Original Research

The Effect of Written Pharmacist-Provided Patient Education for 3 Frequently Prescribed Oral Anticancer Agents on the Incidence of Patient-Initiated Triage Calls

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Background: Oral chemotherapy agents (OCAs) continue to play an increasing role in the treatment and management of many oncologic diseases. It has been estimated that >25% of the oncology medications in development are oral agents.1 From 2013 through 2015, 18 oral anticancer agents received initial approval from the US Food and Drug Administration (FDA), including 9 agents in 2015 alone.2 The ease and convenience of oral administration have proven to be a giant step forward in the treatment of cancer. However, these breakthroughs and benefits also come with potential risks.

Limited knowledge about toxicities, coupled with complex dosing regimens, make it challenging and difficult for patients to self-manage adverse events. The incidence of adverse events associated with oral chemotherapy can be as high as 90%,3 with a substantial amount being grade 3 or 4.4 Oral chemotherapy agents (OCAs) continue to play an increasing role in the treatment and management of many oncologic diseases. It has been estimated that >25% of the oncology medications in development are oral agents.5 From 2013 through 2015, 18 oral anticancer agents received initial approval from the US Food and Drug Administration (FDA), including 9 agents in 2015 alone.6 The ease and convenience of oral administration have proven to be a giant step forward in the treatment of cancer. However, these breakthroughs and benefits also come with potential risks.

Pharmacists play a vital role in efforts to avoid medication-related complications, through counseling and management of patients who receive oral chemotherapy. The Oral Chemotherapy Service (OCS) at St. Luke’s Mountain States Tumor Institute (MSTI) has provided these services to patients since 2008. However, many patients managed by the OCS have expressed interest in having more written, streamlined, and organized information when they are initially counseled by one of MSTI’s oncology pharmacists.

Objective: To determine whether written pharmacist-provided education can reduce patient-initiated triage calls and allow patients to self-manage their side effects of oral chemotherapy.

Methods: A 6-month retrospective analysis of the triage calls from all MSTI patients who received oral chemotherapy from July 2014 through December 2014 was performed. The final 16 weeks of this retrospective period were used for comparison with the 16-week postintervention period. During a prospective 16-week period (March 2015 to June 2015), patient education sheets were provided by pharmacists to patients prescribed capecitabine, temozolomide, or pazopanib; together, these agents represented two-thirds of all triage calls pertaining to oral chemotherapy. A subsequent analysis of triage calls was performed for the patients on these drugs who had received an education sheet during the prospective period. Both analyses were performed by tallying the number of calls related to each medication.

Results: A total of 131 patients were included in the 16-week preintervention period. Sixty-four patients received a patient education sheet during the 16-week prospective period, and were included in the comparative analysis. Data from the two 16-week study periods showed that, after distribution of the education sheets, the average number of calls per patient declined by 47%.

Conclusion: Pharmacists can help reduce the number of triage calls from patients on oral chemotherapy by providing appropriate and specific education material, and enabling patients to self-manage the most common side effects of their medication.
patients are inundated with many types of information (eg, clinical and financial support), all of which are relevant and important to the well-being of the patient and family members involved in patient care.6,7 These situations also present valuable opportunities for oncology pharmacists to counsel patients on detailed directions for medication use, potential side effects, and procedures for monitoring adverse events (eg, by telephone or during patient visits with providers). Most important, pharmacists can provide patients with appropriate self-care techniques for recognizing and managing common adverse events before they progress and become unmanageable or even life-threatening.

In a program at a community cancer center, oncology pharmacists provided medication review and counseling for patients taking oral chemotherapeutics.8 Nurses and medical oncologists at this site expressed satisfaction with this program, and indicated that patients found these pharmacists helpful and easily contactable.

St. Luke’s Mountain States Tumor Institute (MSTI) is a regional cancer referral center with 6 locations, spanning southern Idaho and eastern Oregon. Since initiation of the MSTI Oral Chemotherapy Service (OCS) in 2008, many patients prescribed oral chemotherapy have expressed a desire for patient education material that is concise, easy to understand, and that provides the knowledge needed to self-manage common side effects of treatment.

A review of the literature indicates that interventions for patients on oral chemotherapy focus on either adherence or symptom management.9 A 2005 survey of 42 US cancer centers showed that 10 centers had no formal process for monitoring patient adherence.10 Within a 1-year period prior to the survey, at least 1 serious adverse drug event related to oral chemotherapy occurred at 10 of these centers, and a “serious near miss” was reported at 13 others. The rates of adherence to oral chemotherapy regimens vary greatly, from 20% to 100%.9 Moreover, there is no uniform definition of adherence. In some studies, missing just 1 dose may be defined as failure to adhere; in others, missing ≤20% of doses may constitute nonadherence. Overadherence also may occur. One study showed that overadherence was more common than underadherence for certain patients receiving complex dosing regimens of OCAs.11

The inconsistencies in defining and measuring adherence make it difficult to demonstrate measurable and objective results from any intervention focused solely on improving adherence.

Managing the side effects of oral chemotherapy to improve adherence may involve nurse-initiated phone calls, automated phone surveys with nurse follow-ups, and symptom management kits as a supplement to nursing follow-ups.9 In contrast to the bulky materials and many pages of supplemental counseling documents and FDA-mandated prescribing information, the OCS at MSTI has implemented a simple, straightforward approach to help patients identify and manage common side effects of OCAs. The pharmacist provides patients with a simple, 1-page, full-color sheet of information that is easy to understand. This information enables patients to evaluate, and, more importantly, self-manage the most common side effects of oral chemotherapy without clinical intervention.

In this performance-improvement study, we sought to determine the effect of this handout on the volume of patient-initiated triage calls to the nursing staff at MSTI. Lower call volume would indicate improved self-care by patients, and reduced use of valuable healthcare resources.

Methods

This performance-improvement project began with a retrospective review of the records of all MSTI patients who received oral anticancer therapy for a 6-month period from July 2014 through December 2014. The information collected included age, sex, number of triage calls made, number of inpatient stays and emergency department visits, and type of OCA prescribed.

The 3 most frequently prescribed oral anticancer drugs were identified by reviewing documentation from the MSTI nursing triage department, and clinical notes from the electronic medical records for any potential triage calls, inpatient admissions, or emergency department visits. If any patient had an actual triage call, inpatient hospital stay, and/or emergency department visit during the retrospective period, an assessment was conducted to determine if an OCA was responsible.

The evaluation period for this particular assessment began on the initial date that dispensing occurred within the 6-month retrospective period, and lasted until the final day of this period. A triage call, inpatient admission, or emergency department visit was deemed possibly related to the medication if the patient experienced a side effect documented in the FDA prescribing information for the drug; these side effects included, but were not limited to, nausea, vomiting, diarrhea, constipation, stomatitis, rash, and hand-foot syndrome. This determination was made by a single clinical pharmacist to avoid the potential for variability in clinical judgment among different pharmacists.

The calls or admissions that were considered unrelated to oral chemotherapy (eg, pertaining to appointment times, scheduling changes, medication refills, diagnostic scan results, or symptoms of disease progression) were not included in the analysis.
The second part of the study entailed comparing results of the retrospective review with those of the intervention period. The number of inpatient stays and emergency department visits were analyzed in each comparison group to rule out the possibility of an increase or decrease in triage calls leading to an increase or decrease in hospitalizations or emergency department visits between the 2 comparison groups.

Patient education sheets were created and designed by pharmacists from the MSTI OCS for the 3 drugs associated with the most calls, which were identified through the 6-month retrospective review. Figure 1 provides an example of a patient education sheet. Input on the content and language was provided by nurses, and the sheets were approved by the MSTI Patient Education Committee prior to being distributed to patients.

Beginning in March 2015 and continuing for 16 weeks, the sheets were provided to all new patients initiated on 1 of the 3 OCAs. Thus, none of the patients in the retrospective review were included in the 16-week prospective assessment. These sheets were provided with the prescription itself (at pickup), or mailed with the prescription to patients in rural areas.

Approximately 1 week before pickup or mailing, an MSTI oral chemotherapy pharmacist established telephone contact with the patient, and reviewed the dosing regimen, possible side effects, and management procedures of the prescribed drug. This initial counseling by telephone has been standard practice since 2008; therefore, it was not a new intervention for the present study. The content of the pharmacist’s telephone counseling was the same as that provided in the written education sheet. During the conversation, the patient was informed that the 1-page education sheet would supplement the information provided verbally.

The triage calls initiated by patients were counted for the retrospective and prospective periods. The average number of weekly calls per patient was determined for each study period, and results were compared and analyzed statistically. As with the retrospective period, inpatient stays and emergency department visits related to side effects were counted for the prospective period.

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16-week preintervention period (September 2014 through December 2014) was selected from the full retrospective review period, and results were compared with findings from the 16-week postintervention period (March 2015 through June 2015). Key population characteristics (ie, age, sex, type of OCA) were documented and compared for the 2 study periods (Table).

A small percentage of patients in the postintervention group received concurrent capecitabine/temozolomide. An independent t-test was used to analyze continuous data. The average number of weekly calls per patient was analyzed. A 2-sided P value of ≤ .05 was considered significant.

### Results

A total of 450 patients received an OCA during the 6-month retrospective review period, and 315 (70%) of those patients made a combined total of 278 triage calls. Of these 278 calls, 183 (66%) were made by patients who received 1 of the 3 most frequently prescribed OCAs, which were capecitabine (48% of calls), temozolomide (10% of calls), and pazopanib (8% of calls; Figure 2).

In the retrospective period, 131 patients were receiving 1 of these 3 agents during the latter 16 weeks (September 2015 through December 2015); these patients made a total of 139 triage calls during that time. Sixty-four patients received an education sheet and were included in the postintervention analysis (Figure 3). The average number of weekly calls per patient was 0.066 in the 16-week preintervention period, compared with 0.035 in the 16-week postintervention period (36 triage calls among 64 patients), representing a reduction of 47% (P = .003).

In a 16-week period, the average number of calls per patient was 1.06 before the intervention, and 0.56 afterward (Figure 4). The distribution of calls by medication in the preintervention (Figure 5) and postintervention (Figure 6) periods showed that capecitabine was responsible for the most triage calls.

During the preintervention period, there were 2 emergency department visits, and no inpatient hospitalizations that may have been related to side effects of the 3 most common OCAs. During the postintervention period, there were 3 emergency department visits, and no inpatient admissions that may have been related to side effects of these drugs.

### Discussion

The OCAs for which information sheets were prepared were based on an analysis of patient-initiated triage calls. We felt that it would be more clinically relevant to focus our intervention on the agents responsible...
for the most triage calls, rather than the agents prescribed most frequently. However, our 2 most frequently prescribed OCAs (capecitabine and temozolomide) were also responsible for the most triage calls during the 6-month retrospective period. This is consistent with current literature, suggesting that these OCAs should be included in any performance-improvement project designed to enhance medication safety and reduce patient harm, particularly because of their risk for significant toxicity.\textsuperscript{10,12} Moreover, temozolomide is prescribed for patients with unique clinical needs and challenges.\textsuperscript{12} The adverse drug reactions addressed in our patient education sheets are also consistent with the clinically documented adverse effects of these drugs among oncology patients.\textsuperscript{13}

The goal of our project was to improve patient care by providing better and more streamlined materials for self-management of OCA-related side effects. The significant reduction in the average number of weekly triage calls per patient in a 16-week period indicates that our objective was achieved. Because there were so few OCA-related emergency department visits and no OCA-related inpatient stays in the preintervention period, we decided not to focus on any intervention designed solely to improve those metrics.

The fact that there was little difference in those metrics between the 2 study periods suggests that patients were consistently well-managed, and did not require other clinical interventions to manage their adverse effects. The results of this project are promising, and may lead to the creation of education sheets for additional OCAs, especially as new agents and novel indications become approved by the FDA. The most common reasons for the triage calls were similar in the 2 study periods, and related to information provided on the education sheets; however, the lower number of patient calls in the postintervention period suggests that these sheets were of clinical significance.

**Limitations**

Despite the favorable findings of this study, several limitations exist. It cannot be assumed from our analysis that patients who are better equipped to manage the side effects of OCAs have improved therapeutic outcomes.

Although our study did not include an evaluation of the impact of our intervention on patient satisfaction or Hospital Consumer Assessment of Healthcare Providers and Systems scores, it would be interesting to examine such outcomes in future studies.

Moreover, the study data were dependent on human documentation of call content by nursing staff, which may not have been completely accurate for every call. There is no standard for nurses to document such calls, which may lead to inconsistent notation and interpreta-
Conclusion

It is difficult to determine what effect, if any, the intervention may have had on reducing healthcare costs. However, the reduction in call volume would indicate a reduction in use of nursing-related resources. It can be hypothesized that by reducing the need for oral chemotherapy triage staff, cost-savings could be realized by the institution. However, determining the amount and extent of possible savings from such interventions would require future research.

This performance-improvement project demonstrated that pharmacists are able to make a clinically and statistically significant impact on patients’ abilities to self-manage the side effects of oral chemotherapy.

This performance-improvement project demonstrated that pharmacists are able to make a clinically and statistically significant impact on patients’ abilities to self-manage the side effects of oral chemotherapy. Working closely and communicating effectively with all interdisciplinary team members is vital to the implementation and success of any performance-improvement effort. Our findings also demonstrate the importance of reducing the quantity of patient education materials, and increasing the quality and efficiency of this information.

By focusing on managing side effects and reducing the severity and duration of adverse events, rather than concentrating solely on improving compliance, we can measure the impact of clinical interventions more objectively, and better target these efforts in the future.

Author Disclosure Statement

Dr Mancini is on the speaker’s bureau for Millennium Pharmaceuticals and Pfizer. Dr De Padova, Dr Grabowski, and Dr Incek have no conflicts of interest to report.

References