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Original Article

The Elderly are Less Likely to Receive Recommended Radical Radiotherapy for Non-small Cell Lung Cancer

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Abstract

Aims: The National Institute for Healthcare Excellence recommends continuous hyperfractionated, accelerated radiotherapy (CHART), concurrent chemoradiation (cCRT) and stereotactic ablative radiotherapy (SABR) for appropriate patients with non-small cell lung cancer (NSCLC), but these are not universally available in all UK radiotherapy centres. Reduced access to these treatments may be contributing to reduced survival, with the concern that elderly patients are less likely to receive guideline-recommended therapy (GRT).

Materials and methods: We report a prospective, UK national study of patients treated with curative-intent radiotherapy for NSCLC over a 2 month period. Clinical oncologists in all UK radiotherapy centres were contacted and asked to complete a proforma on all patients treated with curative-intent radiotherapy.

Results: Three hundred and seventeen records were returned from 82% of centres. Only 49% (95% confidence interval 43–55%) of patients received the GRT for their tumour type. Patients aged 70 years or over were less likely to access GRT than those under 70 years (40% compared with 60%, $P = 0.001$), both as a result of clinicians offering therapy less frequently (52% compared with 65%, $P = 0.03$) and a higher refusal of therapy (22% versus 8%, $P = 0.02$). A reluctance to travel to a different centre was a key component of these decisions. SABR was delivered to only 52% of suitable patients, mainly because it was not available in the local centre.

Conclusions: In this study of UK curative-intent radiotherapy practice, a lack of local access seems to limit uptake of advanced radiotherapy techniques such as SABR, especially for patients aged over 70 years.

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Key words: Aged; lung cancer; radiotherapy

Introduction

Lung cancer is the leading cause of cancer-related death in the UK [1]. The elderly are predominately affected, with 62% of those diagnosed aged at least 70 years [2]. Seventy four per cent of histologically confirmed lung cancer is non-small cell lung cancer (NSCLC) [2]. After surgery, radiotherapy is the second most commonly used curative treatment for NSCLC. Radiotherapy treatments are delivered at 59 centres in the UK, with an emerging trend for therapies

such as stereotactic ablative radiotherapy (SABR) to be delivered at supra-regional centres. Research into radiotherapy treatments over the past two decades has improved outcomes. Altered fractionation, such as continuous hyperfractionated, accelerated radiotherapy (CHART), has improved overall survival [3,4]. In locally advanced disease, concurrent chemoradiation (cCRT) has improved outcomes, but with increased toxicity [5]. In localised disease, SABR has been associated with increased overall survival in some studies [6], but not all [7]. National guidance [8,9] provides standards for patient selection and treatment with radiotherapy, to maximise access to these therapies.

Outcomes for lung cancer are worse in the UK than for many other European countries [10]. This has been linked to both late presentation and reduced access to treatments.

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Only one half of patients receive guideline-recommended therapy (GRT) for NSCLC [11–13]. Advanced age was associated with reduced access in all these studies. Although recent reports have highlighted concerns about access for elderly patients in the UK, the reasons for this remain uncertain [14]. Access could be limited because clinicians do not offer a treatment or because patients declined a treatment. This study was designed to assess access to curative-intent GRT for patients treated with radical radiotherapy for NSCLC, and to determine the reasons underpinning these treatment decisions.

Materials and Methods

Consultant clinical oncologists working in UK radiotherapy centres were asked to complete an online proforma for all patients beginning radical radiotherapy for NSCLC between Monday 14 October 2013 and Friday 6 December 2013. Overall findings have been reported in a previous paper [15], and the variability in access between networks in an abstract [16]. Clinicians were asked to identify which patients were suitable, according to nationally agreed criteria for cCRT [8] (grade A), CHART [8] (grade A) and SABR [17] (grade B). They were also asked why they did not offer these techniques and, if the technique was offered, why patients refused it. Patients of at least 70 years of age were defined as elderly [18–20]. Baseline demographic factors known to affect treatment choice such as stage, age, percentage predicted forced expiratory rate (%FEV) and performance status [8] were analysed to see if these affected access. Patients from the same centre might be more likely to have the same outcome compared with patients from different centres. To allow for this, the analyses were carried out using multilevel statistical methods. Two-level models were used with patients nested within centres. Univariable logistic regression analyses of factors followed by a multivariable analysis were carried out. A backwards selection procedure was used to retain only those factors found to be associated with access to GRT. An additional set of analyses examined the reasons why therapy was not offered and also the reasons why patients declined therapy, using Fisher's exact test.

Results

Forty-five of an expected 59 centres returned 317 questionnaires; four additional centres had no patients, producing a centre response rate of 82%. There was no pattern to the 10 centres that did not take part; they included both small and large volume units and academic affiliated and non-affiliated institutions. A median of four questionnaires were returned for each department (range 0–25). One centre collected for only 2 weeks because of high patient throughput. Three (1%) patients were referred to a different centre for SABR. Data completeness was good, with stage recorded in 99% and performance status in 97%.

The baseline characteristics of the study population are shown in Table 1. The cohort had a median age of 72 years; 178 (56%) were at least 70 years old. Fourteen per cent had

dyspnoea on walking less than 100 yards; 26% were of poorer performance status (World Health Organization performance status 2+); 96% of patients were positron emission tomography/computed tomography staged; 42% were treated with radiotherapy alone, 20% with cCRT, 18% with sequential chemotherapy followed by radiotherapy, 12% with SABR and 8% with CHART; 97% of fractionation schedules were within the national guidance [9].

Two hundred and sixty-three patients (83%) were eligible for one of the guideline therapies (Figure 1). Those not eligible primarily received 55 Gy/20 fractions. Seventy-four patients were eligible for two GRT. If a patient received either of these, they were recorded as having received their GRT. For six patients it was uncertain if they were offered a GRT. Of the remainder, 59% ($n = 151$) were offered a guideline therapy and of these 15% ($n = 23$) declined a GRT. Of those eligible for GRT, 49% (95% confidence interval 43–55%) ($n = 128$) received the specified therapy. Multi-level logistic regression was used to examine factors associated with this outcome (Table 2). Patients aged over 70 years were much less likely to have access, with the odds of

Table 1
Patient and tumour characteristics

Overall number (n)	317
Age	
Median age (± 1 standard deviation)	72 (± 9) years
% patients aged ≥ 70 years	56%
Gender	
Male	179 (56%)
Female	138 (44%)
World Health Organization performance status	
0	17%
1	54%
≥ 2	26%
Unknown	3%
Pulmonary function	
Median %FEV1 (range)	72% (26–164%)
(data for 260 patients)	
Median % predicted transfer factor (data for 191 patients)	64% (24–133%)
Breathlessness	
Walks over 100 yards without dyspnoea	56%
Dyspnoea on walking 100 yards or less	14%
Unknown	29%
AJCC stage	
I	33%
II	15%
IIIA	28%
IIIB	24%
IV	0%
Missing	1%
Pathological subtype	
Adenocarcinoma	30%
Squamous carcinoma	46%
Other	9%
Radiological lung cancer	15%

Unless otherwise stated the denominators for analyses were 317. %FEV, percentage predicted forced expiratory rate; AJCC, American Joint Committee on Cancer.

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