Benefits of Digital Symptom Monitoring With Patient-Reported Outcomes During Adjuvant Cancer Treatment

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Digital symptom monitoring via electronic patient-reported outcomes (PROs) has been demonstrated in prospective randomized trials and population research to improve outcomes for adults with metastatic cancer receiving systemic treatment, including symptom control, quality of life, emergency department visits, time on treatment, and survival.[1-8] Catching symptoms early via this strategy enables care teams to intervene early and avert preventable downstream complications.[9] It is well-established that up to half of patients' symptoms go undetected by providers, and digital monitoring bridges this gap.[10-12]

Best practices for digital monitoring include a parsimonious questionnaire of common actionable symptoms (ie, 10-15 items) loaded into software through which patients ideally have a choice to self-report via various modes including Web, smartphone, or automated telephone interface. The software can be integrated with an electronic medical record platform or can be free-standing. A core group of crosscutting symptoms can be included representing common symptoms of cancer and adverse sequelae of treatment[13] with optional addition of tailored items specific to a cancer type or treatment, a physical function item (ie, performance status), and an open-ended free-text box.[14]

Patients may complete questionnaires at clinic visits via computer kiosks or tablets or from home between visits using their own devices (prompted by regularly scheduled text, e-mail, or phone reminders). If patients do not comply with a scheduled self-report, a reminder electronic prompt can be triggered, ideally followed by a call from clinic personnel. When a worsening or severe symptom is self-reported, an electronic alert is triggered to the care team (generally to a nurse or care coordinator) to inform potential intervention, and self-care advice can be delivered automatically to the patient. Full reports of symptoms should be acknowledged or reviewed by the care team with patients at visits so that patients will know that their self-reported information is an integral part of care. Training and coaching of patients and clinic personnel is essential to attain sufficient engagement and compliance, following tenets of quality improvement and implementation science.

To date, evidence of benefits of digital symptom monitoring has been largely focused on patients receiving treatment for metastatic cancer. There has been limited evaluation of impact on patients with curable disease receiving adjuvant therapy. Patients receiving adjuvant therapy differ fundamentally from those with metastatic cancer in that they generally have limited disease burden and minimal baseline cancer symptoms and have not received prior toxic cancer treatment. They therefore begin with better performance status and reserve than those with metastatic cancer. Additionally, adjuvant therapy is time-delimited, whereas treatment for metastatic cancer is often indefinite. For these reasons, it has not been clear if digital monitoring would confer the same benefits in the adjuvant setting as in the metastatic setting.

In the article that accompanies this editorial, Absolom et al[15] address this evidence gap with an important contribution to the digital monitoring literature. The authors randomly assigned 508 patients either to usual care or to the addition of digital symptom monitoring, among which the majority of patients (69.4%) were receiving adjuvant treatment with curative intent. Compared with usual care, benefits were seen in patients using digital monitoring; statistically significant quality-of-life benefits (specifically physical well-being) were observed at 6 and 12 weeks, but not at 18 weeks, which was the primary end point.

This trajectory of quality-of-life findings is not surprising, given the substantial number of trial participants receiving time-delimited adjuvant therapy. Patients receiving adjuvant therapy with curative intent experience toxicities with treatment from which they then rebound once supportive measures are worked out or as therapy winds down. This trial therefore supports the notion that digital symptom monitoring is useful during the active portion of adjuvant therapy.

The system used by patients in the symptom monitoring group of this trial included many best practice elements, including weekly prompts by e-mail or text reminding participants to log in from home and alerts to the care team for severe symptoms. It is not clear whether patients and clinic personnel were consistently monitored

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and coached to sustain engagement and compliance. On average, 64.6% of patients logged in at expected time points, but dropped to 58.1% by week 18. This relatively low patient compliance suggests that there may not have been optimal patient engagement to encourage self-reporting. Additionally, patients receiving adjuvant therapy may be less inclined to self-report as they wind down treatment. A best practice strategy to encourage patient compliance includes a reminder electronic prompt within 24 hours for nonreporting, followed by a telephone call reminder by clinic personnel 24 hours after that, which could be considered in future evaluations of this system.

E-mail alerts to the care team in this trial were triggered by severe patient-reported symptom magnitude or for multiple moderate symptoms. A best practice is also to include alerts for worsening symptoms, and there is evidence that the most actionable concerns stem from worsening rather than absolute thresholds. For example, an alert algorithm without such an approach would miss potentially actionable worsening of symptoms from scores of none to moderate.

Unlike prior studies, there was not an observed reduction in hospital admissions. Again, this finding is likely because of the high number of participants receiving adjuvant therapy in this trial. Although rates of avoidable hospitalizations are relatively high among patients with metastatic cancer, they are lower in the adjuvant setting.

In summary, the authors are to be lauded for conducting this trial, which adds to the mounting evidence documenting clinical benefits of digital symptom monitoring in oncology. Their research group is responsible for much of the foundational published research integrating PROs into routine cancer care. There is now evidence that benefits of digital monitoring are conferred to those receiving adjuvant therapy, at least during the active phase of treatment. There may also be utility in long-term periodic monitoring in this population to detect late toxicities, which warrants future evaluation. Digital monitoring with PROs is an effective strategy to continuously engage and assure the health of patients and should become a cornerstone of population health management in oncology.

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