What is the Most Effective Follow-up Model for Lung Cancer Patients? A Systematic Review

Mia Schmidt-Hansen, PhD,* David R Baldwin, MD, FRCP,† and Elise Hasler, BSc, MCLIP‡

INTRODUCTION: In the U.K. more than 40,000 people are diagnosed with lung cancer every year and an estimated 65,000 people are living with lung cancer. The most effective follow-up strategy for these patients is undetermined. This article reports a systematic review of studies comparing different follow-up strategies for patients with lung cancer.

METHODS: We searched Medline, Premedline, Embase, Cochrane Library, Cinahl, BNI, Psychinfo, Amed, Web of Science (SCI & SSCI), and Biomed Central and included any original study published in English comparing one type of follow-up strategy to another in patients with lung cancer who had received treatment with curative or palliative intent and/or best supportive care. Studies were included if there were 50 patients or more per follow-up group.

RESULTS: Of the four included studies that compared different follow-up strategies in patients with lung cancer, one was a randomized controlled trial and three were retrospective. The studies all examined different follow-up strategies and tended to be marked by various limitations. No formal data synthesis was therefore possible. However, in one article there was some evidence that regular review was associated with less emergency-department crisis attendances than symptom-generated review.

CONCLUSIONS: The included studies were marked by a number of methodological compromises. On the basis of the reported body of evidence it is therefore not possible to make any firm conclusions about the most effective follow-up strategy but the review has identified a need for urgent research into all aspects of follow-up.

KEY WORDS: Lung cancer, Lung neoplasm, Follow-up, After care, Posttreatment, Surveillance.

(Cancer. 2012;7: 821–824)

*Mia Schmidt-Hansen, PhD, National Collaborating Centre for Cancer, Cardiff, United Kingdom.
†Respiratory Medicine Unit, David Evans Centre, Nottingham University Hospitals, United Kingdom.
‡National Collaborating Centre for Cancer, Cardiff, United Kingdom.

Disclosure: This article presents an extension to a systematic review undertaken as part of the 2011 NICE guideline on “The Diagnosis and Treatment of Lung Cancer (update),” which was developed by the National Collaborating Centre for Cancer. The NCC-C receives funding from the National Institute for Health and Clinical Excellence. The authors declare no conflict of interest.

Address for correspondence: Mia Schmidt-Hansen, PhD, National Collaborating Centre for Cancer, Greyfriars Road, Cardiff CF10 3AF, Wales, United Kingdom. E-mail: Mia.Schmidt-Hansen@wales.nhs.uk

Copyright © 2012 by the International Association for the Study of Lung Cancer

ISSN: 1556-0864/12/821-824

Journal of Thoracic Oncology • Volume 7, Number 5, May 2012
Characteristics and Findings of the Studies

Moore et al² randomized 203 patients who had completed their initial treatment for lung cancer of any stage and type and who were expected to live for 3 months or more to receive either conventional follow-up or follow-up by lung cancer specialist nurses. Conventional follow-up consisted of one posttreatment appointment and then routine outpatient appointments every 2 to 3 months for medical assessments and investigations to monitor disease progression in addition to need-based appointments. Although it is not explicitly reported who followed up the patients allocated to receive conventional follow-up, given the breadth of the sample it is highly likely that a number of different specialists were involved in the conventional follow-up (e.g., medical and clinical oncologists, and thoracic surgeons). Nurse-led follow-up consisted of monthly assessment either over the telephone or in a nurse-led clinic to identify signs of disease progression, symptoms warranting intervention, or serious complications. The main focus of the clinical nurse specialist was to provide information and support and coordinate input from other services or agencies.

Median survival did not differ between the follow-up groups, but median time to symptomatic progression was shorter in the nurse-led follow-up group (6 months) than in the conventional follow-up group (10.2 months), although this difference was not evident in time to objective progression, which did not differ between the groups. Although quality of life was comparable between the groups at 3, 6, and 12 months (when the alpha-level is corrected for multiple comparisons), the patients who received nurse-led follow up reported at 3 and 6 months that they were generally more satisfied with their care than the patients who received conventional follow up (again with alpha-level correction for multiple comparisons). The groups did not differ in the number of visits to general practitioners, home visits by general practitioners, admissions to hospital/hospice, scans since previous visit, the number of radiographs taken at 3 and 6 months, rate of radiotherapy treatment at 3 months, consultations with other medical staff/specialists/therapists, the number of patients who died at home (rather than in hospital/hospice), or in the use of social series, district nurse, Macmillan nurse or home-care team, other community therapist, chemotherapy or surgery since previous assessment, nor did the groups differ in the rate of changes in drugs/new drugs since previous assessment (with alpha-level adjustment for multiple comparisons). The authors did, however, find in a trend analysis that the patients who received nurse-led follow-up had significantly less consultations with a hospital doctor (at 3 months) than the patients who received conventional follow-up.

Although Moore et al² provide no details about the method of randomization and whether allocation concealment was employed, this study seems to be adequately powered to detect differences (at least) in primary outcomes (i.e., quality of life and patient satisfaction at 3 months) and the follow-up groups were comparable at baseline.

In a sample of 1398 retrospectively recruited patients who had undergone surgery for non–small cell lung cancer, Nakamura et al⁶ assessed whether survival differed between patients who were followed up postoperatively by thoracic surgeons (n = 846; 630 men) and patients who were followed...
up postoperatively by chest physicians (n = 552; 384 men). Although there seemed to have been no protocol-driven follow-up programs, follow-up by thoracic surgeons included physical examination and chest radiograph at 1 month after the surgery and then every 3 to 4 months for the next 3 years. In addition to these procedures, follow-up by chest physicians also included chest computed tomography every 6 months. It was the case for both follow-up groups that the frequency of other scans and follow-up visits depended on the doctors in charge of follow-up. Nakamura et al\(^3\) found that follow-up by thoracic surgeons conferred an independent increased hazard of death relative to follow-up by chest physicians (hazard ratio = 1.279). However, this result is confounded by the differences in follow-up procedures between the groups (e.g., unlike the patients who were followed up by thoracic surgeons, the patients who were followed up by chest physicians received regular chest CTs) and it is not possible to further unravel this confound because of the absence of additional details regarding the exact follow-up interventions received by the patient groups.

In a retrospective study, Virgo et al\(^4\) examined in patients with stage-I to -IIIA lung cancer treated with curative intent whether a number of outcomes differed between those who received an intensive follow-up schedule (n = 120) and those who received a nonintensive follow-up schedule (n = 62). Length of follow-up and baseline characteristics of the groups were comparable with the following exceptions: the intensively followed-up group had significantly more comorbidities and a significantly longer disease-free interval than the nonintensively followed-up patients. Intensity of follow-up did not significantly influence time to detection of local or regional recurrences, time to detection of second primary, time to detection of metastases, survival (for all patients or for stage-I patients only), survival after detection of local or regional recurrence, survival after detection of second primary, survival after detection of metastases, local and regional recurrences, second primaries, metastases, and multiple metastases.

Younes et al\(^5\) assessed retrospectively whether patient outcomes differed between a strict follow-up schedule and a symptom-based follow-up schedule in patients who had undergone complete operative and pathologic resection of non–small cell lung cancer. The strict follow-up schedule consisted of physical examinations (at weeks 1 and 3, at 2 months, then bimonthly for the first 6 months and subsequently every 3 months until 2 years had elapsed), chest radiographs (at weeks 1 and 3 and then at 2, 4, 9, 15, and 24 months), and liver functions tests (at 1 and 2 years). The patients in the symptom-based follow-up group received a maximum of 3 consultations per year in the first 2 years after surgery. The baseline characteristics of the groups were comparable. Disease-free survival and survival after recurrence did not differ between the strict (n = 67; 55 men) and symptom-based (n = 63; 56 men) follow-up groups, but the patients who received symptom-based follow-up experienced more (health problem) episodes detected in the emergency room, had more health problems treated on an inpatient basis, and spent more days as an inpatient for health problems compared to the patients receiving a strict follow-up schedule, who had more health problems treated on an outpatient basis.

**DISCUSSION**

Evidence on the effectiveness of follow-up for lung cancer patients is limited both because of the design and number of the studies examining different follow-up models/strategies. Three of the four included studies were retrospective and marked by a number of limitations that render the results unreliable (e.g., lack of procedural details, group differences in baseline clinical characteristics, and small sample sizes). In addition, the follow-up strategies employed differed between all four studies, which makes formal data synthesis impossible.

The paucity of evidence precludes firm evidence-based recommendations about the best follow-up strategy for lung cancer patients. However, the study by Younes et al\(^5\) does provide tentative evidence for an effect that seems intuitively correct—that is, that regular follow-up results in fewer crisis-driven health-related episodes. Such episodes are distressing to patients and carers, not least because the emergency admission process is often difficult and, in the U.K. at least, often leads to inpatient management by nonspecialists,\(^6,7\) which, in turn, is likely to be associated with higher costs. However, the evidence has not permitted an analysis of cost effectiveness.

The randomized controlled trial by Moore et al\(^2\) constituted the best available evidence of the current topic and showed that follow-up led by specialist clinical nurses is associated with high levels of patient satisfaction and acceptability, and with comparable levels of quality of life, median survival, and time to progression.

None of the included studies examined the use of specific tests/interventions in the context of follow-up (e.g., various imaging modalities such as computed tomography, chest radiograph and positron emission tomography, sputum cytology, bronchoscopy, and serum markers) although the use of some tests seemed to differ between some of the follow-up groups (e.g., 2–3). Systematic examination of the value of different tests and the frequency with which they should be used in follow-up of patients diagnosed with lung cancer is needed to establish the most effective follow-up strategy. The value of individual tests is likely to depend on whether the patient is followed up after intervention(s) with palliative or curative intent and the timing of the tests can fruitfully be informed by what is already known about the pattern of first recurrence, metastatic spread, and side effects following treatment (cf. ref. 8). Moreover, added value of optimal routine follow-up may also be observed in earlier identification of second cancers in the thorax and aerodigestive traction. Thus, it is clear that more prospective research is needed in this area, ideally in the form of well-designed randomized controlled trials comparing different follow-up strategies in patients who have received treatment for lung cancer.

**Implications for Practice**

Despite the absence of a firm evidence base on which to make recommendations for practice, it is important that the issue of providing good follow-up for patients must not be
neglected. The wishes of patients and carers should always be a priority in offering follow-up. Where evidence is lacking, we have to rely on expert opinion. The most recent recommendations on follow-up can be found in the recently updated National Institute for Health and Clinical Excellence guideline on the Diagnosis and Treatment of Lung Cancer,9 which are based on this systematic evidence review and expert opinion (see also refs. 10 and 11):

- Offer all patients an initial specialist follow-up appointment within 6 weeks of completing treatment to discuss ongoing care, and regular appointments thereafter rather than relying on patients requesting appointments when they experience symptoms.
- Offer protocol-driven follow-up led by a lung cancer clinical nurse specialist as an option for patients with a life expectancy of more than 3 months.
- Ensure that patients know how to contact the lung cancer clinical nurse specialist involved in their care between their scheduled hospital visits.

ACKNOWLEDGMENTS

The authors would like to thank the National Institute for Health and Clinical Excellence (NICE), the National Collaborating Centre for Cancer and the Guideline Development Group for the “Diagnosis and Treatment of Lung Cancer (update)” NICE Guideline (2011).

REFERENCES