Original Work

Expanding the Roles of Certified Pharmacy Technicians in the Setting of Anticoagulation: Addressing In-Range INRs for Stable Patients

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Abstract

Objective: The primary objective was to develop and implement an anticoagulation (AC) clinic guideline for certified pharmacy technicians (CPhT) management of patients on stable doses of warfarin. The secondary objectives were to obtain 100% AC clinician approval of CPhT warfarin therapy plans and to observe improvement in time to complete a CPhT-patient encounter comparable to the AC clinician's management of the stable patient population.

Methods: One CPhT was paired with one AC clinician to complete an initial training period and allow for verification of patient encounter accuracy. The CPhT identified stable patients with in-range INRs and completed an encounter comprised of a chart review, patient phone interview, and finalizing a therapy plan with warfarin dosing and appropriate frequency of INR monitoring. The AC clinician reviewed the accuracy and appropriateness of the CPhT plan. The CPhT-patient encounter data was collected for a three month period.

Results: The CPhT was able to utilize an AC clinic guideline for management of patients on stable doses of warfarin to complete 56% of the eligible patient encounters in addition to their usual daily responsibilities. All of the completed encounters were deemed appropriate by the AC clinician verification. The weekly average of time to complete encounters showed a steady decline over the data collection period, which pointed to improved CPhT efficiency.

Conclusions: The CPhT was able to provide appropriate warfarin management of stable patients with in-range INRs without sacrificing the ability to complete their usual clinic responsibilities. This allowed for an enhanced AC clinician focus on the most complex patient populations.

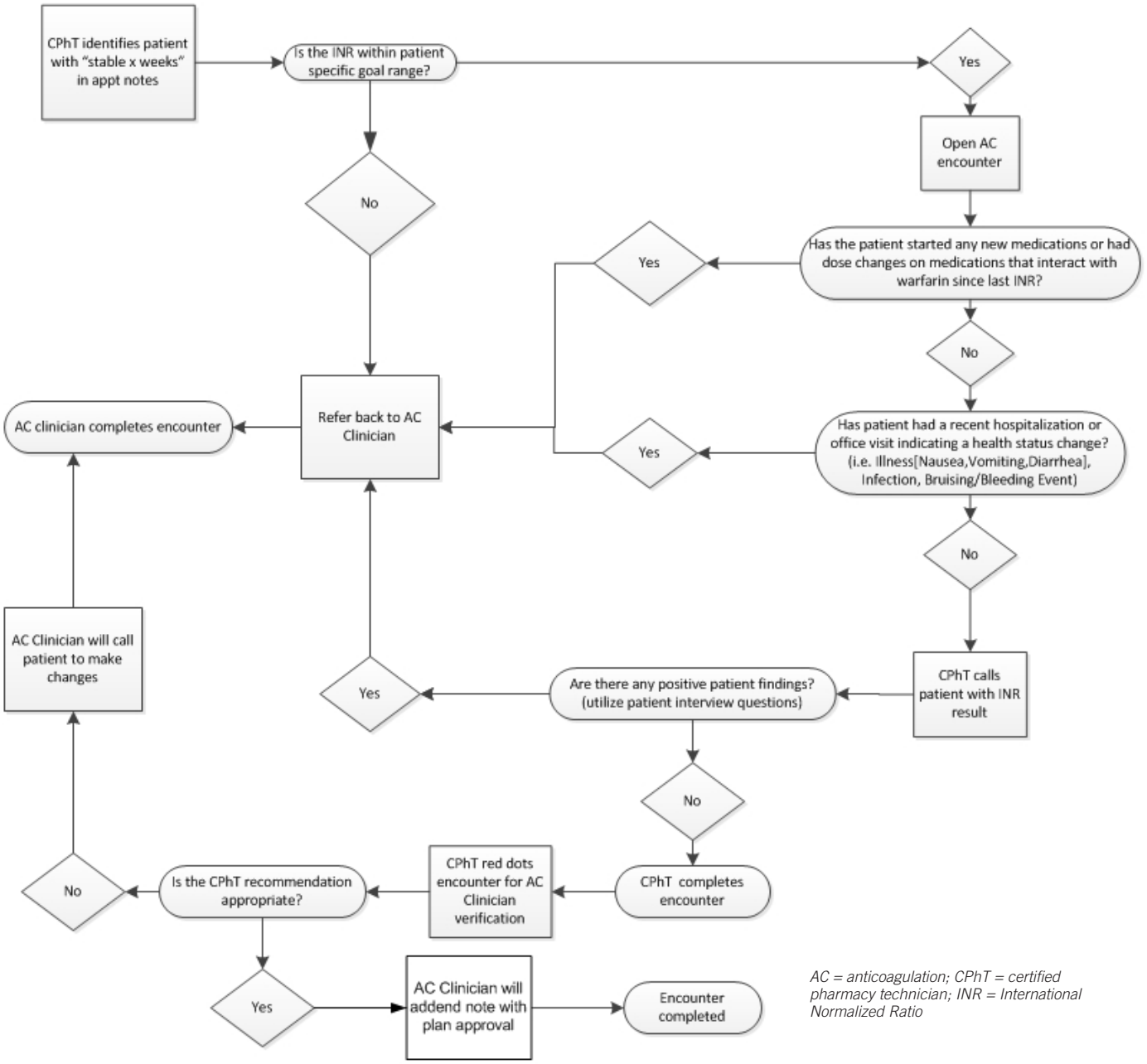
Anticoagulation management of warfarin is a complex process that involves monitoring many factors that can alter the medication's safety and effectiveness, such as patient adherence to the appropriate dosing regimen, dietary vitamin K intake, drug-drug interactions, and patient health status changes.[1] Numerous studies have shown that pharmacy-led anticoagulation (AC) clinic management of warfarin patients leads to improved time in therapeutic International Normalized Ratio (INR) range and lower rates of bleeding and thromboembolic events when compared to management by a physician.[2,3] These improved outcomes lead to significant cost savings in direct anticoagulation care cost, as well as savings from lower rates of hospital admissions/ER visits.[4]

Due to the intensive monitoring required by AC clinicians (pharmacists and nurses) to provide safe and effective patient care, time constraints can become a barrier to maximizing patient outcomes. Previous studies have examined whether appropriately trained, certified pharmacy technicians (CPhT), may be able to perform tasks that have been typically reserved for AC clinicians.[5,6]

A pharmacy-managed inpatient study of the warfarin dosing service at Burnaby Hospital in British Columbia, examined whether appropriately trained clinical pharmacy support assistants (CPSA) could accurately obtain patient data collection and provide appropriate dosing recommendations in an acceptable time frame in order to be considered cost-neutral compared to the work of the AC clinician.[5] In this small study of 60 patient encounters, it was determined that the CPSAs obtained accurate data collection and provided appropriate dosing recommendations when compared to the clinical pharmacists. The time to complete an encounter was longer with the CPSA than the clinical pharmacist, but the times did decline over the course of the study, which reflected the probability of improved efficiency with more experience.

The Veterans Affairs (VA) System also investigated what proportion of the AC clinic workload could be completed by appropriately trained pharmacy technicians, including some tasks which were typically reserved for pharmacists.[6] It was determined that pharmacy technicians could conduct interviews for patients

FIGURE 1. CPhT Encounter Process



AC = anticoagulation; CPhT = certified pharmacy technician; INR = International Normalized Ratio

with in-range INRs. It was decided that if clinical questions arose during the patient interviews (i.e., food and drug interactions), the questions should be routed to an available AC clinician. The advanced-practice pharmacy technicians were able to complete 41% of the clinic workload compared to 21% of the workload handled by pharmacy technicians without advanced training, which allowed for enhanced AC clinician focus on the more complicated patients.

The positive findings identified in these studies led the SSM Health Dean Medical Group AC Clinic to begin incorporating these enhanced CPhT responsibilities into the workflow to determine if these principles could translate to clinic success on a larger scale. SSM Health operates as an integrated delivery network whereby a medical group, hospital system, and health plan work cooperatively to provide quality care. This collaborative environment offers unique challenges and opportunities for providing services across the care continuum. The medical director for the AC Department attends monthly project meetings, presents case studies and relevant research to the staff, and consults on difficult-to-manage patients. The clinic operates under a collaborative care agreement and a series of evidence-based guidelines and protocols that are reviewed and signed by the medical director. The AC Clinic is currently comprised of 10 AC clinicians (five pharmacists and five nurses)

FIGURE 2. Patient Interview Questions

Is the current warfarin strength/dose correct?

Have you had any missed/extra doses?

Have you experienced any bruising/bleeding concerns (nose bleeds, red/black stool, blood in urine)?

Have you had a change in dietary vitamin K intake (green veggies, vitamins, supplement shakes)?

Have you experienced any recent illness/diarrhea/vomiting?

Have you had any prescription/OTC medication changes (TMP/Sulfa, metronidazole, fluconazole, amiodarone, dicloxacillin, rifampin)?

Are you scheduled for any upcoming procedures/surgeries?

OTC – over the counter; TMP/Sulfa = trimethoprim/sulfamethoxazole

that manage approximately 5,000 patients on warfarin. The patients are split into pods that are assigned to each AC clinician to improve continuity of care. There are also 3 CPhTs that participate in various non-clinical responsibilities throughout the clinic. By providing enhanced training to these technicians, the aim was to duplicate the positive findings in the previous studies to advance the roles of our CPhTs and to allow for increased AC clinician focus on the most complex patients in an effort to maximize patient outcomes. The primary objective was to develop and implement an AC clinic guideline for CPhT management of patients on stable doses of warfarin. The secondary objectives were to obtain 100% AC clinician approval of CPhT warfarin therapy plans and to observe improvement in time to complete a CPhT-patient encounter comparable to the AC clinician's management of the stable patient population.

Methods

Patient Selection Criteria

The AC clinicians were responsible for determining which patients could be deemed stable for a CPhT-patient encounter. A patient could be considered stable if they had been on the same warfarin dose for greater than 6 months and had remained consistently within their INR goal range. The AC clinicians then documented in the daily appointment notes that the patient was stable, which identified them as eligible for inclusion in the CPhT encounters. The patient was only eligible for inclusion in a CPhT encounter if they were within their INR goal range. The fluidity of a patient's health status

TABLE 1. Stable Patient Encounter Data

Encounter Type	*Totals*
Eligible Stable Patient Encounters	148
CPhT Completed Encounters	83
AC Clinician Approved Encounters	83
Encounters Referred Back to AC Clinician	0
Encounters Altered by AC Clinician	0

AC = anticoagulation; CPhT = certified pharmacy technician

necessitated continued reassessment of their stability with each subsequent encounter. If a stable patient had an out-of-range INR, the AC clinician completed the encounter and then determined whether their stable status needed to be removed based on the cause of the out-of-range result. If a patient who was considered stable had an isolated out-of-range INR due to an identifiable cause such as a procedural warfarin hold, the patient could maintain their stable status as long as subsequent INRs remained within their INR goal range.

CPhT Training Requirement

The CPhT was paired with an AC clinician for the initial training period, which included education on the use of appropriate prescription and natural medicine reference materials and dietary vitamin K resources. The CPhT was instructed in proper patient chart review to identify pertinent information that might signify a patient health status change or medication additions/changes, which could warrant warfarin dosing adjustments. There was an initial shadowing period where the CPhT observed the AC clinician throughout the entire process of completing patient encounters, followed by CPhT completion of encounters under the direct supervision of the AC clinician to ensure the encounter process (Figure 1) was completed in its entirety.

CPhT INR Encounter Process

In the initial pilot phase of the program, one CPhT was paired with one AC clinician for training and verification of the accuracy of the patient encounters. When the CPhT identified a stable patient that was within their INR goal range, they began a chart review prior to the phone interview portion of the encounter. The chart review was used to identify any potential change in medications that might cause an interaction with warfarin, or a recent hospitalization/office visit that indicated a significant change in health status. The CPhT utilized a pre-made list of significant drug interactions, as well as drug reference interaction checkers to flag potentially concerning medications. Positive findings in regards to drug interactions or health changes required routing back to the AC clinician for completion of the encounter. If there were no positive findings identified, the CPhT proceeded to the phone interview portion of the encounter. During the phone interview, the CPhT utilized patient interview questions (Figure 2) to identify any other positive findings that might require an intervention by the AC Clinician. If no further positive findings were identified, the CPhT continued the patient's current warfarin dosing and provided them with their next INR date based on the patient's historical testing frequency. The AC clinician finalized the encounter by documenting that the plan had been reviewed and was appropriate

FIGURE 3. CPhT Usual Daily Responsibilities

1. **Answer incoming clinic phone calls**
2. **Schedule/Reschedule patient INR appointments**
3. **Receive and process new patient referrals**
4. **Provide reminder calls to patients that are overdue for INR monitoring**
5. **Receive INR results and alert the appropriate AC clinician**
6. **Pend warfarin refill requests for AC clinician approval**
7. **Route patient and provider messages to AC clinician**
8. **Enter INR lab orders (internal electronic orders or faxed outside clinic orders)**
9. **Facilitate communication of warfarin orders (via electronic health record) to SSM clinic pharmacy med box program**
10. **Initiate and finalize completion of home INR monitoring applications for patients**

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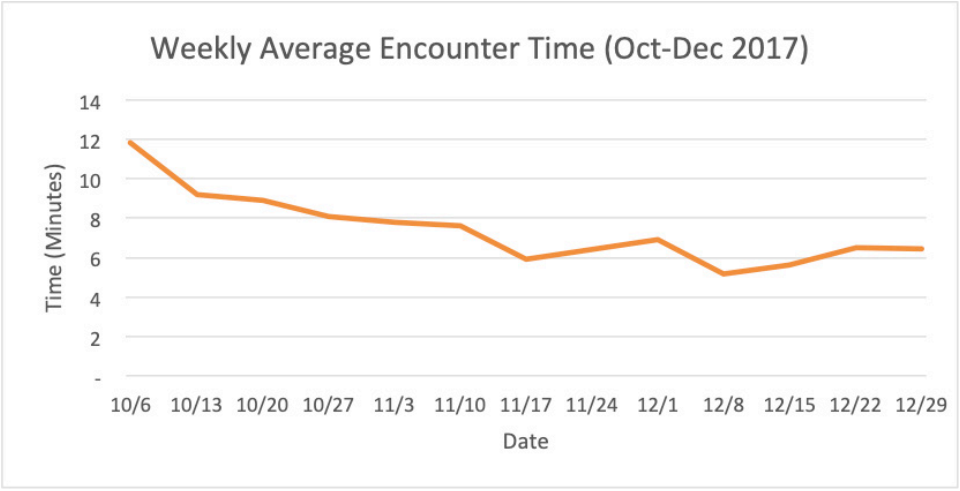
FIGURE 4. Average CPhT Encounter Time



for the patient based on the information gathered through the thorough chart review and phone interview.

Results

Primary Objective

Following a training period with an AC clinician, the CPhT was able to utilize a standard AC clinic guideline to complete a thorough patient chart review and phone interview. Then, the CPhT was able to provide an appropriate warfarin therapy plan for a stable patient, confirmed by AC clinician encounter verification. The average time required for the AC clinician to complete final encounter verification was 45 seconds, which demonstrated a minimal time commitment.

Secondary Objectives

For the initial pilot phase of one CPhT to one AC clinician, encounter data was collected for a three month period (Table 1). There were 148 eligible encounters of stable patients that were within their target INR goal range. The CPhT was able to complete 83 of the eligible encounters (56%) in addition to their usual daily responsibilities (Figure 3). All of the completed therapy plans were deemed appropriate in the verification step by the AC clinician, indicating that a high level of patient care was preserved in the CPhT-patient encounters. The remaining 65 encounters were completed by the AC clinician due to CPhT time constraints in completing their usual clinic responsibilities.

The time required to complete an encounter was expected to be initially longer in the early stages, as the CPhT became familiar with the process. The goal was to see a decrease in encounter time as the CPhT became more efficient in the patient encounter process. The weekly average of encounter times was tracked over the same three month data collection period (Figure 4). The AC clinician encounter times for the stable patient population were collected over one clinic day to provide a comparison to the CPhT encounters. The average time for the AC clinician to complete a stable patient encounter was 3 minutes. The average CPhT encounter in week 1 was 11.83 minutes from the start of the chart review process to the completion of the patient call and all necessary charting. As expected, the average showed a steady decline as the CPhT became more efficient in the patient encounter process. From week 6 and beyond, the average time to complete an encounter was consistently between five to seven minutes, which compared favorably to the time necessary for the AC clinician to complete an encounter for a stable patient that is within their therapeutic INR goal range.

Discussion

The positive results obtained in the initial pilot phase of this program bode well for further expansion in our clinic. The CPhT was able to complete a high percentage of eligible patient encounters in a favorable timeframe to allow for completion of their usual technician tasks in addition to the enhanced INR encounter responsibility. Expanding these enhanced responsibilities to our other technicians will allow for a higher number of stable patients to be managed by a CPhT, thereby allocating more time for AC clinicians to focus on our more complex patients. Expanding the management of stable patients to additional pharmacy technicians in our clinic will require continued monitoring of performance to ensure that their plan accuracy and time management meet or exceed the initial positive data obtained in our pilot phase. Future success could potentially lead to a further transformation of the CPhT role by placing a larger emphasis on direct patient management.

Conclusion

Providing enhanced training to certified pharmacy technicians in the setting of anticoagulation can allow for CPhT management of stable warfarin patients. CPhT patient management allows for an advanced technician role in patient care and an enhanced focus on complex patients for the AC clinicians, which helps maintain the quality of care for stable patients and improves the care for the most complex patient populations.

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