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Waiting Times between GP Consultation and Out-patient Consultation for Patients with Colo-rectal Cancer

Yo-Eun Kim

Senior Researcher, Department of Information, Korea Health Industry Development Institute

영국 대장암 환자의 대기시간에 관한 연구

한국보건산업진흥원, 산업정보단, 책임연구원

김 요 은

목적: 본 연구는 영국 남서부지역의 대장암 환자들을 대상으로 1차 진료기관 진찰 후 종합병원 전문의에 의한 진료 시까지의 대기시간을 환자의 인구학적 또는 임상학적 특성뿐만 아니라 지리적 또는 사회경제적 특성들을 고려하여 분석하고자 하였으며, 그 연구 결과를 토대로 의료서비스의 질적 향상을 도모할 수 있는 방안을 강구해 보고자 하였다.

방법: 본 연구는 진정한 의미의 '대기시간'을 분석하기 위해서 1991년 9월부터 1995년 8월 사이에 대장암으로 진단을 받고 정확한 진료 일이 명시된 2,223명의 환자 중 예약수술을 받은 1,919명의 환자(즉, 응급수술환자는 제외)만을 분석 대상으로 하였다. 대기시간 분석에는 일반 통계방법 및 다변량회귀분석 방법의 일종인 '콕스모델'이 사용되어졌으며, 특히 콕스모델을 이용하여 대기시간과 주요 변수들과의 연관성분석이 수행되어졌다. 분석에 사용된 주요 변수들은 연령 · 성별 등의 인구학적 특성, 병원규모 등의 임상학적 요인뿐만 아니라 치료지역 또는 환자의 집에서 병원까지의 거리 등의 지리적 특성 및 사회경제적 수준을 포함하였다.

결과: 평균대기시간은 66일이었으며, 그 중앙값은 30일로 나타났다. 치료지역($p<.0001$)과 병원규모($p=.0005$; 치료받은 환자 수를 기준으로 분류)가 다른 변수들의 간섭작용을 배제한 후에도 대기시간과 밀접한 연관성을 보였다. 반면, 연령, 성별, 병원까지의 거리 및 사회경제적 수준은 의미 있는 관련성은 없는 것으로 나타났다. 특히 치료지역들간 대기시간 차이는 치료지역별로 상이한 대장암 전문외과의사에 의한 수술 비율 및 표준화등록률과 상당한 관련성을 보이고 있다.

결론: 잠재적인 교란요인들을 고려한 후에도 치료지역간의 대기시간 차이가 나타나기 때문에 본 연구는 중요한 의료정책적 시사점을 내포하고 있다. 다시 말하면, 치료지역간 수술의 질을 포함한 의료서비스의 질적 격차는 반드시 시정되고 해소되어야 할 것이며, 이를 통하여 환자의 대기시간은 단축될 수 있고, 환자는 보다 양질의 의료서비스를 제공받을 수 있게 될 것이다.

Key Words: 대장암, 대기시간, 콕스모델, 표준화등록률, 지역차

Corresponding author : Yo-Eun Kim, Senior Researcher, Department of Information, Korea Health Industry Development Institute.
Tel: 02-2194-7489, Fax: 02-824-1761, E-mail: kimy@khidi.or.kr

INTRODUCTION

For both men and women colo-rectal cancer is very fatal in most western countries.[1-6] While most research has concerned about the incidence, the mortality or survival of colo-rectal cancer[6-27] very few studies have examined waiting times. Waiting times may be related to socioeconomic circumstances and geographical characteristics such as districts of treatment centres or distance from home to treatment centres. This study examines and analyses waiting times for those being referred from primary to secondary care. In particular, we look at the interval between the first GP consultation and the first out-patient consultation in the Wessex area. The analysis uses a Cox model (survival analysis) but the time interval used here is not that separating operation and death but waiting time instead. The aim of this study is to investigate how long cases with colo-rectal cancer wait from having GP consultation through seeing a specialist. Several variables such as age, gender, district of treatment centres, distance from home to a hospital, Carstairs deprivation scores and hospital size (based on number of cases treated) are controlled for through a Cox model. Tumour type and stage of disease at operation are not fitted for waiting time analysis since the GP would not have any information. In addition, cases who have emergency surgery are also ruled out in order to examine authentic 'waiting times'. Not only is the effect of other variables allowed for, but also a relative hazard (waiting time) between categories within a variable is demonstrated through a Cox model using waiting times.

DATA AND METHODS

The study uses data from cases with colo-rectal cancer in the Wessex region in southern England: this area covers Hampshire, Dorset, Wiltshire, the Isle of Wight and parts of Avon and Somerset. The data were obtained from the South and West Cancer Intelligence Unit based in Winchester and comprise the following: patient number, age, gender, site of tumour, stage of disease, surgery type (where elective or non-elective), postcode of residence, hospital code, district of treatment, date of first GP consultation, date of first out-patient consultation. There are 11 districts of treatment, corresponding to the main centres of examination and operations in the region.

Straight-line distances from home to treatment centres were calculated using grid references that corresponded to the postcodes of residences and hospitals. From a total of 1,919 cases having waiting times there were 119 cases (6.2%) with missing or unmatched postcodes.

The Wessex Cancer Audit database has no data, at an individual level, on the socio-economic status of patients. Thus, ward level Carstairs deprivation scores, based on 1991 Census data, were obtained using the postcodes of residence of patients. The Carstairs deprivation score is an unweighted composite score based on unemployment, overcrowding, lack of car and low social class.[28,29] The deprivation scores were divided into quartiles and then into two groups (the most deprived group and the other three quartiles).

For the analysis of a waiting time all 59 hospitals were grouped into three categories referred to for convenience as 'large', 'medium' and 'small' according to number of cases with colo-rectal cancer treated: 16 large hospitals ($\geqq$50 cases), 10 medium hospitals ($\geqq$10 to $<$50 cases) and 33 small hospitals ($<$10 cases).

ANALYSIS OF WAITING TIMES

This analysis uses two dates: dates of the first consultation with GP and the first out-patient consultation. Firstly, all 2,223 cases (43.2% of total cases) where both dates are present were selected from the total of 5,147 cases. Only patients having elective surgery were selected in order to look at authentic 'waiting times'. Two cases where the time difference

resulted in a negative waiting time were excluded. The cases are likely to have had out-patient consultation before the GP consultation due to some accident or emergency, although they are classified as having had elective surgery. As a result of the selection 1,919 cases (86.3% of 2,223 cases having two dates) can be used in the fitting of a Cox model using waiting times. Age, gender, district of treatment centres, distance between residence of patients and treatment centres, Carstairs deprivation scores and hospital size are utilised as covariates in a Cox model. This modelling is done in SPSS.

RESULTS

The mean waiting time of patients having elective surgery is 66 days (median: 30 days; Std. Dev.: 154.40); the minimum and the maximum waiting times are 0 day and 2,991 days (about 8 years) respectively. The proportion of patients where waiting time is zero is 4.6 percent (88 cases) of 1,919 cases having elective surgery (Table 1). Over a half (50.9%) of cases with elective surgery have the first out-patient consultation within 1 month after seeing GP and over four-fifths (83.7%) have a consultation with a specialist within 3 months of the GP consultation. About 7 percent of the 1,919 cases suffer a delay of over 6 months for seeing a consultant (Table 1).

Table 1. A proportion of cases having elective surgery by a waiting time

Waiting time	Cases	Percent	Cum percent
0 day	88	4.6	4.6
1 day to ≦1 week	265	13.8	18.4
>1 week to ≦1 month	624	32.5	50.9
>1 to ≦3 months	629	32.8	83.7
>3 to ≦6 months	177	9.2	92.9
>6 to ≦12 months	82	4.3	97.2
>12 months	54	2.8	100.0
Total	1919	100.0	

Table 2 shows the results from fitting a Cox model, where the response variable is the waiting time and the following variables are fitted as covariates: age, gender, district of treatment centres, distance from residence of patients to hospitals, Carstairs deprivation scores and hospital size based on number of patients treated. District where treated, and hospital size according to number of cases treated, are highly significant explanatory variables. However, gender (p=.3167), distance (p=.8520) and Carstairs deprivation scores (p=.1156) have no effect on waiting times. In addition, age is not significant (p=.1299) in this waiting time analysis. Therefore, the patient's age or gender does not influence waiting time. Neither does proximity to or remoteness from hospitals influence waiting time, nor does the socio-economic characteristics of the area from which are drawn does.

Table 3 examines differences in waiting times between districts of treatment centres. In particular, a waiting time in district H is significantly longer than that in other districts and all the other parameters are not significant. As Table 3 provides, district H shows by far the longest waiting time and districts K, B and J have the second, the third and the fourth longest waiting time. In contrast, districts G, F and E show a short waiting time.

There seems to be a weak relationship between a waiting time and a ratio of the operations by

Table 2. Variables by a waiting time in a Cox model

Variables	Chi-square	d.f.*	Significance
Age	7.1159	4	.1299
Sex	1.0027	1	.3167
District	52.7879	10	.0000
Distance	.7895	3	.8520
Deprivation scores (contrasting)	2.4761	1	.1156
Hospital size	15.1218	2	.0005

d.f.*: degree of freedom

Table 3. Waiting times by district of treatment in a Cox model (ranking*)

District	B†	Exp (B)‡ (95% CI)	Proportion of operations by specialists (%)
District H	-.5164	.5967 (.4514～.7887) (1)§	36.4
District K	-.2109	.8099 (.6542～1.0026) (2)	45.5
District B	-.1102	.8957 (.7101～1.1296) (3)	34.4
District J	-.1060	.8995 (.7205～1.1228) (4)	53.2
District C	-.0311	.9694 (.7849～1.1974) (5)	46.4
District A (reference category)	.0000	1.0000 (6)	43.7
District I	.0427	1.0437 (.8268～1.3174) (7)	57.7
District D	.0963	1.1010 (.8664～1.3992) (8)	36.5
District E	.1352	1.1448 (.8831～1.4841) (9)	79.1
District F	.1500	1.1618 (.9214～1.4649) (10)	60.5
District G	.2056	1.2283 (.9909～1.5226) (11)	47.3

*: Ranking; 1=lowest hazard (longest waiting time), 11=highest hazard (shortest waiting time), †: Log hazard, ‡: Hazard, §: Significant (based on 95% CI)

specialists (Table 3). Districts H and B having the longest and the third longest waiting time show the second lowest and the lowest proportion of surgery by specialists. District K with the second longest waiting time has also a comparatively low ratio of operations by specialists although district J with the fourth longest waiting time shows a relatively high proportion of surgery by specialists. In contrast, districts F and E having the second and the third shortest waiting times show the second highest and the highest proportion of specialist-surgery and district G with the shortest waiting time too has a comparatively high ratio of surgery by specialists. In short, differences in waiting times between hospitals may be a result of the proportion of surgery by specialists.

In addition, there may be some association between a waiting time and the incidence of the colo-rectal cancer. To investigate this we have calculated Standardised Registration Ratio (SRR) of the disease in each of the 11 districts of hospitals (Table 4). District H with the longest waiting time has the highest SRR and district B showing the third longest waiting time has the second highest SRR even though districts K and J having the second and the fourth longest waiting times show intermediate SRRs between districts of treatment centres in the Wessex region. In contrast, districts G, F and E with a short waiting time have a relatively low SRR.

Table 4. SRRs by district of treatment in Wessex region

District	SRR (Combined gender)
District A	103.56
District B	141.79
District C	111.31
District D	101.71
District E	68.04
District F	86.72
District G	80.13
District H	211.64
District I	55.28
District J	85.59
District K	84.29

*SRR 100=the national average

There is considerable difference in waiting times between hospitals based on number of cases treated (Table 5) and hospital size is strongly associated with

Table 5. Waiting times by hospital size in a Cox model

Hospital size	B*	Exp (B)† (95% CI)
Large§ (reference category)	.0000	1.0000
Medium§	.3389	1.4034 (1.1169～1.7634)‡
Small§	-.5827	.5584 (.3518～.8862)‡

*: Log hazard, †: Hazard, ‡: Significant (based on 95% CI), §: 16 large hospitals (≧50 cases); 10 medium hospitals (≧10 to ＜50 cases); 33 small hospitals (＜10 cases)

a waiting time in a Cox model (p=.0005; Table 2). The parameters are significant (Table 5). Medium hospitals have the shortest waiting time. However, patients treated in small hospitals incur the longest waiting times. Large hospitals do not show a short waiting time since patients having non-elective surgery were excluded in modelling.

DISCUSSION

In this study mean waiting time between the first GP consultation and the first out-patient consultation of patients with elective surgery is 66 days (median: 30 days). Other authors[30] found out that median waiting time from presentation to GP to out-patient appointment for large bowel cancer in Devon was 39 days. Median waiting time through out-patient consultation in the Wessex region is shorter as compared with that in Devon. Another authors[31] reported that mean waiting time from the first medical consultation to referral to specialists of 127 cases with colo-rectal cancer in two districts in the North-West region was 121 days. Mean waiting time (between GP consultation and out-patient appointment) of this study is shorter than that (from GP consultation to referral to specialists) of their study. However, the use of 'mean' waiting time may be of little value if some patients wait for a very long time such as 8 years in this study. Department of Health[10] points out that it may not be easy for GPs to detect cancers of the colon and rectum early since symptoms of the cancers are comparatively common in the general population and may reflect other diseases or conditions, such as haemorrhoids. However, other authors[30] mention that the reasons for delay by GPs or by staff in hospitals are complicated and suggest that further studies should be done.

This study has found out that district of treatment and hospital size based on number of cases treated are strongly related to waiting times from the first GP consultation through out-patient consultation. There is variation in waiting times between districts of hospitals after allowing for other factors. In particular, those in districts H, K, B and J wait for a longer time for seeing a consultant after having GP consultation than other districts of treatment centres whereas districts G, F and E have a shorter waiting time (Table 3) though only H seems very different from the 'norm'. Variation in waiting times from district to district may be associated with SRRs (Table 4) and the proportion of surgery performed by specialists (Table 3). On the whole, districts with higher SRR and a lower proportion of the operations by specialists are likely to be inclined to have a longer waiting time than other districts. This may be related to difference in loading of patients as compared with numbers of staff between districts of hospitals. Some authors[30] point out that there are striking variations in the waiting time from referral to first out-patient appointment or from first out-patient consultation to treatment for those with cancer of the large intestine between health districts in Devon, presenting a twofold difference in the waiting times between some two districts.

Hospital size based on number of patients treated has also been shown to be significant. Patients treated

in 10 medium hospitals (≧10 to ＜50 cases) wait for a shorter time than those treated in 16 large (≧50 cases) or in 33 small hospitals (＜10 cases). Those in small hospitals seem to wait for the longest time for the out-patient consultation after GP consultation (Table 5). Regretfully, this finding can not be compared with other studies due to lack of studies using waiting times with different hospital sizes. Further studies are needed.

Age and gender are not significantly associated with waiting times (Table 2). In addition, waiting times are unlikely to be affected by relative location from hospitals (distance between home and hospitals; Table 2). Deprivation is not significant (Table 2). However, other authors[31] mention that cases in low social class show a slightly longer delay than those in higher social class. Further research using individual data on socio-economic factors is required.

CONCLUSIONS

This study has found that district of hospitals and hospital size according to number of cases treated are very significant factors in explaining delay in referral for an out-patient consultation. Waiting times should be reduced and further relevant studies should be done since delay to a specialist by GPs is problematic and may obstruct appropriate medical care for the cases. The present study is valuable in having controlled for other variables. In addition, the variation in waiting times between districts of treatment centres may be related to quality of medical care including a proportion of the operations by specialists between districts of treatment centres.

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