

Can Cancer Patients Seeking a Second Opinion Get Better Care?

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Objectives: To investigate whether cancer patients who sought a second opinion received better medical care.

Study Design: A total of 1358 newly diagnosed colorectal cancer patients undergoing resection were identified from Taiwan's National Health Insurance Research Database between 2004 and 2008. The frequency of doctor shopping and hospital shopping in the 6 months before resection was used to define "seeking a second opinion."

Methods: A generalized hierarchical linear model was used to determine the influence of doctor shopping and hospital shopping on in-hospital complications and prolonged hospitalization after colorectal resection.

Results: The risk of in-hospital complications for heavy doctor shoppers was significantly higher than that for patients who were not doctor shoppers (odds ratio [OR] = 1.675, $P = .037$). However, the risk was significantly lower for heavy hospital shoppers compared with those who were not hospital shoppers (OR = 0.272, $P = .007$). The frequency of doctor shopping and hospital shopping was not significantly associated with prolonged hospitalization.

Conclusions: For colorectal resection patients, the selection of a proper hospital for surgery resulted in better surgical care. The quality of surgical care was worse with heavy doctor shopping. We suggest that healthcare authorities disclose data about the quality of a hospital's cancer treatment to increase patient access to such information. This may help patients find quality healthcare providers more quickly and reduce the waste of medical resources resulting from the long process of seeking medical care.

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The development of public insurance and the availability of media for medical information have reduced the obstacles that hinder patients from seeking medical care and raised patients' consumer awareness.¹ With the ability to choose a preferred treatment, patients can seek a second opinion for the same illness to receive better quality of medical care.² Unlike the 1-way medical care of the past, patients can now not only spontaneously seek the medical care that they need, but also change their healthcare provider if they are dissatisfied with their first provider.³ However, in view of increasing medical expenses, many researchers have examined hospital shopping or doctor shopping to test the hypothesis that seeking a second opinion could cause a financial burden on the medical care system.⁴⁻⁶

Seeking a second opinion is defined as seeking medical care from more than 1 physician for the same condition. Compared with the judgment made by only 1 physician, a diagnosis made by multiple doctors is considered less likely to be inaccurate and can reduce a patient's anxiety.^{4,7,8} Most previous studies have evaluated the seeking of a second opinion by patients with specific conditions such as upper respiratory diseases, pulmonary tuberculosis, cancers, neurologic disorders, or polypharmacy.^{5,9-11} A patient's targets for comparison include both physicians and hospitals. Factors influencing a patient's choice of a hospital include reputation, service volume, location, cost, and the patient's own previous experiences.¹²⁻¹⁴ Factors important in the choice of a physician include the physician's attitude, treatment recommendations, and patient satisfaction with that physician's care.¹⁵⁻¹⁷ Patients select a preferred care provider after a thorough comparison of all these factors.

There are 3 broad areas in the research on seeking a second opinion. One area of research has been to study the characteristics of patients who are on the receiving end of poor communication.^{2,18,19} A second area involves investigation into the motives for seeking a second opinion.^{18,20} A few studies have evaluated the results after seeking a second opinion.^{18,21-23} Some earlier studies found that improperly seeking a second opinion could waste medical resources and should be avoided.¹⁸ In addition, patients tended to feel even more lost if the second physician made the same diagnosis. Conversely, some researchers suggested that when there are diagnostic differences between the first and second opinions, the second opinion could be help-

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ful for providing proper medical care and avoiding excessive or insufficient treatment.^{21,22}

Due to the nature of their disease and the potential harm from toxic treatment modalities, cancer patients are more likely to seek a second opinion. According to studies, nearly 60% of cancer patients have sought a second opinion.^{24,25} A diagnosis of cancer is a great shock to a patient, and cancer patients often have many questions about their diagnosis and treatment. If they do not obtain satisfactory answers from the first physician, patients go to other doctors for reassurance about their disease.^{10,18} In some instances, seeking a second opinion is beneficial for cancer patients. Reassurance from another physician could increase a patient's confidence in the treatment. Furthermore, there may be differences in testing methods, medications, therapeutic techniques, and medical teams in different hospitals. During the process of seeking a second opinion, patients can choose a medical technology that is newer, more effective, or more suitable for them.¹⁰ Because of patient psychological factors and the development of therapeutic technologies, perhaps second opinions should be advised for cancer patients.

Although seeking a second opinion is increasingly common for cancer patients, little is known about the relationship between seeking a second opinion and the outcomes of medical care. Therefore, we investigated whether cancer patients who sought second opinions received better medical care. Through the process of hospital or surgeon selection, we assumed that patients had more chances to choose a better medical team with better therapeutic skills. Therefore, we inferred that seeking a second opinion could be helpful in getting better care. Using colorectal resection patients as an example, the aim of this study was to determine the relationship between seeking a second opinion and therapeutic outcome.

METHODS

Study data came from Taiwan's National Health Insurance Research Database (NHIRD), which was provided by the Bureau of National Health Insurance in Taiwan for research purposes. The National Health Insurance program in Taiwan contains data on more than 99% of the entire population of 23.74 million people. The NHIRD is a national and representative database that contains comprehensive claim records of outpatient, inpatient, and emergency care. These data were cross-checked and validated to ensure accuracy.^{26,27} We used

Take-Away Points

Seeking second opinions increases the cost of medical care. However, seeking second opinions might be recommended for cancer patients due to the variety of cancer treatments.

- Among colorectal resection patients in Taiwan, those who were heavy hospital shoppers had a lower risk of in-hospital complications, whereas those who were heavy doctor shoppers had a higher risk of in-hospital complications.
- Prolonged hospitalization was not significantly affected by frequencies of hospital shopping and doctor shopping.
- Information on quality of cancer care should be disclosed to help patients shorten their process of seeking medical care.

the database for a sampled cohort of 1 million people from 2004 to 2008. We also used admission files from the population-based inpatient expenditures database from 2004 to 2005.

From the hospitalization claims data of 1 million randomly chosen patients in NHIRD from July 2004 to November 2008, we identified patients who were newly diagnosed with colorectal cancer as a primary or secondary diagnosis 6 months before surgery (*International Classification of Diseases, Ninth Revision, Clinical Modification [ICD-9-CM] codes 153.XX or 154.XX*). We excluded patients with anal tumors (*ICD-9-CM code 154.2*) because surgical resection is not usually considered first-line treatment for this disease. For patients who underwent multiple surgical resections, data from only the first operation were analyzed.

We used doctor shopping and hospital shopping in the 6 months before surgery as second opinion-seeking behaviors. The number of physicians or hospitals that patients consulted about their colorectal cancer was calculated after the operating physician or hospital was excluded. Patients who shopped for 0, 1, and 2 or more physicians were classified as non-doctor shoppers, light doctor shoppers, and heavy doctor shoppers, respectively. Hospital shoppers were classified using the same criteria. Sex, age, Charlson Comorbidity Index (CCI) score, urbanization level, site of the tumor, use of preoperative screening colonoscopy, and use of preoperative chemotherapy were controlled for in the analyses. The urbanization level, which was developed by the Taiwan National Health Research Institute, was stratified into 7 classifications (I, II, III, IV, and $\geq V$) and ranged from greater to lower degrees of urbanization in the analyses.²⁸ Hospital characteristics obtained from the population-based inpatient expenditures database included in the analysis were accreditation level (academic medical center, regional, district), ownership (public, private), and average annual hospital volume for colorectal cancer surgery in 2004 and 2005.

Based on the study objective and the limitations of secondary data, we used in-hospital complications and prolonged

hospitalization as the indicators of surgical outcome. Mortality has been used to measure the quality of operations, and many studies have used mortality as a quality indicator following colorectal resection.²⁹⁻³³ The low number of deaths during a short surgical period, however, may result in a poor level of statistical confidence. Zheng and colleagues³⁴ suggested overcoming this problem by improving the selection of indicators, extending the study period, or enlarging the sample size. Therefore, we used in-hospital complications and prolonged hospitalization, which are intermediate clinical indicators, as the outcome measures. In-hospital complications were defined as infections and cardiovascular, respiratory, gastrointestinal, urologic, or other complications.³⁵⁻³⁷ Patients who developed any of these conditions were classified as having in-hospital complications. To avoid overestimating the incidence of complications, patients presenting with comorbidities 1 month before surgery were excluded. Not all complications are the result of bad care or lower technical skills, and the correlation between comorbidities and complications has been observed in colorectal cancer patients.³⁸ Therefore, prognostic factors, including patient characteristics and comorbid conditions, were controlled for in our analysis to reduce estimation bias. Furthermore, prolonged hospitalization was defined as a length of stay of more than 14 days.

The χ^2 test (or Fisher exact test, as appropriate) was used to explore the relationship between seeking a second opinion and outcomes of surgical care. In addition, data in the present study had a hierarchical structure, with patients nested within physicians and physicians nested within hospitals because the clustering effect and the dependence of observations within groups made the traditional regression model unsuitable. Considering the same size and that the dependent variables were binary outcomes, the 2-level hierarchical generalized linear model was applied (level 1 was the patient level; level 2 was the hospital level). The analyses were performed using the SPSS 17.0 (SPSS Inc, Chicago, Illinois) and HLM 6.02 (Scientific Software International, Inc, Skokie, IL) software packages. Significance was defined as a 2-sided *P* value of <.05.

Along with the hierarchical linear model, a null model with no predictor variables at any level was first used to verify suitability. A null model can measure the magnitude of variation in an outcome measure across the different levels. The proportion of the variance across different levels can be expressed as an inter-class correlation coefficient (ICC). For the 2-level dichotomous outcome model, the ICC between level 2 and the total variation was represented as $\sigma^2/(\sigma^2 + \pi^2/3)$.³⁹ After confirming the existence of significant variances among groups, further mean-as-outcomes models were applied to predict the intercept in level 1.

RESULTS

The study subjects included 1358 patients from 77 hospitals. Patient characteristics and surgical outcomes are shown in **Table 1**. There were 767 (56.5%), 434 (32.0%), and 157 (11.6%) non-doctor shoppers, light doctor shoppers, and heavy doctor shoppers, respectively. The non-hospital shoppers, light hospital shoppers, and heavy hospital shoppers totaled 978 (72.0%), 334 (24.6%), and 46 (3.4%), respectively. There were 77 hospitals where patients underwent surgery. Among hospitals, 24.7%, 61.0%, and 14.3% were academic medical centers, regional hospitals, and district hospitals, respectively. There were 22 (28.6%) public hospitals and 55 (71.4%) private hospitals. The mean annual hospital volume for colorectal surgery was 99.3 (± 128.8) patients. Complications during hospitalization occurred in 255 (18.8%) of patients, and prolonged hospitalization occurred in 631 (47.3%) of the 1333 patients who survived at least 14 days after resection.

Table 2 shows the relationships between seeking a second opinion and surgical outcomes. The incidence of in-hospital complications was 19.6%, 17.1%, and 19.7% for non-doctor shoppers, light doctor shoppers, and heavy doctor shoppers, respectively. The incidence of prolonged hospitalization was 48.8%, 46.7%, and 41.9% for non-doctor shoppers, light doctor shoppers, and heavy doctor shoppers, respectively. The frequency of doctor shopping was not significantly associated with surgical outcomes after a bivariate analysis. The incidence of in-hospital complications was 19.3%, 18.6%, and 8.2% for non-hospital shoppers, light hospital shoppers, and heavy hospital shoppers, respectively. Heavy shoppers had the lowest incidence of in-hospital complications, but this difference was not statistically significant. The incidence of prolonged hospitalization was 49.3%, 42.4%, and 41.3% for non-hospital shoppers, light hospital shoppers, and heavy hospital shoppers, respectively. Non-hospital shoppers had the highest incidence of prolonged hospitalization, but this difference was not statistically significant.

The results of the null models of hierarchical linear models demonstrated a significant variation in surgical outcomes among hospitals. The ICC of patients with the same hospital was 5.27% [0.114/(0.183 + 3.289); *P* = .003] for in-hospital complications, and the ICC of patients with the same hospital was 19.37% [0.790/(0.790 + 3.289); *P* <.001] for prolonged hospitalization. The variance in the null model was significant in level 2, suggesting that there were significant differences in the incidence of in-hospital complications and prolonged hospitalization among patients of different hospitals. This result indicates that it is suitable to use a generalized hierarchical linear model and further mean-as-outcomes

models. In further models, patient-level predictors were included in level 1, resulting in this equation:

$$\log\left(\frac{P_{ij}}{1-P_{ij}}\right) = \pi_{0j} + \pi_{1j}(\text{sex})_{ij} +$$

$\pi_{2j}(\text{age})_{ij} + \pi_{3j}(\text{CCI})_{ij} + \pi_{4j}(\text{urbanization levels I})_{ij} + \pi_{5j}(\text{urbanization levels II})_{ij} + \pi_{6j}(\text{urbanization levels III})_{ij} + \pi_{7j}(\text{urbanization levels IV})_{ij} + \pi_{8j}(\text{site of tumor})_{ij} + \pi_{9j}(\text{chemotherapy})_{ij} + \pi_{10j}(\text{colonoscopy})_{ij} + \pi_{11j}(\text{light doctor shopping})_{ij} + \pi_{12j}(\text{heavy doctor shopping})_{ij} + \pi_{13j}(\text{light hospital shopping})_{ij} + \pi_{14j}(\text{heavy hospital shopping})_{ij}$.

Further, hospital predictors are included in level 2, resulting in equations of $\pi_{0j} = \beta_{00} + \beta_{01}(\text{academic medical center})_j + \beta_{02}(\text{regional hospital})_j + \beta_{03}(\text{public hospital})_j + \beta_{04}(\text{hospital volume})_j + e_{0j}$. Age, CCI, and hospital volume were continuous variables. Therefore, we entered them in the model by subtracting them from the grand mean.

Table 3 shows the results of mean-as-outcomes models of hierarchical generalized linear models. The initial incidence of in-hospital complications was 21.32% (0.271/[1 + 0.271]). The risk of in-hospital complications was significantly higher for men than for women (odds ratio [OR] = 1.333; $P = .003$). The risk also increased significantly in older patients (OR = 1.023; $P < .001$) and those with higher CCI scores (OR = 1.076; $P = .004$), and the risk of in-hospital complications was significantly lower for those who received the preoperative screening colonoscopy (OR = 0.648; $P = .006$). After adjusting for other characteristics, heavy doctor shoppers were at a higher risk of in-hospital complications than non-doctor shoppers (OR = 1.675; $P = .037$). Conversely, heavy hospital shoppers had a lower risk of in-hospital complications than non-hospital shoppers (OR = 0.272; $P = .007$). The average incidence of prolonged hospitalization was estimated as 41.28% (0.703/[1 +

Table 1. Patient Characteristics, Hospital Characteristics, and Surgical Outcomes

Variable	No.	Percentage or Mean	SD
Patient characteristics			
Sex			
Female	566	41.7%	
Male	792	58.3%	
Doctor shopping			
None	767	56.5%	
Light	434	32.0%	
Heavy	157	11.6%	
Hospital shopping			
None	978	72.0%	
Light	334	24.6%	
Heavy	46	3.4%	
Urbanization level			
I (highest)	402	29.6%	
II	372	27.4%	
III	221	16.3%	
IV	214	15.8%	
≥V	149	11.0%	
Site of tumor			
Colon	574	42.3%	
Rectum	784	57.7%	
Chemotherapy			
No	1248	91.9%	
Yes	110	8.1%	
Colonoscopy			
No	324	23.9%	
Yes	1034	76.1%	
Age, y	1434	65.1	13.1
CCI score	1434	2.8	3.0
Hospital characteristics			
Accreditation level			
Academic medical center	19	24.7%	
Regional	47	61.0%	
District	11	14.3%	
Ownership			
Public	22	28.6%	
Private	55	71.4%	
Hospital volume	77	99.3	128.8
Surgical outcome			
In-hospital complication			
No	1103	81.2%	
Yes	255	18.8%	
Prolonged hospitalization			
No	702	52.7%	
Yes	631	47.3%	

CCI indicates Charlson Comorbidity Index; SD, standard deviation.

■ **Table 2.** The Results of χ^2 Tests for Seeking a Second Opinion and Surgical Outcomes

Behaviors	In-Hospital Complications (n = 1358)				Prolonged Hospitalization (n = 1333)			
	No	Yes	χ^2	P	No	Yes	χ^2	P
Doctor shopping			1.250	.535			2.529	.282
None	617 (80.4%)	150 (19.6%)			385 (51.2%)	367 (48.8%)		
Light	360 (82.9%)	74 (17.1%)			227 (53.3%)	199 (46.7%)		
Heavy	126 (80.3%)	31 (19.7%)			90 (58.1%)	65 (41.9%)		
Hospital shopping			3.276	.192			5.723	.066
None	789 (80.7%)	189 (19.3%)			486 (50.7%)	473 (49.3%)		
Light	272 (81.4%)	62 (18.6%)			189 (57.6%)	139 (42.4%)		
Heavy	42 (91.3%)	4 (8.2%)			27 (52.7%)	19 (41.3%)		

0.703]) among hospitals. The risk of prolonged hospitalization also increased significantly in older patients (OR = 1.028; $P < .001$) and those with higher CCI scores (OR = 1.059; $P = .001$). However, the frequencies of hospital shopping and doctor shopping were not significant predictors of prolonged hospitalization after adjusting for other characteristics.

DISCUSSION

We found that the factors that influenced the incidence of in-hospital complications for colorectal resection patients were sex, age, CCI score, the screening colonoscopy, doctor shopping frequency, and hospital shopping frequency. After controlling for patient and hospital characteristics, heavy doctor shoppers were at a higher risk of in-hospital complications than non-doctor shoppers. Conversely, heavy hospital shoppers had a lower risk of in-hospital complications than non-hospital shoppers. In addition, prolonged hospitalization was significantly influenced by age, CCI score, and whether a patient had the preoperative screening colonoscopy. Nevertheless, after controlling for patient and hospital characteristics, the frequencies of doctor shopping and hospital shopping were not significantly associated with prolonged hospitalization.

With regard to the risk of in-hospital complications, we found that heavy doctor shoppers were at a higher risk than non-doctor shoppers, which suggests that the quality of care was not enhanced for patients who were heavy doctor shoppers. Previous studies have demonstrated that a patient's choice of a physician is influenced by the professional knowledge, skills, and attitude of the physician. Patients can obtain more accurate therapeutic information after seeking a second opinion, which leads to a higher level of satisfaction with their treatment.^{17,40} Our finding is not in accordance with the results of several previous studies, although no previous study has discussed the effect of doctor shopping on treatment outcomes

in detail. This finding was not surprising, as it confirmed what previous researchers have discovered about the generally poor health status of frequent doctor shoppers.² A possible reason for heavy doctor shoppers being at higher risk for in-hospital complications than non-doctor shoppers is that a longer delay from diagnosis to surgery negatively affects surgical outcomes. Some studies have indicated that longer delays for cancer surgery potentially influence prognosis.^{41,42} Therefore, we inferred that the behaviors of heavy doctor shoppers might increase the delay from diagnosis to surgery, which may result in worse surgical outcomes.

Another important finding in this study was that hospital shopping was significantly correlated with in-hospital complications. Heavy hospital shoppers had a lower risk of in-hospital complications than non-hospital shoppers. Previous studies have shown that hospital quality is 1 of the reasons why patients select a hospital for surgery. Patients choose a high-quality hospital based on a physician's recommendation, hospital reputation, or quality reports.^{13,14,43} In the present study, the effect of heavy hospital shopping on the incidence of in-hospital complications was not in favor of heavy doctor shopping. There may be more variation in the quality of hospitals than in the quality of physicians. Developing medical technologies have made medical care more complex, and complicated patients need professional teamwork for successful treatment. Other than physician skills, the quality of care is also correlated with hospital equipment and the abilities of medical professionals.⁴⁴ Cancer care requires the coordination of physicians, nurses, medical laboratory scientists, radiologists, and nutrition support staff, and several studies have reported that surgical outcomes are associated with professional staffing.⁴⁵ In addition, quality-of-care problems that lead to surgical complications include problems with technical care during a surgical procedure, problems with medications administered, failure to provide preventive care, and failure to monitor a patient's condition or medications.^{46,47} Preventing complications was associated not

Table 3. Results of Generalized Hierarchical Linear Model for Factors Influencing Surgical Outcomes

Factors	In-Hospital Complications			Prolonged Hospitalization		
	OR	95% CI	P	OR	95% CI	P
Patient level						
Intercept	0.271	0.159-0.461	<.001	0.703	0.325-1.519	.366
Sex (reference: female)						
Male	1.333	1.107-1.606	.003	0.981	0.759-1.267	.882
Age	1.023	1.012-1.035	<.001	1.028	1.019-1.037	<.001
CCI score	1.076	1.024-1.131	.004	1.059	1.026-1.094	.001
Urbanization level (reference ≥V)						
I (highest)	0.930	0.585-1.479	.760	1.038	0.639-1.685	.880
II	0.982	0.676-1.425	.923	0.854	0.563-1.296	.458
III	0.996	0.583-1.699	.987	1.009	0.663-1.533	.968
IV	0.976	0.612-1.555	.919	1.124	0.673-1.877	.654
Site of tumor (reference: colon)						
Rectum	1.040	0.835-1.296	.726	0.896	0.745-1.076	.240
Chemotherapy (reference: none)						
	0.628	0.340-1.159	.137	0.805	0.533-1.216	.303
Colonoscopy (reference: none)						
	0.648	0.477-0.880	.006	0.697	0.569-0.854	.001
Doctor shopping (reference: none)						
Light	0.975	0.736-1.291	.860	1.177	0.864-1.603	.303
Heavy	1.675	1.032-2.718	.037	1.053	0.680-1.630	.817
Hospital shopping (reference: none)						
Light	0.926	0.624-1.375	.703	0.797	0.550-1.155	.231
Heavy	0.272	0.106-0.697	.007	0.773	0.364-1.641	.502
Hospital level						
Accreditation level (reference: district)						
Academic medical center	0.830	0.557-1.237	.356	2.169	0.939-5.012	.069
Regional	0.992	0.631-1.562	.973	1.924	0.958-3.864	.065
Ownership (reference: private)						
Public	0.775	0.501-1.200	.251	1.671	0.958-2.913	.070
Hospital volume	1.000	0.999-1.001	.900	0.998	0.997-1.000	.073

CCI indicates Charlson Comorbidity Index; CI, confidence interval; OR, odds ratio.

only with the skills of physicians and support staff, but also with the processes of care. The superior technique of medical professionals and superior management of a hospital can prevent and detect complications at an early stage. By receiving treatment in capable hospitals, patients can obtain better surgical care and higher-quality therapy.

In contrast, doctor shopping and hospital shopping conferred no significant effect on prolonged hospitalization, although they did significantly affect the risk of in-hospital complications. A possible explanation for this finding may be that prolonged hospitalization is both a medical indicator and a managerial indicator. In the present study, prolonged hospitalization, a measure for quality of care, conflicted somewhat

with the pressures to decrease health utilization.⁴⁸ Therefore, we suggest that other outcome measures (eg, recurrence, readmission rate) be considered to better examine quality of care.

There are several limitations in this study. First, we did not have information on cancer staging, which is an important factor that impacts surgical outcomes and is also an influential factor for patients seeking a second opinion. Nevertheless, the use of screening colonoscopy, which can effectively identify cancers in early stages, was controlled for in these analyses. Second, we used administrative data to determine the incidence of in-hospital complications. However, the accuracy of administrative data remains in doubt, as highlighted in previous studies.⁴⁹ In the present

study, the complication rate might be underestimated due to coding inaccuracies. Furthermore, all complications do not result from bad care. Although patient characteristics were controlled for in the present study, the use of complications as an intermediate outcome indicator is still limited. Conversely, using postoperative unplanned procedures as a complication marker may facilitate future outcome studies.⁵⁰

CONCLUSIONS

This is the first study, to our knowledge, to test the effects of seeking a second opinion on surgical outcomes in cancer patients. We found that colorectal cancer patients can obtain a higher quality of surgical care by selecting a hospital for their operation. However, heavy doctor shopping may be unfavorable to the quality of surgical care. We inferred that hospital shopping may be beneficial for patient care. Therefore, we suggest that healthcare authorities increase patient access to information about the quality of cancer care in various hospitals. This information may help patients shorten the process of finding quality healthcare providers; at the same time, it may help reduce the waste of medical resources that result from the long process of seeking care.

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