Variation in radical resection for lung cancer in relation to survival

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NCIN national cancer intelligence network
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Introduction

Lung cancer is one of the most common types of cancer accounting for 1.3 million deaths per year world wide.[1] In 2006, around 39,000 people were diagnosed with lung cancer in the UK.[2] Five-year relative survival, diagnosed between 2001 and 2006, was 9% for men and 7% for women.[3] Non-small cell lung cancer (NSCLC) accounts for 80% of all lung cancers[4] and surgical resection is the most effective therapy for these patients.[5] In the UK around 10% lung cancer patients are resected.[6]

Objective

To explore the relationship between radical resection and survival for lung cancer. To see if overall survival increases with an increase in resection, and if survival in resected patients decreases with an increase in resection.

Methods

We extracted data on 175,369 persons diagnosed with lung cancer (ICD-10 C33-C34) between 1998 and 2003 from the National Cancer Repository Dataset.

We looked at survival among 151,965 (86.6%) patients who were diagnosed with non-small cell carcinoma (NSCLC) or with unspecified lung cancer.

We used Cox proportional hazards regression to asses the survival of all patients and of the resected patients in relation to the proportion of patients in Primary Care Trusts (PCTs) who were resected. We displayed these proportions in five quintiles of the proportion of resected patients, and we mapped this by PCTs.

We also looked at the survival of all patients and of the resected patients in relation to Government Office Regions (GOR) of residence.

Results

Figure 1 shows the geographical distribution of the five quintiles of radical surgery resection proportions in PCTs. The map indicated a lower proportion of patient's receiving radical surgery in South East England, but otherwise there was no obvious geographical pattern.

Examining all patients, 11% of patients received radical resection in quintile one compared to 4% in quintile 5 (table 1). The hazard ratios decreased with increasing radical resection. Adjusting for case-mix had no effect on the hazard ratios.

Restricting the analysis to resected patients, there was the opposite effect and resected lung cancer patients in quintiles with a high level of resection had the highest hazard ratio (table 2). Adjusting for case-mix attenuated the relationship, and reduced the hazard ratio in the highest quintile to 1.14.

South East England, North West, East Midlands and London were outliers compared with the rest of the GORs (figure 2).

Restricting the analysis to resected patients, the hazard ratios provided large confidence intervals which insinuated uncertainty about the hazard ratios; hence a large sample size is required to make a precise conclusion (figure 3).

Conclusion

Overall survival increases with an increase in resections, and survival in resected patients decreases with an increase in resections. Analysis suggest that the lung cancer survival in England could possibly increase if a larger proportion of patients were resected.

Figure 1: Geographical distribution of quintiles of the proportion of lung cancer patients who received radical surgery by PCT in England, 1998-2003.

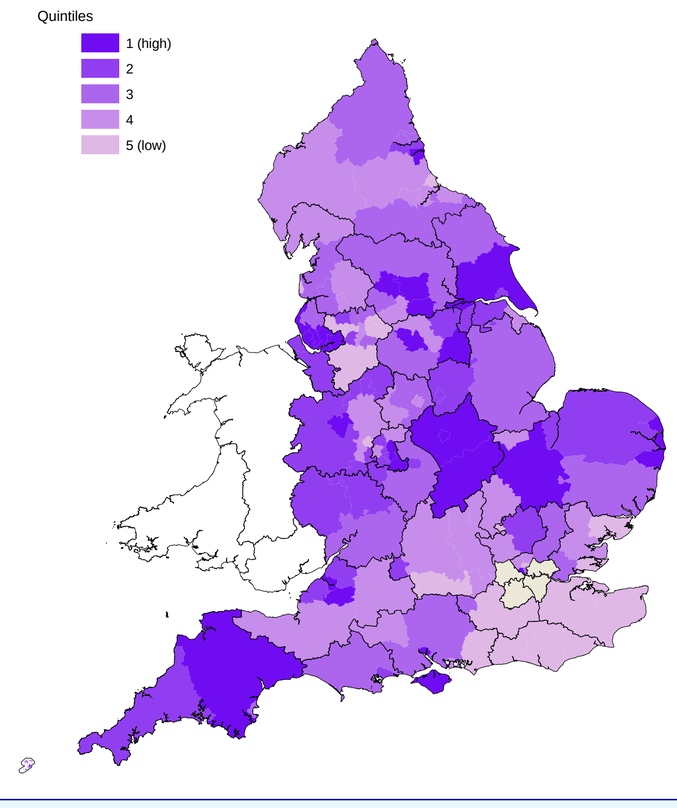


Table1: Hazard ratios (HR), 95% confidence interval (CI) and p-value for all lung cancer patients (excluding SCLC) diagnosed between 1998 and 2003

				Unadjusted		Adjusted*	
		Number of patients	Surgery (%)	HR	(95% CI)	HR	(95% CI)
Surgery quintile	1 (high)	30,956	11	0.96	(0.94- 0.97)	0.96	(0.95- 0.98)
	2	30,297	9	0.97	(0.95- 0.98)	0.97	(0.95- 0.98)
	3	30,036	8	0.98	(0.97- 1.00)	0.99	(0.97- 1.00)
	4	30,351	7	1.01	(0.99- 1.03)	1.01	(1.00- 1.03)
	5 (low)†	30,325	4	1.00		1.00	
	χ^2			44.33		44.40	
	p-value for trend			<0.001		<0.001	

*Case mix variables are age, sex and socioeconomic deprivation
†Baseline group

Table 2: Hazard ratios (HR), 95% confidence interval (CI) and p-value for resected lung cancer patients (excluding SCLC) diagnosed between 1998 and 2003

				Unadjusted		Adjusted*	
		Number of patients	Surgery (%)	HR	(95% CI)	HR	(95% CI)
Surgery quintile	1 (high)	3,542	100	1.19	(1.09- 1.31)	1.14	(1.04- 1.25)
	2	2,638	100	1.14	(1.04- 1.26)	1.09	(0.99- 1.20)
	3	2,327	100	1.09	(0.98- 1.20)	1.06	(0.96- 1.17)
	4	2,068	100	1.12	(1.01- 1.24)	1.10	(0.99- 1.22)
	5 (low)†	1,338	100	1.00		1.00	
	χ^2			12.78		5.65	
	p-value for trend			<0.001		0.02	

*Case mix variables are age, sex and socioeconomic deprivation
†Baseline group

Figure 2: Hazard ratios of 151,965 lung cancer patients (excluding SCLC) diagnosed between 1998 and 2003 (unadjusted) against radical surgery (%)

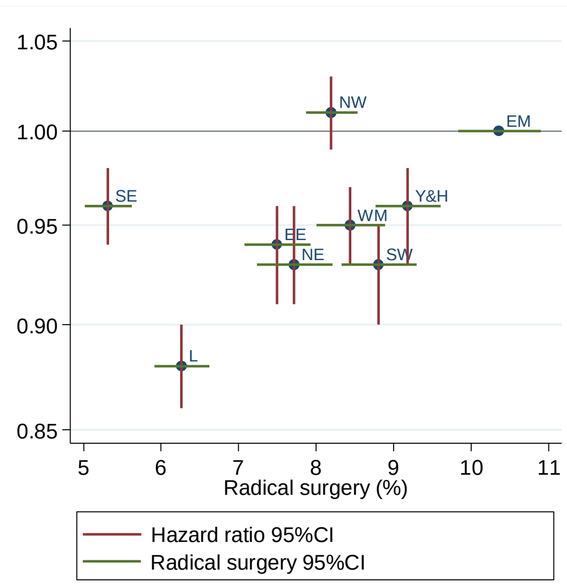
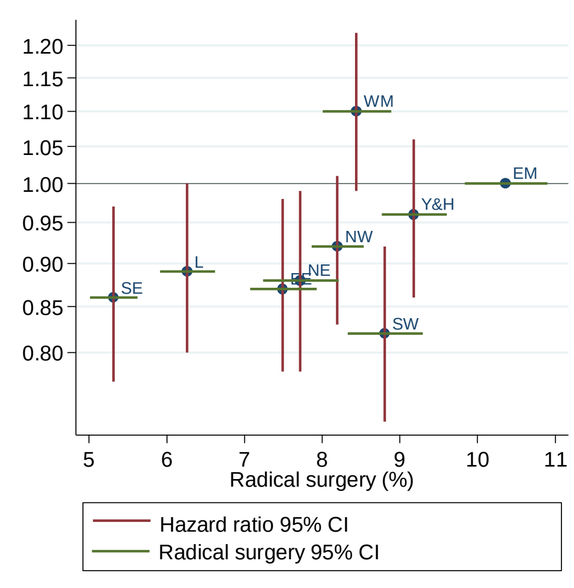


Figure 3: Hazard ratios of 11,913 resected lung cancer patients (excluding SCLC) diagnosed between 1998 and 2003 (unadjusted) against radical surgery (%)



Reference

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