

**Original Article****Patient-Reported Symptom Interference as a Measure of Postsurgery Functional Recovery in Lung Cancer**

Qiuling Shi, PhD, Xin Shelley Wang, MD, MPH, Ara A. Vaporciyan, MD, FACS, David C. Rice, MD, Keyuri U. Papat, MD, and Charles S. Cleeland, PhD

Department of Symptom Research (Q.S., X.S.W., C.S.C.), The University of Texas MD Anderson Cancer Center, Houston; Department of Thoracic & Cardiovascular Surgery (A.A.V., D.C.R.), The University of Texas MD Anderson Cancer Center, Houston; and Department of Anesthesiology & Perioperative Medicine (K.U.P.), The University of Texas MD Anderson Cancer Center, Houston, Texas, USA

**Abstract**

**Context.** Few empirical studies have combined the patient's perspective (patient-reported outcomes [PROs]) with clinical outcomes (risk for complications, length of hospital stay, return to planned treatment) to assess the effectiveness of treatment after thoracic surgery for early-stage non-small cell lung cancer (NSCLC).

**Objectives.** Quantitatively measure PROs to assess functional recovery postsurgery.

**Methods.** Treatment-naïve patients ( $N = 72$ ) with NSCLC who underwent either open thoracotomy or video-assisted thoracoscopic surgery (VATS) used the MD Anderson Symptom Inventory (MDASI) to report symptom interference with general activity, work, walking, mood, relations with others, and enjoyment of life for three months after surgery. Functional recovery was defined as interference scores returning to presurgery levels. The MDASI's sensitivity to change in functional recovery over time was evaluated via its ability to distinguish between surgical techniques.

**Results.** Interference scores increased sharply by Day 3 after surgery (all  $P < 0.001$ ), then returned to baseline levels via different trajectories. Patients who had unscheduled clinic visits during the study period reported higher scores on all six MDASI interference items (all  $P < 0.05$ ). Compared with the open-thoracotomy group, the VATS group returned more quickly to baseline interference levels for walking (18 vs. 43 days), mood (8 vs. 19 days), relations with others (4 vs. 16 days), and enjoyment of life (15 vs. 41 days) (all  $P < 0.05$ ).

**Conclusion.** Repeated measurement of MDASI interference characterized functional recovery after thoracic surgery for NSCLC and was sensitive to VATS' ability to enhance postoperative recovery. Further study of the clinical applicability of measuring recovery outcomes using PRO-based functional assessment is warranted. *J Pain Symptom Manage* 2016;■■■-■■. © 2016 Published by Elsevier Inc. on behalf of American Academy of Hospice and Palliative Medicine.

**Key Words**

Postoperative care, thoracoscopy, VATS, thoracotomy, quality of care, symptom management, outcomes

**Introduction**

The symptomatic sequelae of major thoracic surgery and its complications may have a significant negative impact on functional recovery for patients with cancer.<sup>1-3</sup> Because time to recovery dictates how quickly a patient can attain normal physical functioning and subsequent planned cancer therapies can begin, if needed, understanding functional

recovery is particularly important. Delayed or canceled adjuvant therapy can adversely affect long-term clinical outcomes;<sup>4</sup> therefore, measuring the severity of both symptoms and functional impairment from surgery should be a routine component of perioperative care.

Functional recovery after surgery is a complex process that involves physical, psychological, and social

Address correspondence to: Xin Shelley Wang, MD, MPH, Department of Symptom Research, The University of Texas MD Anderson Cancer Center, 1515 Holcombe Boulevard,

Unit 1450, Houston, TX 77030, USA. E-mail: [xswang@mdanderson.org](mailto:xswang@mdanderson.org)

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domains and that is influenced by various factors, including patient, surgical, and anesthetic characteristics and the presence of adverse events.<sup>5,6</sup> In general, functional status after major surgery is characterized by a period of immediate deterioration followed by gradual rehabilitation to baseline level,<sup>6</sup> yet actual functional recovery does not always align with metrics typically used to assess recovery, such as length of hospital stay (LOS). For example, although the median LOS for patients with non–small cell lung cancer (NSCLC) has been reported to be six days (interquartile range 4–9 days),<sup>7</sup> the true postoperative recovery period for returning to preoperative levels of usual activity varies, ranging from one to three months.<sup>8,9</sup> The rapid adoption of enhanced recovery pathways also is influencing functional recovery after surgery, in terms of both LOS and postdischarge functioning.

To grasp the potential impact of newly developed enhanced recovery and operative techniques, one must first be able to understand the effects of such techniques on a reasonable outcome, such as change in functional status over time. However, there is lack of agreement about a standard outcome measure to assess functional recovery after major surgery or hospital discharge. Patient-reported outcomes (PROs) are not typically collected during postoperative care (except for pain scores). Nonetheless, functional status can be reported by patients using short PRO questionnaires and electronic data-capture methods, even after discharge. PROs have been widely accepted in clinical research,<sup>10</sup> are increasingly used in routine oncology practice,<sup>11</sup> and have been endorsed by the U.S. Food and Drug Administration for use in drug labeling-claim trials.<sup>12</sup>

The introduction of patient-reported functional outcomes in patient care is relatively novel in current perioperative practice, primarily because of concerns about the reliability and comparability of PRO data and methodological issues related to how PROs can be deployed and understood in clinical studies and practice.<sup>13</sup> Few studies with PRO-based functional status as a primary or secondary outcome have longitudinally described functional recovery trajectories throughout the perioperative period, and few empirical studies have combined the patient's perspective (PROs) with clinical outcomes (risk for complications, length of hospital stay, return to planned treatment) to assess treatment effectiveness.<sup>14,15</sup> Integrated into postoperative care, such PRO reports could provide additional information to clinicians about recovery and could be an additional metric for comparing different surgical approaches, with minimal increase in cost.

The objective of the present study was, through a longitudinal PRO-based investigation, to establish a method for monitoring functional recovery in patients with early-stage NSCLC undergoing either open

thoracotomy or video-assisted thoracoscopic surgery (VATS), a less-invasive procedure that is expected to favor more rapid postoperative recovery.<sup>16–18</sup> We have previously reported on the utility of symptom-severity measurement from repeated administration of the MD Anderson Symptom Inventory (MDASI) after thoracic surgery.<sup>19</sup> Here, we hypothesized that MDASI interference, as a measure of daily functioning, would be sensitive to differences in the recovery trajectory related to surgery type (open thoracotomy vs. VATS).

## Methods

### Patients

We prospectively recruited treatment-naïve patients with Stage I or II NSCLC who were scheduled for thoracic surgery (either open thoracotomy or VATS) at The University of Texas MD Anderson Cancer Center in Houston, Texas. Eligible patients were required to be at least 18 years old, to understand English and to be able to understand the study requirements, and to be willing and able to respond to repeated MDASI assessments administered via a computerized, telephone-based interactive voice response (IVR) system after hospital discharge. The study was approved by the MD Anderson institutional review board, and all participants gave written informed consent.

### Study Design

**Outcome Measures.** Functional status was assessed with the MDASI, a psychometrically validated PRO assessment tool that measures multiple cancer-related symptoms and their interference with daily functioning.<sup>20</sup> The MDASI includes not only 13 symptom items but also six items that measure symptom interference with daily functioning in response to the question, “How have your symptoms interfered with your life?” The interference items include physical aspects (general activity, work, walking) and psychological aspects (mood, relations with others, enjoyment of life). Each interference item is rated on an 11-point scale, with 0 = “did not interfere” and 10 = “interfered completely” in the previous 24 hours. MDASI interference was the outcome measure for this study.

While hospitalized, patients completed a paper-and-pencil version of the MDASI at the time of enrollment (presurgery baseline) and on Day 3 after surgery. Patients were given a demonstration of the IVR system before they were discharged. Beginning on Day 7 after surgery and continuing to three months after surgery or until the patient started other cancer treatments, the IVR system called patients once each week.

At baseline, the Medical Outcomes Study 12-item Short-Form Health Survey (SF-12)<sup>21</sup> was administered to measure presurgery functional health and well-being.

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