisfaction scores among the eight items by one-way layout ANOVA. The highest mean score was E) "procedures during angiography and interaction with the hospital staff", and the lowest was B) "testing and pre-procedures that are necessary for angiography". (figure 1)

3. Comparison by mean scores according to patient characteristics and distribution of responses on the 6-point scale of patient satisfaction

Figure 2 shows the items that demonstrated significant differences in mean satisfaction score when patients were grouped by certain characteristics. The item that showed a significant difference based on the presence or absence of experience with angiography was, "A) explanation of angiography in the outpatient setting and in brochures." Those who were undergoing angiography for the first time reported significantly lower levels of satisfaction compared with those who had previously experienced angiography.

In addition, the items that exhibited significant differences according to age were, E) "procedures during angiography and interaction with the hospital staff," and "G) care by and interaction with nurses in the hospital room after angiography." Those who were 70 years old and older reported significantly higher satisfaction, compared with those who were younger than 69.

(figure 2)

4. Influence of the presence or absence of requests for improvement in the critical pathway on mean levels of overall patient satisfaction

Table 4 shows the results of multiple linear regression analysis. Among the items regarding the presence or absence of a request for improvement in services included in the critical pathway, the items that showed significantly positive correlations with the mean score of overall satisfaction were, "time waiting for an explanation of angiography results," "ease of reading and understanding the brochure," and "timing of being given the brochure for angiography in the outpatient setting," in ascending order of standardized partial regression coefficient. "Absence of requests" for improvement in these items was associated with a better degree of patient satisfaction. (table 4)

5. Free comments

Table 5 summarizes additional requests by patients recorded in the section for free comments. Sixty-five patients (73.9%) mentioned additional requests. (table 5)

VI. Discussion

The mean score of overall patient satisfaction was 4.7 out of 6 points (78.3 out of 100 points) . Significant differences were found between the eight items in terms of degree of satisfaction. We need to further evaluate whether 78.3 points was a good outcome for this evaluation of the critical pathway.

Existing studies have suggested that evaluation of degree of satisfaction should use questions that reflect the behavior of patients who want to receive medical services at the facility in the future, such as "intention to continue utilizing this service" and "likelihood of recommending these services to others," and should not be evaluated only by surveys using "satisfied-dissatisfied type questions" (Imanaka, Araki, & Murata, 1993; Takyu, 1994) . Studies have suggested that the evaluation should make an effort to prioritize users' needs based on their expectations before receiving the medical services (Takyu, 1994) .

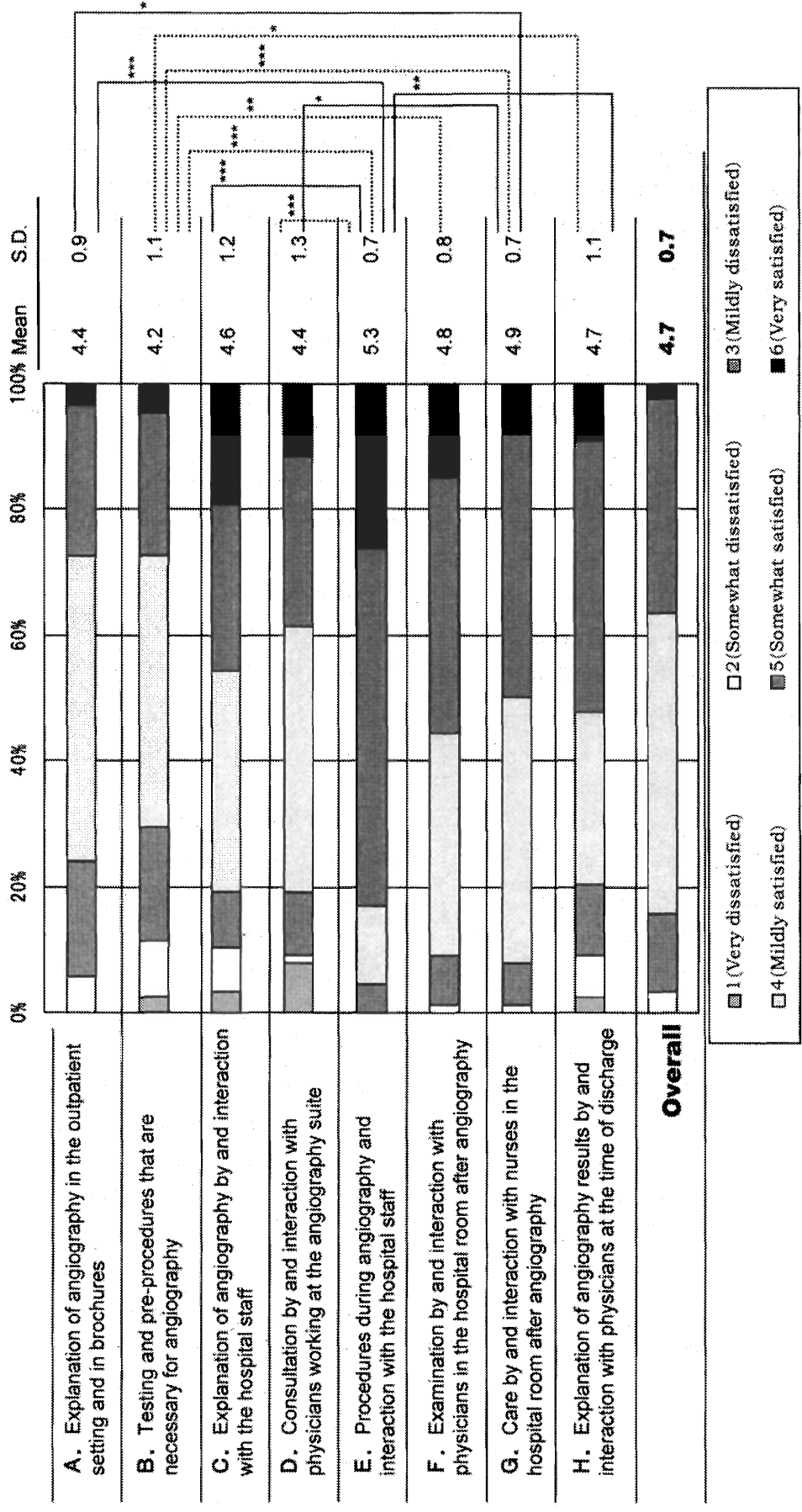


Figure 1. Distribution of responses on the 6-point scale of patient satisfaction and scores of 88 patients: Mean scores and standard deviations for overall satisfaction and for each service included in the critical pathway (8 items)

* $p < .05$, ** $p < .01$, *** $p < .001$ (by Bonferroni test with one-way layout ANOVA and Levene test)

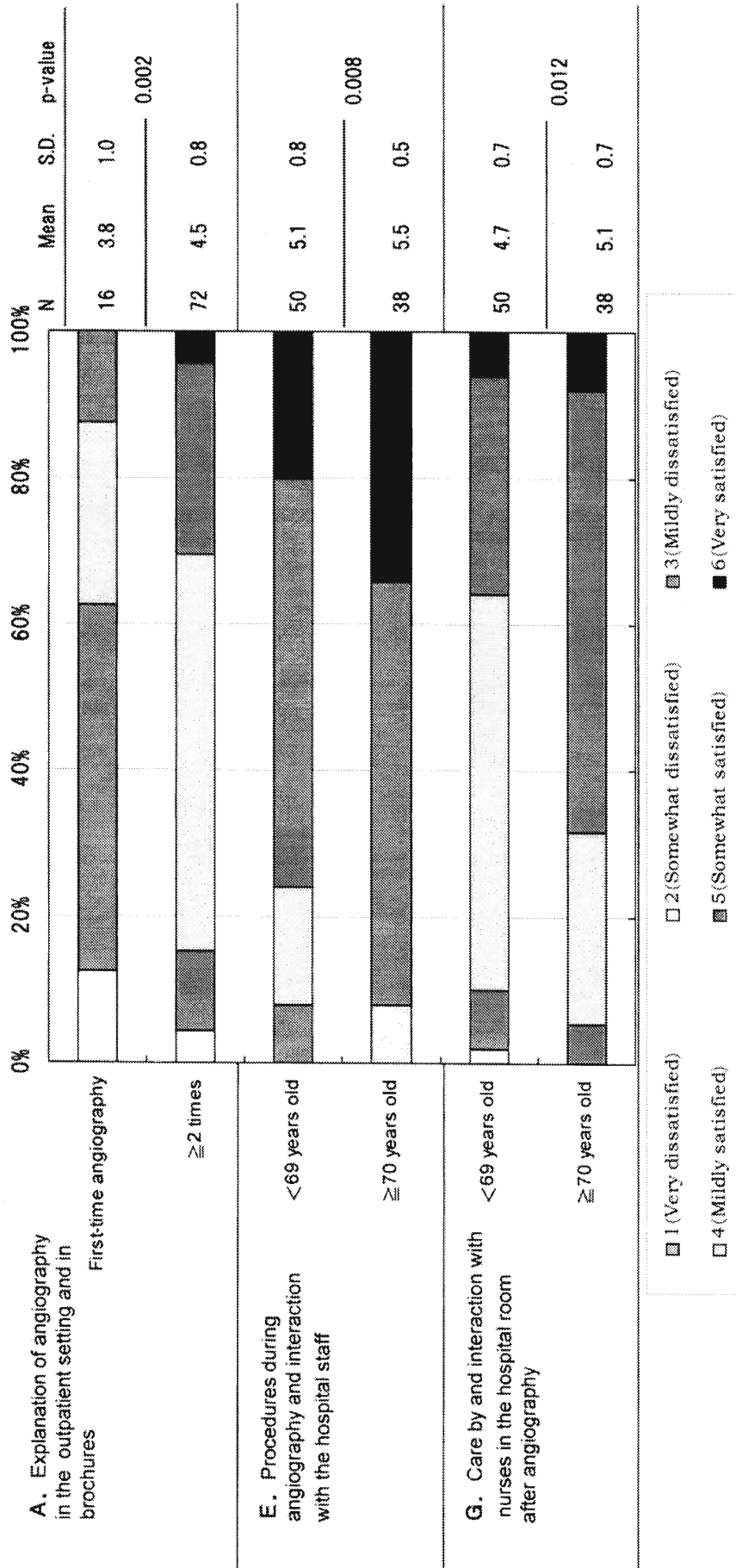


Figure 2. Comparison of the distribution of responses on the 6-point scale of patient satisfaction and the mean scores according to characteristics of the 88 patients: Mean scores and standard deviations for the items that showed significant differences (by t-test with Levene test)

Table 4. Influence of the presence or absence of requests for improvement in services included in the critical pathway (7 explanatory variables) on mean levels of overall patient satisfaction: Standardized partial regression coefficients by multiple regression analysis in 88 patients

Explanatory variables	Request presence / absence (number of patients)	Standardized partial regression coefficients	p-value
Before angiography			
Timing of being given the brochure for angiography in the outpatient setting	8/80	0.253	0.006
Ease of reading and understanding the brochure	17/71	0.286	0.002
Interaction with hospital staff during pre-procedures one day before angiography	9/79	0.134	ns
After angiography			
Time waiting for mobilization following bedrest after angiography	22/66	0.117	ns
Time waiting for an explanation of angiography results	23/65	0.399	<0.0001
Interaction with hospital staff at the time of admission and discharge procedures	14/74	0.062	ns
Duration of three-night hospitalization	21/67	-0.031	ns
Coefficient of determination adjusted for the degree of freedom			
Multiple correlation coefficient		0.664	<0.0001
Coefficient of determination adjusted for the degree of freedom		0.601	

Table 5. Free comments
(N=65)

Content	Number of patients
I Requests to the staff	38
1 Lack of consideration during procedures and care	18
2 Lack of explanation about angiography	13
3 Lack of explanation about the critical pathway (hospitalization program)	7
II Requests for improved health-care services	34
1 Dissatisfaction with the amenities	14
2 Requests and suggestions about hospital management	10
3 Dissatisfaction with meals	5
4 Dissatisfaction with the cost of health-care services	5
III Requests for improvement of the hospital system	9
1 Dissatisfaction with the complicated procedures for admission and discharge	5
2 Dissatisfaction with the duration of hospitalization	4

Other studies have suggested that the evaluation should focus on the relationship between health outcome as the goal of health care, including improvement in the standard of health and the degree of health recovery, and the degree of satisfaction (Ohwada, Gunji, & Imanaka, 1995) . In addition, studies have suggested that only those satisfaction surveys conducted by a third party are reliable (Ford, Bach, & Fottler, 1997) . Therefore, a need to develop better methods of evaluation exists and as a minimum, we need to improve services related to the items to which patients responded "3; mildly dissatisfied," or lower ("1; very dissatisfied," or "2; somewhat dissatisfied") .

Among such items, the following four items in particular, "B) testing and pre-procedures that are necessary for angiography," "A) explanation of angiography in the outpatient setting and in brochures," "D) consultation by and interaction with physicians working at the angiography suite," and "C) explanation of angiography by and interaction with the hospital staff" were associated with low mean scores, with a large portion of the responses being 1; "very dissatisfied" or 2; "somewhat dissatisfied." In addition, regarding the influence of the presence or absence of requests for improvement in services included in the critical pathway on overall satisfaction levels (Table 4) , the responses of patients who did not "request further improvement in the explanation of angiography and the critical pathway" were associated with a higher degree of satisfaction. Moreover, some responses in the section for "free comments" were consistent with these findings. We obtained these results even though over 80% of the patients in the present survey had previously experienced angiography. This indicates that patients need explanations and information regarding the testing and procedures that they are going to receive that are easy to understand, and have high expectations about their interactions with and attitudes of hospital staff that will allow them to undergo angiography with peace of mind. Previous satisfaction surveys also found that items that influence degree of satisfaction and intention to continue to receive medical services include, "subjective feelings of health recovery," "competence of the physicians," "environment in which medical

care is provided," "waiting time," and "reputation," as well as "explanations by physicians," "interaction with physicians," and "interaction with nurses" (Imanaka, Araki, & Murata, 1993; Takyu, 1994; Ohwada, Gunji, & Imanaka, 1995; Imai, Yang, & Kojima, 2000) . As is well known, the critical pathway is not simply a manual describing each step of the duties, but also represents "methods of informed consent and communication" between hospital health-care staff and patients, and is supposed to efficiently and effectively provide medical services that patients seek. Moreover, one of its ultimate goals is for patients and their family members to obtain relief, satisfaction, and improvement in the level and recovery of their health. Our results suggest that patients expect sensitive interactions in the daily duties of hospital staff, beginning with explanations in the outpatient setting to the time of discharge.

Those who were 70 years old and older showed significantly higher levels of satisfaction regarding two items, "E) procedures during angiography and interaction with the hospital staff," and "G) care by and interaction with nurses in the hospital room after angiography." Previous studies also suggest a tendency for elderly patients to have higher levels of satisfaction compared with younger patients (Takyu, 1994; Imai, Yang, & Kojima, 2000) . We are only able to speculate that elderly patients were either truly satisfied with the medical services and specialized professionals, or that they provided "lenient responses". However, because some elderly patients reported dissatisfaction due to lack of consideration by hospital staff and lack of explanation in the section for free comments, it is possible to conclude that these elderly patients gave generous answers. In addition, because the majority of the 14 patients who did not return the questionnaire were 70 years old and older, it is possible that the present survey did not include negative evaluations (non-response bias) (Eisen & Grob, 1979) . In any event, because the majority of patients in our study will continue to be elderly patients, we need to develop more reliable survey methods that will allow us to obtain an honest evaluation from elderly patients.

We also evaluated the influence on satisfaction level

of the presence or absence of requests for improvement in services included in the critical pathway (Table 4) . The request with the highest standardized partial regression coefficient was "time waiting for an explanation of angiography results." Those who did not have an unpleasant experience in this regard showed a tendency toward higher satisfaction. "Waiting time" is one of the issues raised by the management at outpatient facilities. The present study suggests that waiting time during hospitalization also influences the degree of satisfaction. When patients experience mistrust, such as "physicians and nurses did not keep to the time that they promised," or unpleasant feelings, such as "I felt tired because I had to wait," this experience could strongly affect the degree of satisfaction. In the future, we need to develop more strategic medical services for hospital management accompanying the prospective-payment system. As an initial theme, as an organization, we need to evaluate concrete strategies, for medical services that not only seek efficiency, but that patients truly trust, that make them happy to have chosen our hospital, and that do not make them feel uncomfortable.

VII. Conclusions

- 1) The mean score of overall patient satisfaction was 4.7 points (78.3 out of 100 points) . Significant differences were found in the degree of satisfaction between the eight items in the critical pathway.
- 2) Those undergoing their first angiography showed significantly lower levels of satisfaction regarding the explanation of angiography in the outpatient setting and in brochures, compared with those who had previously experienced angiography.
- 3) Compared with those who were 40-69 years old, those 70 years old and older showed significantly higher levels of satisfaction regarding the following two items, "procedures during angiography and interaction with the hospital staff," and "care by and interaction with nurses in the hospital room after angiography".
- 4) Dissatisfaction with the waiting time required for an

explanation of angiography results, with ease of reading and understanding the brochure before undergoing angiography, or with timing of being given the brochure had a significant affect on overall mean satisfaction scores. Furthermore, an increase in the number of elderly patients is forecasted for the future. We need to develop more reliable survey methods that can be easily administered to elderly people and that will allow us to obtain honest evaluations.

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