Original Article

A Randomized Trial of Weekly Symptom Telemonitoring in Advanced Lung Cancer

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Abstract

Context. Lung cancer patients experience multiple, simultaneous symptoms related to their disease and treatment that impair functioning and health-related quality of life (HRQL). Computer technology can reduce barriers to nonsystematic, infrequent symptom assessment and potentially contribute to improved patient care.

Objectives. To evaluate the efficacy of technology-based symptom monitoring and reporting in reducing symptom burden in patients with advanced lung cancer.

Methods. This was a prospective, multisite, randomized controlled trial. Two hundred fifty-three patients were enrolled at three sites and randomized to monitoring and reporting (MR) or monitoring alone (MA). Patients completed questionnaires at baseline, 3, 6, 9, and 12 weeks and symptom surveys via interactive voice response weekly for 12 weeks. MR patients' clinically significant symptom scores generated an e-mail alert to the site nurse for management. The primary endpoint was overall symptom burden; secondary endpoints included HRQL, treatment satisfaction, symptom management barriers, and self-efficacy.

Results. This randomized controlled trial failed to demonstrate efficacy of symptom monitoring and reporting in reducing symptom burden compared with monitoring alone in lung cancer. HRQL declined over 12 weeks in both groups ($P < 0.006$ to $P < 0.025$); at week 12, treatment satisfaction was higher in MA than MR patients ($P < 0.012$, $P < 0.027$). Adherence to weekly calls was good (82%) and patient satisfaction was high.

Conclusion. Feasibility of using a technology-based system for systematic symptom monitoring in advanced lung cancer patients was demonstrated. Future research should focus on identifying patients most likely to benefit and other

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patient, provider, and health system factors likely to contribute to the system's success. J Pain Symptom Manage 2014;47:973–989.

Key Words
Lung cancer, symptoms, randomized controlled trial, health information technology, telemonitoring

Introduction

Patients with advanced lung cancer face a shortened life expectancy and typically experience multiple, simultaneous, debilitating symptoms related to their disease and its treatment. In addition to impairing patients' daily functioning and health-related quality of life (HRQL),[1] unrecognized or poorly controlled symptoms can cause emergency department (ED) visits and hospitalizations for management as well as decreased treatment efficacy.[2,3] Outpatient chemotherapy is usually administered over several months, with office visits scheduled two to four weeks apart. As a result, many symptoms emerge between scheduled clinic appointments,[4,5] which creates challenges for the effective and timely monitoring and management of symptoms.

There are many patient, provider, and health system barriers to adequate symptom management.[1,6] Two widely reported barriers are inadequate or nonsystematic symptom assessment[6–10] and limited patient–provider communication about symptoms.[1,11,12] Clinicians vary in their ability to elicit information about patient symptoms[13–16] and systematically underestimate them.[17–20] Patients often forget to report important medical information[21,22] and fail to accurately report symptom levels.[23] Systematic symptom assessment and reporting to the provider is associated with reduced symptom distress,[24,25] better pain control,[26,27] and improved, more focused symptom communication.[6,28,29]

Advances in health information technology enable routine, systematic assessment of patient-reported outcomes (PROs; e.g., symptoms, and HRQL) that can be conducted from home, between office visits, with minimal burden.[5,6,30] Technology-based monitoring is feasible and well-accepted by patients,[31–36] improves patient–provider communication,[37–39] and focuses attention on priority symptoms.[39–45]

We elected to use telephone-based interactive voice response (IVR) technology for our **Sy**mptom **Mon**itoring and Reporting System for **L**ung Cancer (SyMon-L) because of the telephone's widespread adoption and familiarity. In our observational, single institution pilot study,[46] we found IVR monitoring to be feasible and acceptable to patients, which also has been demonstrated by others.[47–56] This paper describes a multisite, prospective, randomized controlled trial (RCT) evaluating whether technology-based weekly symptom monitoring and automated reporting of problematic symptoms to the clinical team reduces on-treatment symptom burden of people with advanced lung cancer compared with monitoring alone (i.e., with no reporting to the clinical team). We hypothesized that SyMon-L monitoring and reporting, a more active intervention, would reduce symptom burden to a greater extent than a more passive monitoring intervention by facilitating timely care management realized because of early problem identification and intervention, with secondary benefit to HRQL, treatment satisfaction, perceived barriers to symptom management, and self-efficacy.

Methods

Study Design

Following approval by the research site institutional review boards, we enrolled ambulatory patients with advanced (Stages III or IV) non-small cell lung cancer or small cell lung cancer in a non-blinded, randomized, controlled trial of technology-based symptom monitoring and reporting (MR group) to the clinical team compared with symptom monitoring alone (MA group). Both groups monitored their symptoms weekly; they differed in two respects: (1) automated delivery of reports of clinically significant symptoms of the MR group to their clinical team for further assessment and/or management; and (2) availability of paper