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Overview

Decision Making in Lung Cancer – How Applicable are the Guidelines?

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Abstract

Modelling demand for radiotherapy is contingent on the uniform application of clinical practice guidelines. However, decision making in lung cancer is a complex process requiring the integration of multimodality treatment in patients who frequently have underlying comorbidities. Population studies have shown that guideline adherence in lung cancer is modest, ranging from 44 to 52%. The application of guideline treatment decreases with increasing age and the presence of comorbidities. Patient and clinician attitudes also impact on this. In some regions, sociodemographic factors, such as lower income and non-White race, have been associated with a lack of guideline treatment. One of the major barriers in treating lung cancer patients according to guidelines is the mismatch between the clinic population and those enrolled in clinical trials from which evidence is derived. The lung cancer clinic population often consists of patients who are older, have multiple comorbidities and are of borderline performance status, all characteristics that are usually exclusion criteria for clinical trials. Hence, there is uncertainty not only about the magnitude of benefit, but also potential toxicities of guideline treatment. Further research is necessary in order to define the best treatment in these patients and thus increase the applicability of guidelines to the general lung cancer population. Lung cancer is an extreme example of the difficulties in translating evidence into clinical practice. The applicability of guidelines to specific cancer populations will affect the modelling of demand for radiotherapy and other treatment modalities.

Key words: Guidelines; lung cancer; patterns of care; quality of care; radiotherapy; variation

Statement of Search Strategies Used and Sources of Information

References from previously authored manuscripts on the use of guideline treatment in lung cancer were reviewed. These were further updated up to March 2014 using Medline and PubMed searches using the terms 'lung neoplasms', 'guidelines' and 'patterns of care'. Articles were selected on the basis of studies that had looked at the application of guidelines in clinical practice.

Introduction

Modelling demand for radiotherapy is dependent on accurate definitions of its indications in cancer treatment. Indications for the benefits of radiotherapy are usually derived from clinical trials. Clinical practice guidelines provide a summary of trial evidence in stating management recommendations to guide clinical practice. This process works well in scenarios where the clinic population matches that of the clinical trials population, resulting in actual radiotherapy utilisation close to that predicted by models of optimal utilisation [1]. However, the limitation with guidelines is where the evidence derived from clinical trials is in a highly selected population not reflecting patient characteristics in the clinic population. This leads to uncertainty about treatment recommendations and underutilisation of potentially beneficial therapies.

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This review is based on the rather extreme clinical example of lung cancer. Lung cancer patients seen in clinic often have multiple comorbidities and are older with a poorer performance status than those enrolled in clinical trials. In addition, disease progression can occur in a short space of time while a management plan is being formulated [2,3]. These characteristics affect the ability to treat lung cancer patients according to guidelines.

Concordance of Clinical Practice with Guidelines

There have been a number of studies that have attempted to evaluate the compliance of clinical practice with guideline recommended treatment (GRT) in lung cancer. Some studies have assessed whether recommendations were concordant with guidelines [4,5], whereas others have examined whether actual treatment was concordant, either in the general lung cancer population [6–8] or in selected populations as defined by patient demographics or multidisciplinary discussion [9–11].

Two studies examined the concordance of clinician recommendations for GRT. In an Australian study, Vinod *et al.* [4] evaluated concordance of multidisciplinary team meeting recommendations to Australian guidelines in a cohort of 335 patients discussed from 2005 to 2007. GRT was considered very broadly if there was an indication for surgery, chemotherapy or radiotherapy or a combination of therapies. They found that that the concordance was 71% for overall management, 58% for surgery, 88% for radiotherapy and 71% for chemotherapy. In a French study, Couraud *et al.* [5] used four hypothetical clinical scenarios to survey oncologists and pulmonologists specialising in thoracic oncology to assess their awareness of French Guidelines. The rate of guideline application ranged from 25 to 63%. Overall, only 15% of clinicians applied the guidelines appropriately to all four cases, and 10% did not apply them in any of the cases. These low concordance rates may be explained by their strict method of assessing GRT, with clinicians having to specify agents and the number of cycles of chemotherapy. There was no difference between oncologists and pulmonologists, but clinicians working in public practice were more likely to recommend GRT than their counterparts in private practice.

These studies show that the reported concordance with GRT can differ depending on the definitions of GRT. The differences in concordance rates between the Australian and French studies could simply be due to definitions. However, a more important end point to measure GRT compliance is actual treatment received. There have been three large population-based studies looking at this [6–8].

Potosky *et al.* [6] examined the treatment received by non-small cell lung cancer (NSCLC) patients selected randomly from a population-based sample in USA in 1996 (Table 1). This was compared with GRT as prospectively defined by the authors based on contemporary evidence. GRT was surgery for stage I and II NSCLC, surgery or chemoradiotherapy for stage IIIA, chemoradiotherapy for 'dry' stage IIIB (no pleural effusion), chemotherapy ± radiotherapy for 'wet' stage IIIB (associated with a pleural effusion) and chemotherapy for stage IV. Overall, 52% of NSCLC patients received GRT according to their definitions, but this varied by stage from 41% for stage IV to 69% for stage I and II NSCLC. The receipt of GRT was inversely associated with increasing age, advanced stage at diagnosis and increasing number of comorbidities, but only the former two factors reached statistical significance. Sociodemographic factors such as race and marital status also had statistically significant associations with the receipt of GRT, with lower rates of GRT seen in the non-White population and single population.

De Rijke *et al.* [7] carried out a similar population-based study in the Netherlands (Table 1). They compared treatment received by patients with NSCLC with local guidelines in place during the study period. Overall, only 44% with stage I–III NSCLC were treated according to GRT. This varied from 82% of stage I and II NSCLC, 48% of stage IIIA and 54% of stage IIIB. Stage IV patients were not assessed due to a lack of clear treatment guidelines at the time. For all stages, GRT decreased with age older than 75 years. The presence of comorbidity or poor Eastern Cooperative Oncology Group (ECOG) performance status was only associated with a lack of GRT for stage I and II NSCLC.

More recently, a population-based study from Australia compared the management of lung cancer patients diagnosed between 2006 and 2008 with that recommended by Australian guidelines [8] (Table 1). The receipt of GRT was 51% in the whole population, 54% in small cell lung cancer (SCLC) patients and 51% in NSCLC patients. The lowest use of GRT was seen in those with limited stage SCLC and stage IIIB NSCLC, where only 22% and 25%, respectively, received GRT. Increasing age, stage, ECOG performance status and country of birth were factors significantly associated with the receipt of GRT.

These three population-based studies all show that at best only half of all lung cancer patients are treated according to guidelines. They have all tried to evaluate factors associated with the receipt of GRT, but the results depend on the variables that have been collected. ECOG performance status was not recorded in the American study [6] and comorbidities were not collected in the Australian study [8]. All three studies clearly show increasing age as a negative predictor for receiving GRT.

The use of GRT has also been evaluated in specific populations. Shugarman *et al.* [9] examined lung cancer care in the USA by linking Surveillance, Epidemiology and End Results (SEER) data to Medicare claims and comparing this with National Comprehensive Cancer Network (NCCN) guidelines (Table 1). They found that overall only 42% received timely and appropriate GRT. GRT was delivered in 37% of stage I and II, 58% of stage III and 29% of stage IV NSCLC patients. Older patients and African–Americans were less likely to receive GRT across all stages. Women were less likely to have surgery for stage I or II NSCLC. Other variables such as residence, income and health provider characteristics had an inconsistent relationship with GRT.

Wang *et al.* [10] studied the use of NCCN guidelines in older veterans diagnosed with NSCLC (Table 1). For localised