Quality of life measurement in cancer patients receiving palliative radiotherapy for symptomatic lung cancer: a literature review

N. Salvo, S. Hadi, J. Napolskikh BSc, P. Goh BSc, E. Sinclair MRT(T), and E. Chow MBBS

1. INTRODUCTION

Lung cancer is a rising epidemic and remains the leading cause of cancer death in both men and women in Canada. In general, 500 Canadians are diagnosed with and 400 Canadians die of lung cancer every week. Such high morbidity and mortality in patients with primary lung cancer emphasizes the need for palliative treatment intent.

Morbidity from lung cancer or lung metastases often presents as troublesome thoracic symptoms such as hemoptysis, cough, chest pain, and dyspnea. Palliative radiotherapy has been effective in ameliorating these symptoms and improves or preserves the quality of life (QoL) remaining in approximately one third of affected patients.

In the past, clinical trials in patients with lung cancer have focused on traditional endpoints such as overall survival, disease-free survival, or local control. Given the relatively poor prognosis of patients with locally advanced lung cancer or lung metastases, the inclusion of QoL as a primary endpoint of treatment becomes increasingly important. Quality of life encompasses the minimization of risks and maximization of benefits of a treatment, including physical and psychosocial effects on the well-being of patients. Studying QoL is particularly relevant in the field of palliative radiotherapy because of known treatment-related side effects and toxicities.

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2. METHODS

2.1 Search Strategy

We conducted a literature review using the MEDLINE (Ovid) database for 1950 to February 2008. Key terms such as “lung cancer,” “lung neoplasms,” or “lung metastases” were combined with the terms...
“radiotherapy,” “radiation,” “external-beam irradiation,” or “palliative radiotherapy.” This search was then combined with “quality of life” or “QOL” and also “symptom palliation.” Relevant articles and abstracts were reviewed, and references from those sources were also manually searched for additional relevant publications.

2.2 Inclusion Criteria

To be included in the present literature review, articles had to meet these criteria:

- Population: patients with a histologic, cytologic, or radiologic diagnosis of primary lung cancer or lung metastases
- Intervention: external beam radiotherapy or endobronchial brachytherapy in at least one study arm, with palliative intent
- Types of studies: randomized trials, prospective or retrospective cohort studies
- Endpoints: QOL or symptom palliation as a primary or secondary endpoint or measured outcome

2.3 Exclusion Criteria

Articles were excluded if they met any of these criteria:

- Article type: individual case report or review article
- Language: publication in a language other than English
- Intervention: no evaluation, in at least one arm, of external beam irradiation to the thorax or endobronchial brachytherapy; or studies of interventions with curative intent
- Types of studies: focus on populations other than those with primary lung cancer or lung metastases
- Endpoints: use of the Karnofsky performance status (KPS) or other similar prognostic tools, correlation of QOL with cost–utility, or test of the reliability or validity of a QOL instrument

2.4 Data Extraction

We extracted the following information from the studies:

- Primary and secondary outcomes
- Radiotherapy treatment details
- Type and number of QOL, symptom palliation, and additional tools, if any, used
- Number of patients in each study arm
- Median age and male:female ratio of the patients enrolled in the study
- Median survival in each study arm

3. RESULTS

We identified a total of forty-three trials that evaluated, in at least one study arm, the use of palliative radiotherapy to the thorax, and that assessed QOL or symptom palliation as a primary or secondary endpoint. Thirty studies (Table i) evaluated the treatment of patients with non-small-cell lung cancer (NSCLC). Four studies (Table ii) involved patients who were treated with endobronchial brachytherapy alone or in addition to external-beam radiation. Brachytherapy differs from external-beam radiation in that it is a more localized form of radiation that limits toxicity in healthy tissue to the immediate vicinity of the radiated region. Another nine trials (Table iii) evaluated the use of palliative radiotherapy in patients with lung cancer of a histologic type other than NSCLC. The four identified studies that measured the difference in efficacy between endobronchial brachytherapy and external beam radiation used both symptom palliation and QOL scores as a primary outcome.

In twenty of the identified studies, symptom palliation was used as a primary outcome. Ten trials used QOL as a primary outcome, and six studies used both symptom palliation and QOL together as a primary endpoint. Seven of the studies used neither symptom palliation nor QOL as primary endpoints, but rather incorporated them as secondary outcomes. The four identified studies that measured the difference in efficacy between endobronchial brachytherapy and external beam radiation used both symptom palliation and QOL scores as primary outcomes.

3.1 QOL and Symptom Palliation Tools Used

A total of 11 tools were used to assess either QOL or palliation of lung cancer–related symptoms; the frequency of use of each tool is presented in Table iv. The most common QOL tool used was the European Organization for Research and Treatment of Cancer (EORTC) QLQ-C30, a questionnaire that was created and validated to assess QOL in individuals with any form of cancer. It has been translated into 81 languages and consists of 30 questions that encompass 5 functional scales: physical, role, cognitive, emotional, and social functioning. The EORTC QLQ-C30 also incorporates 3 symptom scales: fatigue, pain, and nausea and vomiting. The remaining items on the questionnaire cover other symptom-related events that are often described by cancer patients, including dyspnea, diarrhea, and loss of appetite, among others.

The EORTC QLQ-C30 was used in fourteen of the forty-three studies identified in the search (32%), eight of which also used the lung cancer supplement, EORTC QLQ-LC13. The EORTC QLQ-LC13 is the latest version of a lung cancer–specific questionnaire that consists of questions concerning lung cancer symptoms
| Reference | Type          | Study Purpose                                                                                                                                                                                                 | Arms                                                                 | Pts (n) | Median survival  | QoL  | Assessment tools   | Other | Measures of QoL (n) |
|-----------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|---------|-------------------|------|--------------------|-------|--------------------|
| Simpson et al., 1985 | **RCT** (multicentre) | To evaluate 3 XRT schedules and determine the most efficient                                                                                                                                           | A: 40 Gy split course in 4 weeks B: 30 Gy continuous for 2 weeks C: 40 Gy continuous for 4 weeks | 316     | A: 6.2 months B: 6.4 months C: 6.9 months | None | KPS                | Study designed: self-report by patient either complete relief or relative relief | 0      |
| Kaasa et al., 1988 | **RCT** | QoL of patients with radiation therapy and chemotherapy                                                                                                                                                | A: Combination chemotherapy B: 42 Gy/15 fr                          | 95      | Not stated        | Study designed: 29 variables; only psychosocial well-being and global QoL reported | WHO    | None               | 0      |
| Teo et al., 1988 | **RCT** | To compare a hypofractionated scheme with traditional fractionation                                                                                                                                     | A: 45 Gy/18 fr B: 31.2 Gy/4 fr                                    | 291     | Not stated        | None | KPS                | Study designed: subjective responses to changes in thoracic symptoms | 0      |
| MRC Lung Cancer Working Party, 1991 | Randomized prospective | To determine if a shorter treatment course of XRT provides equally good symptom palliation                                                                                                             | A: 17 Gy/2 fr B: 30 Gy/10 fr                                      | 369     | A: 179 days B: 177 days | None | WHO                | Study designed: 4-point scale to rate symptoms | 0      |
| Regan et al., 1991 | Prospective | Correlate physician rating of XRT response to patient views of treatment                                                                                                                              | A: 30 Gy/10 fr B: 17 Gy/2 fr                                    | 40      | 30 Days           | EORTC QLQ-C30 | ECOG | MRC physician questionnaire | 1      |
| MRC Lung Cancer Working Party, 1992 | **RCT** | Investigate whether a single fraction can provide palliation as good as that provided by 2 fractions                                                                                                    | A: 17 Gy/2 fr B: 10 Gy/1 fr                                      | 233     | A: 100 days B: 122 days | None | WHO                | Study designed: daily dairy for first 6 months: 4-point scale to rate symptoms | 0      |
| Omand and Meredith, 1994 | Prospective | To assess frequency of acute side effects of short-term XRT                                                                                                                                             | A: 10 Gy/1 fr B: 17 Gy/2 fr                                     | 61      | Not stated        | None | None               | Study designed: percentage improvement in symptoms | 0      |
| Abratt et al., 1995 | Randomized prospective | To evaluate the dose–response effect on survival of patients with good performance status                                                                                                             | A: 35 Gy/10 fr B: 45 Gy/15 fr                                   | 84      | A: 8.5 months B: 8.5 months | None | WHO                | Study designed: physician graded symptom improvements | 0      |
TABLE 1  (Continued)

| Reference          | Type               | Study Purpose                                                                 | Arms                        | Pts (n) | Median survival | qOL | Assessment tools       | Other               | Measures of qOL (n) |
|--------------------|--------------------|-------------------------------------------------------------------------------|-----------------------------|---------|-----------------|-----|------------------------|---------------------|--------------------|
| Macbeth et al., 1996 16 | Randomized         (multicentre) | To compare palliative with more-intensive xRT with respect to survival and qOL. | A: 17 Gy/2 fr B: 39 Gy/13 fr | 509     | A: 7 months B: 9 months | None | WHO MRC | patient diary card    | 0                   |
| Ball et al., 1997 17  | Prospective        | To assess the effect of adding continuous-infusion fluorouracil to palliative xRT. | A: 20 Gy/5 fr B: 20 Gy/5 fr with fluorouracil for 5 days | 200     | A: 6 months B: 6.8 months | Study-designed questionnaire | WHO | Study-designed questionnaire; to detect symptom palliation | 1                   |
| Gava et al., 1997 18  | Prospective        (multicentre) | To assess the indications for xRT, compliance with treatment plans, and qOL. | A: Radical range: 30Gy–70Gy B: Palliative range: <30 Gy to 70 Gy | A: 109 | Not stated | Study designed | KPS | None | 1                   |
| Lutz et al., 1997 19  | Retrospective      | To measure symptom palliation in patients treated with xRT. | 30 Gy/10–12 fr | 54      | 4 Months | None | SWOG | LCSS | 1                   |
| Vyas et al., 1998 20  | Retrospective      | To evaluate response in patients receiving palliative xRT in 2 large fractions | 17 Gy/2 fr                  | 37      | Not stated | None | Not stated | Study designed: patients asked to grade percentage improvement in symptoms | 0                   |
| Donato et al., 1999 21 | Prospective        | To examine the results obtained with a fractionated xRT regimen. | A: 20 Gy/5 fr (1 treatment) B: 40 Gy/10 (2 treatments) | 52      | Not stated | None | ECOG, KPS | Study designed: subjective patient assessment of symptoms | 0                   |
| Langendijk et al., 2000 5 | Prospective        | To see the association between prognostic factors and qOL and the impact of symptoms on qOL. | A: Curative schedule: 70 Gy in 7 weeks B: Radical schedule: 60 Gy in 6 weeks C: Palliative schedule: 30 Gy in 4 weeks | 262     | A: 19.1 months B: 8.5 months C: 4.1 months | EORTC QLQ-C30 EORTC QLQ-LC13 | WHO | None | 2                   |
| Langendijk et al., 2000 22 | Prospective        | To investigate changes in symptoms and qOL in patients receiving xRT. | 30 Gy/in 4 weeks | 65      | Not stated | None | EORTC QLQ-C30 EORTC QLQ-LC13 | WHO | None | 2                   |
| Nestle et al., 2000 23  | Randomized         prospective | To see if there is a difference between palliative and more intensive treatment. | A: 60 Gy/30 fr B: 32 Gy/20 fr | 152     | A: 8.3 months B: 8.4 months | None | KPS | MRC daily diary card | 0                   |
| Reference | Type | Study Purpose | Arms | Pts (n) | Median survival | QoL | Assessment tools | Other | Measures of QoL (n) |
|-----------|------|---------------|------|---------|-----------------|-----|------------------|-------|-------------------|
| Schaafsma and Coy, 2000 | Prospective | To estimate the effect of high-dose XRT on QoL and computer QoL-D gained | 30 Gy/10 fr | 54 | 266 Days | EORTC QLQ-C30 | KPS | None | 1 |
| Auchter et al., 2001 | Prospective | To evaluate QoL of patients before, at completion, and after accelerated fractionation of XRT | 57.6 Gy/36 fr over 15 days | 30 | 13 Months | FACT-L | ECOG | None | 1 |
| BCentingoz et al., 2001 | Retrospective | To retrospectively evaluate the treatment effects of XRT | Median dose: 30 Gy/1–23 fr | 115 | 30 Weeks | None | KPS | Study designed: subjective palliation rates in one of three groups: near total response, improvement, or no response | 0 |
| Langendijk et al., 2001 | Prospective | To evaluate changes in QoL and symptoms after XRT | 60 Gy total dose | 164 | 8.5 Months | EORTC QLQ-C30 | WHO | None | 2 |
| Bejzak et al., 2002 | RCT (multicentre) | Comparison of 2 fractionation schedules on palliation of symptoms | A: 10 Gy/1 fr B: 20 Gy/5 fr | 230 | A: 4.2 months B: 6 months | EORTC QLQ-C30 | ECOG | LCSS (1 item) | 1 |
| Falk et al., 2002 | RCT (multicentre) | To determine if patients should be given palliative XRT immediately or as needed for symptom relief | A: 17 Gy/2 fr B: 10 Gy/1 fr | 230 | A: 240 days B: 253 days | None | WHO | HADS, RSCL | 0 |
| Nihei et al., 2002 | Retrospective | To investigate the outcome of XRT for airway stenosis | 30 Gy/10 fr | 24 | Responders: 192 days Non-responders: 43 days | None | None | Study designed: Patient subjective report of symptoms | 0 |
| Borthwick et al., 2003 | Prospective | To gain an understanding of fatigue in patients receiving XRT | A: Radical: 55 Gy/20 fr B: Palliative: 39 Gy/13 fr | 53 | Not stated | None | Not stated | Study designed: daily card with 9 questions relating to fatigue | 0 |
| Kramer et al., 2005 | RCT (multicentre) | Compare various fractions of XRT on palliation of thoracic symptoms | A: 16 GY/2 fr B: 30 GY/10 fr | 297 | Not stated | None | ECOG | RSCL | 0 |
| Senkus–Konefka et al., 2005 | Randomized prospective | To compare two palliative XRT schedules | A: 20 Gy/5 fr B: 16 Gy/2 fr | 100 | A: 5.3 months B: 8.0 months | None | WHO | Study designed: patient-reported symptom relief on a 4-point scale | 0 |
| Reference       | Type        | Study Purpose | Arms                  | Pts (n) | Median survival | QOL | Assessment tools | Other | Measures of QOL (n) |
|-----------------|-------------|---------------|-----------------------|---------|------------------|-----|------------------|-------|-------------------|
| Sundstrøm et al., 2005[34] | Randomized prospective | To compare the course of symptoms and HR QOL after immediate thoracic RT between symptomatic (Sym) and non-Sym (NSym) patients | 17 Gy/2 fr 42 Gy/15 fr 50 Gy/25 fr | 395 | NSym: 11.8 months Sym: 6.0 months | EORTC QLQ-C30 KPS | None | 2 |
| Sundstrøm et al., 2006[35] | Randomized | To examine the predictive value of baseline HR QOL data in patients receiving XRT in comparison with demographic, clinical, and treatment variables | A: 17 Gy/2 fr B: 42 Gy/15 fr C: 50 Gy/25 fr | 301 | A: 9.2 Months B: 7.5 Months C: 7.5 Months | EORTC QLQ-C30 EORTC QLQ-LC13 KPS | None | 2 |
| Temel et al., 2007[36] | Prospective | To assess the feasibility of early palliative care in patients with newly diagnosed NSCLC | Not stated | 51 | 9.0 Months | FACT-G FACT-L ECOG HADS | None | 2 |

Pts = patients; QOL = quality of life; RCT = randomized clinical trial; XRT = external-beam radiotherapy; KPS = Karnofsky performance status; fr = fractions; WHO = World Health Organization; MRC = Medical Research Council; EORTC = European Organization for Research and Treatment of Cancer; ECOG = Eastern Cooperative Oncology Group; HADS = Hospital Anxiety and Depression Scale; RSCL = Rotterdam symptom checklist; SWOG = Southwest Oncology Group; LCSS = Lung Cancer Symptom Scale; RT = radiotherapy; QALD = quality-adjusted life-day; HR = health-related.
| Reference                  | Type       | Study Purpose                                                                 | Arms                                                                 | Pts (n) | Median survival | QOL | Assessment tools | Performance | Other | Measures of QOL |
|---------------------------|------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------|---------|-----------------|-----|-----------------|-------------|-------|-----------------|
| Stout et al., 2000        | RCT        | To compare EBB and XRT for symptom palliation and the effect on functional status and QOL of patients | A: 30 Gy/8 fr XRT  
B: 15 Gy/1 fr EBB                                                      | 99       | A: 287 days     | B: 250 days | None          | WHO         | Study designed: 4-point scoring system to monitor performance status and 9 key symptoms  
HADS  
RSCL modified for lung cancer  
HADSc | 2       |                |
| Langendijk et al., 2001   | RCT        | To test that the addition of EBB to XRT provides higher levels of palliation of dyspnea and increases QOL | A: XRT alone: 60 Gy/24 fr  
B: XRT (60 Gy/24 fr or 30 Gy/10 fr) plus EBB (15 Gy/2 fr)  
A: 8.5 months  
B: 7.0 months | 95       | EORTC QLQ-C30  
EORTC QLQ-LC13                                                | WHO         | None          | 2       |                |
| Mallick et al., 2006      | Prospective| To test the hypothesis that palliative EBB treatment with or without XRT can reduce endobronchial symptoms for a prolonged period and also improve QOL | A: 30 Gy/10 fr with EBB on days 6 and 13: 8Gy/1fr  
B: 30 Gy/10 fr with EBB on day 13: 10 Gy/1 fr  
C: EBB 15 Gy/1 fr                      | 95       | EORTC QLQ-C30  
EORTC QLQ-LC13                                                | KPS         | None          | 2       |                |
| Mallick et al., 2007      | Prospective| To compare the subjective and objective responses to 3 regimens for duration, QOL outcomes, and complications | A: 30 Gy/10 fr with EBB on days 6 and 13: 8 Gy/1 fr  
B: 30 Gy/10 fr with EBB on day 13: 10 Gy/1 fr  
C: EBB 15 Gy/1 fr                      | 45       | Not stated      | EORTC QLQ-C30  
EORTC QLQ-LC13                                                | KPS         | None          | 2       |                |

Pts = patients; QOL = quality of life; RCT = randomized clinical trial; fr = fractions; WHO = World Health Organization; HADS = Hospital Anxiety and Depression Scale; RSCL = Rotterdam symptom checklist; EORTC = European Organization for Research and Treatment of Cancer; KPS = Karnofsky performance status.
| Reference                      | Type         | Study Purpose                                                                 | Arms                                                                 | Pts (n) | Median survival | qol | Assessment tools | Other                                                                                             | Measures of qol (n) |
|--------------------------------|--------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------|----------|-----------------|-----|----------------|---------------------------------------------------------------------------------------------------|---------------------|
| Berry et al., 1977 41         | Prospective  | Compares xrt alone and with chemotherapy                                       | A: 40 Gy/20 fr or 36 Gy/12 fr                                       | A: 48    | 125 Days        | None| None           | Study designed: physicians recorded changes in patient symptoms                                 | 0                   |
| Collins et al., 1988 42       | Prospective  | To determine whether palliative xrt should be given to a patient with inoperable carcinoma of the bronchus | Range: 18 Gy/5 fr–48 Gy/10 fr (split course)                       | 96       | 38 Weeks        | None| WHO            | Study designed: symptom response questions                                                       | 0                   |
| MRC Lung Cancer Working Party, 1989 (multicentre) | RCT         | To compare two policies of treatment                                           | A: Combination chemotherapy and xrt (40 Gy/15 fr) B: selective treatment: chemotherapy with or without xrt; treatment given as required to control symptoms | 151      | A: 32 weeks     | None| WHO            | Study designed: treatment reports and daily diary chart                                          | 0                   |
| Devereux et al., 1997 44      | Prospective  | To assess the incidence and severity of the immediate side effects of palliative xrt for bronchial carcinoma | Range: 8 Gy/1 fr–60 Gy/30 fr                                       | 118      | Not stated       | None| None           | Study designed: questionnaire to determine occurrence of symptoms 24 hours post treatment       | 0                   |
| Rees et al., 1997 45          | Randomized   | To compare the symptomatic effects of two regimens of xrt                      | A: 17 Gy/2 fr B: 22.5 Gy/5fr                                       | A: 111   | Not stated       | None| WHO            | Study designed: questionnaire to rate severity of symptoms                                         | 0                   |
| Ampil et al., 2001 46         |              | To see the effects of palliative xrt on patients with synchronous bilateral lung cancers | Range: 5–58 Gy (mean dose: 35 Gy)                                   | 32       | 7 Months        | None| SWOG           | Study designed: subjective response                                                              | 0                   |
| Reference               | Type           | Study Purpose                                                                 | Arms                      | Pts (n) | Median survival | QoL Assessment tools | Other         | Measures of QoL (n) |
|-------------------------|----------------|-------------------------------------------------------------------------------|---------------------------|---------|----------------|----------------------|--------------|-------------------|
| Erridge et al., 2005    | RCT            | To determine whether palliation of chest symptoms was the same in two fractionation schedules | A: 10 Gy/1 fr B: 30 Gy/10 fr | 149     | A: 28.3 Weeks B: 22.7 Weeks | Spitzer's QoL Index | WHO          | HADS 1            |
| Tumer et al., 2005      | Prospective    | To see if older people benefit from external-beam radiotherapy, both in control of symptoms and improvement in QoL (NSCLC, SCLC, and unknown types) | A: “High dose”; (36/39 Gy in 12/13 fr) B: “low dose”; (10 Gy in 1 fr, 17 Gy in 2 fr or 20 Gy in 5 fr) | Elderly (>75 years): 83 B: 7 months Younger (<65 years): 49 | EORTC QLQ-C30 EORTC QLQ-LC17 Barthel ADL Scale | WHO, HADS | Concerns Checklist |
| Hicsönmez et al., 2007  |                | Evaluate efficacy of palliative radiotherapy in terms of QoL and how ECOG correlates with EORTC QLQ-C30 | Not stated                | 88      | Not stated      | EORTC QLQ-C30 ECOG | None         | 1                 |

Pts = patients; QoL = quality of life; XRT = external-beam radiotherapy; fr = fractions; RT = radiotherapy; WHO = World Health Organization; MRC = Medical Research Council; RCT = randomized clinical trial; SWOG = Southwest Oncology Group; HADS = Hospital Anxiety and Depression Scale; ECOG = Eastern Cooperative Oncology Group; SCLC = small-cell lung cancer; EORTC = European Organization for Research and Treatment of Cancer.
and the side effects of conventional treatments used for lung cancer. One trial used an older version of the lung-specific module, the EORTC QLQ-LC17, in addition to the general questionnaire.

The Functional Assessment of Cancer Therapy (FACT) QOL tools constituted a second group used in the identified studies. Both the general questionnaire (FACT-G) and the lung-specific questionnaire (FACT-L) were used. Like the EORTC QLQ-C30, the FACT-G is a general questionnaire that was developed for patients with any type of cancer. The FACT-G covers 4 dimensions of QOL: physical, social, emotional, and functional well-being. The FACT-L is similar to the EORTC QLQ-LC13 because it includes additional questions that relate specifically to QOL in patients with lung cancer. The FACT-L was used in two studies, and the FACT-G in one.

A third validated QOL tool was used in one trial: the Spitzer QOL Index. The Spitzer Index covers 5 dimensions of QOL: activity, daily living, health, support of family and friends, and outlook. It is not a lung cancer–specific questionnaire, however; and thus it does not incorporate questions directly related to the lung-cancer-specific patient population.

Study-designed questionnaires were the most prevalent tool used in the forty-three identified studies. A study-specific method of determining QOL was used in three trials, and nineteen trials attempted to evaluate symptom palliation using a study-designed questionnaire. Table v shows a breakdown of the proportion of studies using a validated QOL or symptom palliation tool as compared with a study-designed tool. Study-designed instruments present a difficulty: drawing comparisons across studies is harder because the methods of measurement vary.

In five studies, a validated symptom palliation tool was used (the frequency of use can be seen in Table iv). The two general symptom tools used were the Hospital Anxiety and Depression Scale and the Rotterdam Symptom Checklist. The Rotterdam Symptom Checklist measures psychological and physical distress in cancer patients through the use of 38 items. The Hospital Anxiety and Depression Scale is a tool used to measure anxiety and depression levels using 14 statements based on a patient’s experience over the preceding week.

One lung-specific symptom tool—the Lung Cancer Symptom Scale—was used. The Lung Cancer Symptom Scale is a tool designed to measure 6 lung-specific symptoms and their effects on symptomatic distress, functional burden, and global quality of life.

Figure 1 outlines the overall picture of questionnaire use in the identified trials. Most of the trials (54%) measured symptom palliation alone; some measured both symptom palliation and QOL (14%). The remaining trials measured QOL only.

### 3.2 Performance Assessment

In forty studies (91%), the performance status of the subjects was measured in addition to QOL or symptom palliation. Performance status was measured primarily as a prognostic factor (twenty of forty trials, 50%) or as part of the exclusion criteria (fourteen of forty trials, 35%). Only six studies used a performance

#### QoL Alone (n=13, 30%)

#### Both QoL and Symptom Palliation (n=6, 14%)

#### Symptom Palliation Alone (n=24, 56%)

**Figure 1** Questionnaire use in all identified studies.
scale as part of the assessment. The 3 most predominant performance status tools used were the World Health Organization performance status, the Eastern Cooperative Oncology Group scale, and the Karnofsky performance status (kps). Although performance scales are useful to determine the functional status of a patient, they are not adequate tools for measuring symptom palliation or QOL.

4. DISCUSSION

In patients with terminal cancer, QOL is a significant concept, and it is influenced by many factors, including symptoms, functional level, coping strategies, and support systems. Common symptoms that influence a lung cancer patient’s QOL include anxiety, depression, pain, fatigue, dyspnea, and cough. Because lung cancer is the leading cause of cancer death in men and the second-leading cause in women globally, it is important that QOL is considered when caring for these patients.

Meaningful palliation refers to symptom relief and prolongation of good-quality survival in lung cancer patients. When treating a patient with palliative intent, it is necessary to use tools that measure the intent of the treatment. For 86% of doctors from the United Kingdom, the United States, and Canada, the treatment of choice for patients with inoperable lung cancer is palliative radiotherapy. It is therefore important that, when considering the side effects of palliative radiotherapy as compared with the side effects of the lung cancer itself, trials investigating the use of palliative radiotherapy use a QOL measure to determine the benefit of the treatment.

A total of twenty identified trials considering palliative radiotherapy for lung cancer included an evaluation of QOL. Of these trials, eleven used a tool that was specific to patients with lung cancer; the remaining nine used general QOL questionnaires for cancer patients or a study-designed questionnaire. In thirty-one identified studies, the level of symptom palliation, one aspect that contributes to a QOL measure, was assessed. This finding suggests that more trials should use a validated lung-specific tool when evaluating the outcome of palliative thoracic radiotherapy. Use of a validated, lung-specific tool will allow for comparisons between trials and will also increase the internal validity of individual studies. Two recommended lung-specific validated tools that would be beneficial for the measurement of QOL in trials evaluating palliative thoracic radiotherapy are the FACT-L and the eORTC QLQ-LC13.

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**Correspondence to:** Edward Chow, Department of Radiation Oncology, Odette Cancer Centre, Sunnybrook Health Sciences Centre, 2075 Bayview Avenue, Toronto, Ontario M4N 3M5.

**E-mail:** Edward.Chow@sunnybrook.ca

* Rapid Response Radiotherapy Program, Department of Radiation Oncology, Odette Cancer Centre, Sunnybrook Health Sciences Centre, University of Toronto, Toronto, ON.