



Relationship between Diagnostic Disclosure, Patient Characteristics and Diet Compliance among 1 Month after Radical Operation for the Patients with Middle and Low Differentiated Gastric Cancer

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Abstract

Background: For patients with middle and low differentiated gastric cancer, will probably require postoperative adjuvant radiation therapy and chemotherapy at 1 month, so it is very important to improve the nutritional status by adjusting diet as advised by the doctor and nurse. Previous research was very little around the influence of diagnostic disclosure on diet compliance. The purpose of our study is to explore the relationship between the diagnostic disclosure and diet compliance.

Methods: On the third day after operation, we obtained the general information and diagnostic disclosure status from the patients and their families. The diet compliance was evaluated through reexamination or telephone follow-up 1 month after operation.

Results: Patients of knowing the diagnosis comprised 29.13% of the study sample. The diagnostic disclosure was significantly associated with age and family history. After the multivariate adjustment, the disclosure diagnoses is closely related to diet compliance (OR=5.701, 95% CI 2.336-13.915, $P \leq 0.001$).

Conclusion: The disclosure diagnoses was an important influence factor for diet compliance in patients with gastric cancer, the results provide important implications for China clinicians concerning the practice of diagnostic disclosure of gastric cancer to patients.

Keywords: Disclosure diagnoses; Diet compliance; Gastric cancer

Introduction

Gastric Cancer (GC), one of the most common malignant tumors, is the third leading cause of cancer related deaths worldwide [1]. The treatment of patients with gastric cancer remains a big challenge. Surgical resection is still the main treatment modality for it [2]. After gastrectomy, patients experienced reduced nutritional intake due to decreased gastric volume and intestinal dysfunction as a result of reconstruction of digestive tract, which result in post-gastrectomy syndrome and malnutrition [3-6]. Malnutrition after gastrectomy increases the incidence of incision infection [7], and significantly and adversely affects overall survival [8]. In addition, middle and low differentiated gastric cancer will probably require postoperative adjuvant radiation therapy and chemotherapy at 1 month. The nutritional status is compounded by the postoperative adjuvant radiation therapy and chemotherapy, conversely, Body Weight Loss (BWL) at 1 month after surgery affects compliance with adjuvant S-1 chemotherapy and survival of gastric cancer patients [9,10]. Therefore, patient's nutrition status at 1 month after operation is particularly important. How to improve the nutritional status of patients is the current research focus. As we know, normal diet and Oral Nutrition Supplement (ONS) are the main ways of nutrition supply after gastric cancer operation. Doctors and nurses always give diet guidance to patients in different ways and methods. However, in practical follow-up work, many patients dietary compliance was low, ignored the importance of diet and nutrition, it may have something to do with they don't know true diagnosis. In China, diagnostic disclosure was a challenge for physicians who work with gastric cancer patients. Most of doctors would not tell the diagnostic disclosure to their patients. Surgeon's preference is to discuss diagnosis with patients' families. This situation is similar in many countries [11,12]. Out of concern for patients,

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few families will tell the true diagnosis to them. Previous research centered around the relationship between diagnostic disclosure and depression [13], quality of life [14], pain [15], levels of hope [15], and very little around the influence of diagnostic disclosure on nutritional status and dietary compliance. The purpose of our study is to explore the relationship between the diagnostic disclosure and postoperative nutritional status, so as to provide new reference for improvement of malnutrition of gastric cancer.

Methods

Statistical methods

By cross-section survey, the patient characteristics of middle and low differentiated gastric cancer were collected. In addition, this study adopted the prospective cohort study to obtain the outcome information of 1 month after radical operation included diet compliance, anxiety and depression, etc.

Patients and data collection

Patients undergoing radical gastrectomy, aged 41 to 84 years old, were recruited continuously from the Department of Gastric and Colorectal Surgery of the First Hospital Affiliated to Jilin University in Changchun, China, from November 2020 to January 2021. This study complies with the Declaration of Helsinki and was approved by the ethical committee of the First Hospital Affiliated to Jilin University, included 127 patients with a 1-month follow-up. We finally included 125 cases in this study after excluding 2 cases that were death.

Inclusion Criteria were as follows: (1) Patients diagnosed by pathology or cytology. (2) Underwent radical gastrectomy for gastric cancer. (3) >18 years old. (4) Get informed consent from patients' families.

Exclusion Criteria were as follows: (1) Cognitive impairment. (2) Cannot take food by eating. (3) With severe dysfunction. (4) Communication barriers exist.

Research contents

During hospital: Day 3 after operation, the main caregivers of patients are given a unified diet education in a fixed classroom, the education include: diet guidance of 1 month after operation, diet principles, diet precautions, prevention and management of complications of diet and methods of oral nutrition supplement, at the same time, the main caregivers of patients complete the questionnaire, which mainly includes the general information, disease-related information and living habits of the patients. Researchers pull the main caregivers of patients into Wechat group during the course. After the course, the researchers comes to patient bedside to give one-to-one again education according to the results of the questionnaire survey for patients, what is more, checking information of questionnaire, and complete answering questions and dispel doubts. All subjects in this study adopted a unified nursing guidance program.

After leave hospital: Researchers push diet related health guidance in Wechat group every day, and reply the patient's questions, when necessary to give at Videophone and Voicephone. The subjects will be followed-up after 1 month after operation by videophone and Voicephone, Videophone preferred. The follow-up contents mainly include: The survival state, health state, readmission, current weight, nutritional assessment, diet-related symptoms, diet compliance, quality of life, etc.

Research tools

Baseline survey: General information, the questionnaire was designed by the researchers themselves, included sex, age, marital status, residence, number of children, education level, family economic income, medical insurance. Patients' lifestyles included activity, diet, drinking, drinking tea, sleep, hypertension history, diabetes history, cardiac disease, smoking history, history of alcohol intake, digestive system disease history, and family history of gastric cancer, hyperlipidemia and Body Mass Index (BMI).

Patient-Generated Subjective Global Assessment, PG-SGA: Nutritional assessment was undertaken by using the Patient Generated Subjective Global Assessment (PG-SGA) [16]. This is the only validated and specific tool for a global nutritional assessment in oncology and has been used as the standard for nutrition assessment in oncology. The scale consists of two parts, a patient-completed component and a clinician component. The former consists of four parts, which weight loss, nutrition impact symptoms, nutritional intake and functional capacity. The later also consists of four parts (produces scores for diagnosis, age and metabolic stress, and a subjective physical examination assessing fat, muscle stores and fluid status). Finally, a global assessment of nutritional status is emerged. PG-SGA total scores range from 0 to 49 scores, and the higher score indicated the worse nutritional status, with triage recommendations as follows: Score 0 to 1 (no malnutrition), score 2 to 3 (suspected or mild malnutrition), score 4 to 8 (middle malnutrition), and score ≥ 9 (severe malnutrition).

Quality of life, QOL: The EORTC QLQ-C30, which is composed of the thorough health status, 5 functional scales (physical, cognitive, emotional, social and role functioning), and three scales for symptoms (fatigue, pain and nausea and vomiting), a scale for general health/QOL, five items for the evaluation of common symptoms related to cancer treatment (dyspnea, loss of appetite, insomnia, constipation and diarrhea), and an item for the assessment of the financial impact of the disease and treatment. The score of every scale ranges from 0 to 100, considering that higher scores for functioning and QOL indicate better performance, and higher scores for symptoms indicate greater intensity of the symptom [17].

The Hospital Anxiety and Depression Scale, HADS: The HADS is composed of 14 items (with scores from 0 to 3), divided into seven items for evaluation of Anxiety (HADS-A), and seven others for the evaluation of Depression (HADS-D). This scale has been validated for the Portuguese language and presents good validity and reliability levels [18]. The total score ranges from 0 to 21 in each subscale, and the higher score indicated the more serious anxiety and depression status. According to the literature, the cutting point adopted is a score equal to or greater than 8 as indicative of Anxiety (HADS-A), and a score equal to or greater than 9 as indicative of Depression (HADS-D) [18].

Karnofsky performance status (KPS) functioning scale: The KPS is a scale, which allows the evaluation of the functional capacity and the ability to perform the activities of daily living of cancer patients. The total score ranges from 0 to 100, and is established by means of observation by the health professional. Higher scores indicate better functioning capacity. This is a widely used functioning scale and its psychometric properties have been tested in several contexts [19,20].

Diet related symptom questionnaire: The questionnaire was designed by the research team by referring to the patients'

participation in the diet management manual and related literature, and evaluated by relevant experts. After pre investigation, it was further modified and improved. The questionnaire is composed of 12 items (with scores from 0 to 4), was assessed by likert 5-level scoring method, grading is as follows: Score 0 (not at all), score 1 (a little), score 2 (some), score 3 (quite), score 4 (very). The total score range is 0 to 44, lower scores indicate better status. Cronbach's α coefficient of the scale is 0.73.

Diet compliance questionnaire: The questionnaire was designed by the researchers themselves. The questionnaire is composed of 8 items (with scores from 0 to 4), was assessed by likert 5-level scoring method, grading is as follows: Score 0 (not at all), score 1 (a little bit of fitting), score 2 (some), score 3 (quite), score 4 (very). The total score range is 0 to 32, lower scores indicate better compliance. Cronbach's α coefficient of the scale is 0.80.

Statistical analysis

All statistical analysis were conducted with SPSS 20.0 (IBM Corp, Chicago, IL). Categorical variables were expressed as frequency and percentage, and the chi-square test or Fisher's exact test was used when necessary. The results of continuous variables were presented as means \pm Standard Deviations (SDs) and non continuous by median. For the comparisons between groups, χ^2 and Student *t* test or one-way ANOVA were conducted for categorical and continuous variables, respectively. In the multivariate analyses, we used the forward selection procedure to adjust for potential clinically relevant confounders. Statistical significance was defined as a *P* value <0.05.

Results

Patients' characteristics

A total of 127 consecutive patients with gastric cancer were included in the analysis. Patients aged between 41 to 84 years, with an average of 62.56 years (SD=10.12), 57 (44.9%) of the patients were old age, and 91 (71.7%) of the patients were males. The incidence rate of moderate to severe malnutrition based on PG-SGA score was 87.4%. 11.8% of the respondents came from city town. There are 14 (11.0%) underweight patients, and prevalence rate of having family history of gastric cancer was 11.8% in the study. See Table 1 for more Patients' characteristics.

The frequencies of diagnostic disclosure and related variables

Patients of knowing the diagnosis comprised 29.13% of the study sample. We compared patients with versus without diagnostic disclosure in bivariate analyses. There were no significant differences in gender, residence, marital status, education, family income, BMI, hypertension, diabetes, coronary disease, hyperlipidemia, anemia, digestive system disease, family history, smoking, alcohol drinking, PG-SGA score, pathological differentiation degree and diagnostic disclosure between the 2 groups. The diagnostic disclosure was significantly associated with age and family history. The incidences of diagnostic disclosure were significantly lower with age (Table 2).

Follow-up investigation

Results 127 cases were treated and 127 cases were followed up 1 month after operation, among which 2 cases suffered die, 7 cases read. Moderate to severe malnutrition occurred in 119 cases and incidence rate was 95.2%. Afterwards, postoperative diet compliance, percentage of weight loss, quality of life, and diet related symptom of patients in two groups (knowing the diagnosis group and ignorant of

Table 1: Demographic characteristics of cancer patients.

Variables	N	%
Gender		
Male	91	71.7
Female	36	28.3
Age (y)		
<60	70	55.1
≥ 60	57	44.9
Marital status		
Married	118	92.9
Single	9	7.1
Residence		
Urban	74	58.3
Rural	53	41.7
Education level		
primary school and below	39	30.7
junior secondary	39	30.7
senior and junior college	31	24.4
bachelor degree or above	19	14.2
Family income		
≤ 20000 RMB/year	43	33.9
2-50000 RMB/year	47	37.0
5-80000 RMB/year	26	20.5
≥ 80000 RMB/year	11	8.7
BMI		
Underweight (<18.5)	14	11.0
Normal weight (18.5-23.9)	66	52.0
Overweight (24.0-27.9)	40	31.5
Obese (≥ 28.0)	7	5.5
Hypertension	30	23.6
Diabetes	12	9.4
Coronary disease	16	12.6
Hyperlipidemia	18	14.2
Anemia	13	10.2
digestive system disease	58	45.7
Family history	15	11.8
Smoking	68	53.5
Alcohol drinking	63	49.61
PG-SGA score		
<2	5	3.9
2-3	11	8.7
4-8	50	39.4
≥ 9	61	48.0
Pathological differentiation degree		
middle differentiation	49	38.58
low differentiation	78	61.42
diagnostic disclosure		
no	90	70.87
yes	37	29.13

Table 2: Relationships of diagnostic disclosure to Sociodemographic and clinical characteristics of all patients.

Variables	Disclosure (N=36)	Non disclosure (N=89)	P value	χ^2/t value
age	57.94 ± 9.41	64.62 ± 9.65	0.001	-3.528
History family			0.012	8.092
yes	9	6		
no	27	83		

Only statistically significant ($p < 0.05$) results are listed

Table 3: The follow-up outcome of 127 patients.

Variables	N/mean ± SD	%
Patients 'outcomes		
Alive	125	98.43
Death	2	1.57
Readmission	7	5.51
Complication	14	11.02
KPS	86.52 ± 6.68	
Quality of life	52.85 ± 6.67	
Diet related symptom	5.72 ± 4.48	
Diet compliance	17.31 ± 4.93	
Percentage of weight loss scores	5.62 ± 5.81	
PG-SGA score	8.09 ± 4.35	
<2	4	3.20
2-3	4	3.20
4-8	79	63.20
≥ 9	40	32.00

Table 4: Follow-up information of disclosure and non disclosure groups.

Variables	Disclosure (N=37)	non disclosure (N=90)	P value	χ^2/t value
Diet related symptom	6.03 ± 4.89	5.59 ± 4.32	0.618	0.500
PG-SGA	9.00 ± 4.37	7.67 ± 4.32	0.249	1.163
KPS	86.19 ± 6.69	86.67 ± 6.74	0.790	-0.268
Quality of life	53.81 ± 6.85	52.40 ± 6.62	0.436	0.787
HADS-A	7.68 ± 4.08	7.57 ± 4.38	0.897	0.130
HADS-D	6.38 ± 4.41	7.17 ± 4.35	0.894	-0.924
Percentage of weight loss scores	3.34 ± 6.81	6.58 ± 5.07	0.004	-2.932
Diet compliance	20.41 ± 4.90	16.03 ± 4.37	<0.001	4.941

the diagnosis group) were appraised and compared. The mean diet compliance score of the 125 complete questionnaires was 20.41 ± 4.896, percentage of weight loss scores of 5.62 ± 5.806 percent, diet related symptom scores of 6.03 ± 4.885, KPS scores of 86.52 ± 6.678 and quality of life scores of 53.81 ± 6.846 (Table 3).

Influence factors of diagnostic disclosure

Results there was no significant difference in diet related symptom, PG-SGA, KPS, total score of quality of life, anxiety and depression between the 2 groups. The diet compliance score of the knowing the diagnosis group was more significantly than that the ignorant of the diagnosis group, and the differences were statically significant ($P < 0.001$). The percentage of weight loss was 3.34 ± 6.812% and 6.58 ± 5.071% in the knowing the diagnosis group and ignorant of the diagnosis group respectively, there was significant difference in the comparison of the two groups ($P = 0.004$) (Table 4).

Table 5: Relationships of diet compliance to demographic characteristics.

Variables	N	diet compliance Mean ± SD	P value	F/t value
Gender			0.114	-1.590
Male	89	16.82 ± 4.89		
Female	36	18.36 ± 4.95		
Age (y)			0.220	-1.234
<60	69	17.75 ± 5.12		
≥ 60	56	16.66 ± 4.67		
Marital status			0.948	-0.065
Married	117	17.26 ± 4.92		
Single	8	17.38 ± 5.48		
Residence			0.565	0.577
Urban	73	17.48 ± 4.86		
Rural	52	16.96 ± 5.08		
Education			0.018	3.470
primary school and below	39	15.79 ± 4.28		
junior secondary	38	19.03 ± 5.02		
senior and junior college	30	16.40 ± 4.84		
bachelor degree or above	18	18.17 ± 5.28		
Family income			0.531	0.738
≤ 20000 RMB/year	43	17.00 ± 5.03		
2-50000 RMB/year	46	16.74 ± 4.61		
5-80000 RMB/year	25	18.04 ± 5.20		
≥80000 RMB/year	11	18.73 ± 5.44		
BMI			0.853	0.262
Underweight (<18.5)	13	16.69 ± 5.91		
Normal weight (18.5-23.9)	66	17.05 ± 4.97		
Overweight (24.0-27.9)	39	17.82 ± 4.84		
Obese (≥ 28.0)	7	17.29 ± 3.82		
Hypertension	29	16.66 ± 3.92	0.451	-0.879
Diabetes	12	18.67 ± 6.30	0.302	1.036
Coronary disease	16	17.25 ± 3.68	0.990	-0.012
Hyperlipidemia	18	16.39 ± 4.67	0.418	-0.812
Anemia	13	17.23 ± 4.25	0.980	-0.026
digestive system disease	57	17.44 ± 4.88	0.719	-0.361
Family history	15	18.60 ± 5.05	0.265	-1.119
Smoking	66	16.32 ± 4.53	0.023	2.305
Alcohol drinking	62	16.40 ± 4.52	0.053	1.956
PG-SGA score			0.075	2.358
<2	5	20.20 ± 7.83		
2-3	10	15.80 ± 4.32		
4-8	50	18.32 ± 4.88		
≥ 9	60	16.38 ± 4.64		
Pathological differentiation degree			0.398	0.863
middle differentiation	49	15.44 ± 3.13		
low differentiation	76	17.36 ± 6.12		
diagnostic disclosure			<0.001	4.748
no	89	16.03 ± 4.40		
yes	36	20.31 ± 4.93		

Table 6: Factors related to diet compliance from multivariate logistic regression models.

Variables	β	Wald	aOR	95% CI	P value
Education level					
primary school and below	Reference				
junior secondary	1.768	10.429	5.860	2.004-17.140	0.001
senior and junior college	0.569	0.946	1.766	0.562-5.550	0.331
bachelor degree or above	0.715	1.155	2.044	0.555-7.523	0.282
Disclosure diagnoses					
no	Reference				
yes	1.741	16.024	5.701	2.336-13.915	<0.001

The patients were dividing into two groups according to the mean of diet compliance

Influence factors of diet compliance

We used one-way ANOVA and Student t test to analyze the relationship between variables and diet compliance (Table 5). Secondly, we analyzed the variables ($P \leq 0.2$) in research sample, using multivariate linear regression analysis. Divide our patients into two groups according to mean of diet compliance (17.26 ± 4.935). After the multivariate adjustment, the disclosure diagnoses is closely related to diet compliance (OR=5.701, 95% CI 2.336-13.915, $P \leq 0.001$), compared with primary school and below group, junior secondary group has better diet compliance (OR=5.860, 95% CI 2.004-17.140, $P=0.001$) (Table 6).

Discussion

In the current study, 29.13% of gastric cancer patients were aware of their diagnosis during hospitalization. This percentage is similar to that found in Zhao's study of gastric cancer patients in Ningxia, China [21]. A study have shown that 97% of US physicians reporting that they routinely inform patients of their cancer diagnosis [22], disclosure of a cancer diagnosis is a common and accepted practice in most Western counties. However, our doctors informed always diagnosis to patient's families rather than patients themselves. Families decide whether or not to disclosure the diagnosis to patients according to their physical and psychological state. The differences in research results of disclosure could have been owing to differences in characteristics, cultural and geographical of recruitment hospitals. What we found in the study is the incidence of moderate and severe malnutrition in patients with gastric cancer is 87.4%. Chen XY found that the proportions of cachexia in patients with gastric cancer were 54.3% to 87.3%; this result is measured by four different measuring tools [23]. Another research which about patients with gastric cancer, at baseline, 3 and 12 months, 61%, 62% and 60%, respectively, were moderate and severe malnutrition [24]. Malnutrition increased risk of surgical site infections of patients with gastric cancer [25], affected the prognosis of patients with gastric cancer [26]. Therefore, for patients with gastric cancer, nutrition is extremely important. In the logistic regression analysis, we found that family history of gastric cancer were associated with disclosure diagnoses, the diagnoses of patients who were more aged was less likely to have been disclosed. This result is consistent with the previous reports [27,28]. It may be that the elderly patients have more basic diseases, weaker mental endurance. Compared with the elderly, younger patients bear more family and social responsibilities, often was able to face the true diagnosis, so the family is more willing to tell the true condition. Moreover, for the patients who have a family history, their illness perception is intense, can easier to think the cancer, so their families

prefer reveal the real disclosure diagnoses. From the follow-up data, the mean (\pm S.D.) of diet compliance in the disclosure group (20.41 ± 4.90) was significantly higher than that of the non disclosure group (16.03 ± 4.37); the percentage of weight loss scores was significantly positively related to diet compliance. Although similar studies have not been found in disclosure diagnoses, our guess is that it's to do with the patients in the disclosure group were more careful to disease rehabilitation and perhaps. In addition, we found that four variables had no significant associations with disclosure diagnoses: Diet related symptom, Quality of life, anxiety, and depression. Other studies have also found the un correlation between disclosure diagnoses and anxiety/depression [21,29]. Lin reported that Taiwanese patients with prostate cancer, who were aware of their cancer, were more satisfied of their therapy sessions and pain control and had better quality of life [30]. Hosaka found that the occurrence of psychiatric disorders in patients of disclosure diagnoses was not much different than in those who were not informed [31]. In a study from Japan, Horikawa showed that, on patients who were not aware of diagnosis and referred to psychiatrics, demonstrated a higher level of anxiety, irritability and suicidal ideation [32]. Based on above results, it seems that hiding diagnosis from patients is unhelpful for their psychology, quality of life and some more. On multivariate logistic regression analysis with adjusted odds ratio for the associations, the level of education and disclosure diagnoses were influence factor for diet compliance. On the patients of diet compliance, compared with primary school and below group, junior secondary group was better, however interestingly, the senior and junior college as well as bachelor degree or above group were no difference. Perhaps it was because the patients with high education level tend to have critical thinking to accept suggestions, they belief they have the ability to acquire disease-related knowledge from books, media and other learning materials, so they accept the suggestions of medical staff selectively.

Conclusion

The study discover that the disclosure diagnoses was an important influence factor for diet compliance in patients with gastric cancer, look at it this way, out of protection to patients, non disclosure diagnoses, is not necessarily beneficial for patients. Our results provide important implications for China clinicians concerning the practice of diagnostic disclosure of gastric cancer to patients.

Clinical Implications and Study Limitations

Few researches have been designed to investigate the effect of disclosure diagnoses on nutritional status. Our research uncovered that disclosure diagnoses during hospitalization was closely correlated with diet compliance and weight loss 1 month after surgery. However, our study has some limitations. First, the objects of study were drawn from two groups (disclosure diagnoses group and no disclosure diagnoses), but, what's the extent of disclosure was not expounded in detail. Second, total sample size was small; the patients' nutritional status and diet compliance 1 month after operation was not further extensions. These limitations will be perfected in our later research.

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