Implications of a negative bronchoscopy on waiting times to treatment for lung cancer patients: results of a prospective tracking study

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Abstract

Objective: To ascertain the causes of delays in treatment to all patients presenting to our centre with a working diagnosis of lung cancer. All were entered prospectively into a ‘tracking study’. Methods: Of 342 consecutive confirmed cases of newly diagnosed lung cancer presenting between September 2003 and December 2005, 193 were general practitioner referrals and 149 presented through casualty and internal referrals. The former group formed the basis of the study. Of GP referral patients, 92 had a positive diagnostic bronchoscopy (group Bronch+). Their waiting times were compared with 94 others with negative result (group Bronch−). For uniformity of comparison the non-GP referral patients were excluded from this study. Results: There were no significant differences in the age, clinical presentation or clinical staging of the two groups. Bronch+ had higher proportion of male patients (p = 0.05). Bronch+ group had higher proportion of small cell and squamous cell carcinoma whereas Bronch− group had higher prevalence of adenocarcinoma (p = 0.02). More patients in Bronch− underwent curative (36 vs 18, p = 0.01) intent treatment. Though the median intervals (days) between the referral to first chest outpatient appointments were similar between the two groups (1 vs 1, p = 0.89), the intervals from out-patient to decision-to-treat (33 vs 57, p = 0.001) and decision-to-treat to treatment (8 vs 12, p = 0.05) were significantly longer for Bronch− group. Overall the median referral to treatment interval for Bronch− was significantly longer compared to Bronch+ (45 vs 75, p = 0.001). Most of these delays occurred in the intervals from outpatient appointments to decision-to-treat. Conclusions: A negative initial bronchoscopy in a suspected lung cancer patient implies a greater potential for excessive delays in diagnosis and treatment in spite of a greater chance of curative treatment. Most of the delay occurs in the interval from the outpatient appointment to decision-to-treat. Patients with negative bronchoscopy require a more concerted effort to achieve a timely diagnosis and treatment.

Keywords: Lung cancer; Bronchoscopy; Waiting times

1. Introduction

Lung cancer is the commonest cancer in the United Kingdom (UK) with an annual incidence of 35,000 new cases every year. The prognosis of lung cancer has remained poor with mean survival in UK of less than 6 months and 5-year survival of 5—10%. The UK has been reported to have the lowest survival and resection rate in the western world. Late presentations along with delays in diagnosis and staging are thought to contribute to poor outcomes for these patients [1].

The National Cancer Plan was launched in the UK in September 2000 to improve management of all types of cancers including lung cancer [2]. It recommended the introduction of multi-disciplinary team meetings and the maximum waiting time targets of 14 days from urgent GP (general practitioner) referral to first outpatient assessment for all types of cancers [source: http://www.nice.org.uk/pdf/CG024niceguideline.pdf, accessed on 3 Sep 2007]. It further recommended a target of maximum wait of 31 days from diagnosis (decision-to-treat) to treatment, and 62 days from GP referral to first mode of treatment.

The targets were rolled out in stages for different cancers. Accordingly it was applied to breast cancer by year 2002 and extended to all cancers including lung cancer by year 2005. Despite these guidelines and introduction of multi-disciplinary team meetings, many patients still wait excessively for treatment. To monitor the waiting times to treatment at University of South Manchester Hospital NHS Trust (UHSMT), all patients presenting to us with a working diagnosis of lung cancer were entered prospectively into a ‘tracking study’. This cohort of patients was investigated to assess how the result of the first bronchoscopic examination affected the waiting times to definitive treatment of lung cancer patients.
2. Methods

From September 2003 to December 2005 all suspected primary lung cancer referrals to the UHSMT respiratory physicians were tracked prospectively to identify patients with newly diagnosed lung cancer by a dedicated audit officer (PQ). The majority of patients presenting via GP as urgent referrals, tend to follow a standard pathway. However patients presenting by other referral routes often do not follow a standard pathway and they tend to take a number of complex routes to achieve the diagnosis and treatment. To ensure satisfactory capture of all the patients presenting by standard or non-standard routes of referral, additional methods of identification of cases, such as regular interval screening of histology results, CT scan reports, ICD codes, thoracic surgery database and Macmillan referrals were used. For this study only patients who presented to us as primary referrals were included and those who came to us as secondary referrals for oncological services from other centres were excluded.

All suspected lung cancer referrals to UHSMT are first assessed by respiratory physicians. They complete the primary diagnostic work-up including chest X-ray, bronchoscopy, lung function tests, CT scan ± needle biopsy. The patients are then discussed at the multi-disciplinary team (MDT) meetings. PET scans were not routine in the early part of study but have become routine in the later part of the study. Following discussion at the MDT the treatment plans are formulated and appropriate specialist referrals are made.

Patients presenting via the urgent GP referral tend to follow a standard pathway and are more homogenous as a group. We chose this group for this study as the NHS Cancer Plan waiting time targets [2] are more suitably applicable to this group. Waiting times to treatments were calculated as median days (inter-quartile range) in accordance with the National Cancer Plan guidelines [Cancer waiting targets: A guide (Version 5) available at www.dh.gov.uk, accessed on 13 Sep 2007]. The urgent GP referrals to date first seen in out-patients were calculated by subtracting dates of urgent GP referrals from the dates first seen in chest out-patients clinic. Similarly urgent GP referrals to dates of first definitive treatments were calculated by subtracting dates of urgent GP referrals from the dates of commencement of first definitive treatments (any of the three modalities). Date of decision-to-treat (DTT) was mostly taken as the date on which the diagnosis was communicated to the patient along with the discussion of the treatment plans. Intervals from DTT to treatment were calculated by subtracting DTT from the dates of first treatments. For this study the waiting time intervals were not adjusted by stopping the clock for any reasons.

The GP referral patients were divided into two groups based on the outcome of first diagnostic bronchoscopy, performed mostly by the attending respiratory physicians. Those in whom the bronchoscopies lead to a positive diagnosis were included in Bronch+ group and those in whom they were not successful in obtaining the diagnosis were included in Bronch− group. The two groups were compared using a statistical software package. Numerical data were compared using t-test or Mann–Whitney test and categorical data were compared using chi-squared test, as appropriate.

3. Results

During the study period 342 patients were confirmed to be new lung cancer patients. One hundred and ninety-three (55%) of them presented via the standard pathway through GP referral. The remaining 149 (45%) presented through a non-standard pathway via casualty and internal referrals. Seven GP referral patients did not undergo bronchoscopy and were excluded from this study. One hundred and eighty-six GP referral patients underwent bronchoscopy out of which 92 resulted in a positive diagnosis (group Bronch+). Their waiting times were compared with the remaining 94 patients whose bronchoscopy results were negative (group Bronch−).

Overall the male to female ratio was 1.8:1 with mean age of 68.1 ± 9.5 years. Group Bronch+ had significantly higher proportion of male patients (67/92 vs 49/94) (p = 0.05). The age distributions were similar with means of 68.8 ± 10 versus 67.5 ± 11 in Bronch+ and Bronch− groups respectively (p = 0.35). Histology was not available in 14 patients in Bronch+ group. Bronch+ had a higher proportion of squamous cell carcinoma (38 vs 20, p = 0.02) and small cell carcinoma (23 vs 11, p = 0.01). In contrast Bronch− had a higher proportion of adenocarcinoma (15 vs 28, p = 0.02) (Fig. 1).

TNM staging was inappropriate (diagnosis small cell) or unavailable for 28 and 18 patients in the Bronch+ and the Bronch− respectively. There was no significant difference between the two groups in terms of stage of disease at the time of presentation (Fig. 2). Twenty-one patients in the Bronch+ and 18 patients in the Bronch− did not undergo any treatment because of patient wishes or deterioration. The group Bronch+ underwent a significantly higher chemotherapy treatment (49 vs 32, p = 0.05) in contrast to the Bronch− group, which underwent a significantly higher surgical resection (29 vs 8, p = 0.001) reflecting more peripheral tumours in the later group (Fig. 3). Overall a significantly higher number of patients underwent curative intent treatment in the Bronch+ group (36 vs 18, p = 0.05).

The times from GP referrals to chest out-patient appointments (OPA) in median days (inter-quartile range, IQR) for Bronch+ and Bronch− were 1 (0–5) and 1 (0–4), which were similar p = 0.83. Intervals from OPA to DTT were significantly longer in Bronch− [57 (40–90) vs 33 (24–40) days, p = 0.001] as shown in box plot in Fig. 4. Decisions-to-treat were made mostly after obtaining histological diagnosis. Once the decision-to-treat was reached the

![Fig. 1. Comparison of histological cell types between two groups.](https://academic.oup.com/ejcts/article-abstract/34/3/479/379559)
median times to chosen first treatment were 8 (4–13) and 12 (6–25) days in Bronch+ and Bronch− respectively, which were also significantly different (p = 0.018) (Box plot Fig. 5), although well within the recommended 31-day target. Overall GP referral to treatment took a median of 45 (37–60) and 75 (54–107) in Bronch+ and Bronch− respectively (Fig. 6) which were significantly different (p = 0.001).

4. Discussion

Negative impact of delays in presentation, diagnosis and treatment of lung cancer has been thought to be one of the important factors contributing towards poor outcome of lung cancer patients. This study emphasises that the delays in the lung cancer patient’s journey [3,4] have persisted in spite of these new guidelines.

Delays in lung cancer treatment can be divided into two phases: pre-hospital delay (patient presentation to GP referral) and hospital delay (GP referral to actual treatment). Previous studies have investigated the causes of pre-hospital delays. In a recent study investigating causes of delayed presentation Corner et al. concluded that patients present to GPs after long delays amounting up to 18 months [5]. They have shown that individuals, regardless of the stage of their disease or their social background, failed to recognise the warning symptoms for a prolonged period of time reaching several months before seeking medical attention. After they eventually reach the GP, there is often a period of further delay at GP surgery. Bjerager et al. have reported a median GP delay of 32.5 days in a study from Denmark [6]. In their study the important reasons for delays in primary care in Denmark were: frequency of symptoms not related to chest, chest X-ray non-suspicious of cancer, comorbidities, waiting times for investigations and lack of explicit follow-up appointments.

Our paper concentrates mainly on hospital delays in the secondary care settings. This study shows that although most patients are seen within 2 weeks of GP referral and treatments are carried out promptly after decisions-to-treat are made. However there are still excessive delays in the process of diagnosis and decision making, which are more marked for patients with negative bronchoscopy. Similar delays have been reported from other European countries [7,8] and Canada [9,10]. None of these reports however have compared the patients according to the bronchoscopy findings. Though DTT to treatment also took longer in Bronch− group, reflecting more curative treatment, the waiting times were well within the recommended limits in both groups. Most of the delays occurred in the interval of out-patient to decision-to-treat.

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Fig. 2. Comparison of TNM staging between Bronch+ and Bronch− groups.

Fig. 3. Comparison of the first treatment methods between Bronch+ and Bronch− groups.

Fig. 4. Box plot comparing out-patient’s appointment to decision-to-treat interval of between two groups.

Fig. 5. Box plot comparing decision-to-treat to treatment interval between the two groups.
Fig. 6. Box plot comparing referral to first methods of treatment between the two groups.

We [11] and others [12] have previously investigated the causes of hospital delays in treatment of lung cancer patients. Due to limitations on resources in the National Health Service (NHS) some amount of waiting times for access to diagnostic and therapeutic facilities [12,13] are inevitable. Although resources are an important issue, careful planning and reorganisation of resources are of equal importance. Reporting from a UK teaching Hospital, Lee et al. have previously shown that it is possible to improve the lung cancer services [4] by restructuring of existing resources. Patients whose bronchoscopies were negative required multiple further investigations such as repeat bronchoscopies, percutaneous/open biopsies, and mediastinoscopy/otomy to diagnose and stage the disease. Bronch− group also underwent significantly greater number of curative intent treatments including surgical resections. This required more work-ups such as echocardiogram, exercise test and bone scans etc. to assess the fitness for treatment. Additionally there is a short but definite waiting list for surgery and radical radiotherapy, which were more often employed in the Bronch+ group. The cumulative effects of additional investigations resulted in significantly longer waits in the Bronch− group. This fact also explains the reasons why most of the delay occurred in the interval from the out-patient appointment to DTT. Once the decision is made most of the patients were treated within the prescribed target time limit of 31 days.

Available data from the rest of the UK are in agreement with our data that the two weeks referral to out-patients and 31 days diagnosis to treatment targets are being achieved in most of the patients irrespective of bronchoscopy findings. Sixty-two days GP referral to treatment interval data is available only for Scotland, which was met in 83% of cases in the first quarter of 2007 [Source: http://www.scotland.gov.uk/Topics/Health/health/cancer/waiting-times, accessed on 3 Sep 2007]. Waiting times for cancer treatments are one of the key determinants of hospital performances and receive a lot of attention. In an audit from James Cook University Hospital [Source: http://www.cancerimprovement.nhs.uk/documents/lung/18.05%20Audit%20of%20breaches.doc. Accessed 3rd Sept. 2007] causes of breaches were found to be complex diagnostic pathway/requirement of multiple diagnostic tests, inter-hospital transfers, inadequate access to radiological tests, interdepartmental transfers, waits for radiotherapy and access to pathology reports.

The finding that there is a greater chance of curative treatment including surgery in the negative bronchoscopy group is not surprising. It is a common clinical observation that most of the patients who have positive bronchoscopy tend to have large bulky central tumours, which reduce their chance of curative treatment. Those who have negative bronchoscopy tend to have more peripheral tumours, amenable to curative intent treatment.

In the light of this study now we treat patients with negative bronchoscopy as patients who are most likely to suffer delays. When needle biopsies are inconclusive we proceed to thoracotomy with frozen section without losing any more time, when the imaging results are highly suggestive of malignancy. We have a more focused discussion with the radiologist whether it is mandatory to obtain histology and where we could initiate treatment without further chasing the histology. There are dedicated slots made available for investigations such as CT scans, needle biopsies etc. which do not need prior booking. The reporting systems have been improved so that the scan and pathology results are available to the clinician as soon as they are ready.

5. Conclusion

A negative initial bronchoscopy in a suspected lung cancer implies a greater chance of a curative treatment but also a greater potential for excessive delays in diagnosis and treatment. Most of the delay occurs in the interval from the outpatient appointment to date of decision-to-treat. Patients with negative bronchoscopy require a more concerted effort to achieve a timely diagnosis and treatment.

References


