Comparison of Time in Therapeutic Range (TTR) in Patients Enrolled in the Anticoagulation Management Services Following Pharmacist Intervention

Mustafa Alessa*

Hallmark Health Sysytem, USA

*Corresponding author: Mustafa Alessa, PharmD, BCPS, Hallmark Health Sysytem Hallmark Health's Anticoagulation Management Service, Stoneham Outpatient Campus, 41 Montvale Avenue, Stoneham, Massachusetts, USA, Tell: 541-908-5428; Email: mustafa.alessa@hotmail.com

Abstract

Most of the patients receiving warfarin at our institution are managed as an outpatient at our Anticoagulation Management Services (AMS) Clinic. Despite of this direct management, some patients failed to maintain their goal. A protocol specific to patients with time in therapeutic range (TTR) <50% was added with the goal of improving this parameter and hence outcomes. The primary endpoint was to assess the percentage of patients with TTR<50% who achieved TTR following the protocol of pharmacist intervention. Secondary endpoint was to compare the number of hospital/ER visits due to bleeding or clotting from warfarin in the same cohort of patients.

A prospective cohort review was conducted using an electronic reporting system to identify all patients on warfarin with TTR <50% and number of warfarin related admissions and ER visits during a three-month period. For a follow up period of three months, a protocol for additional pharmacist intervention was developed and initiated for those patients. The percentage of patients with TTR<50% who achieved TTR following the protocol of pharmacist intervention was 72.9%, P<0.05, compared to 0% before the protocol. The number of hospital/ER visits due to bleeding or clotting from warfarin in the same cohort of patients was zero after utilizing the protocol compared to four events before the protocol. This project demonstrated an increase in the percentage of patients, who were managed using the developed protocol, within TTR and a decrease in the number of hospital/ER visits due to bleeding or clotting.

Keywords: Warfarin; Time in therapeutic range; Pharmacist

Abbreviations: AMS: Anticoagulation Management Services; TTR: Time in Therapeutic Range; ISTH: International Society on Thrombosis and Haemostasis

Introduction

Warfarin is an effective agent in the prevention and treatment of thromboembolic events. Even with the emergence of the direct oral anticoagulants, warfarin continues to be needed and widely used as an oral anticoagulant. This is especially true in patient population who were not studied in clinical trials of target specific oral anticoagulants or who are unable to receive them due to adverse effects or contraindications [1-3]. However, there are many challenges associated with its used due to its narrow therapeutic window, drug-drug interactions, drug-food interactions, patient compliance and patient knowledge about the medication use. All of which can affect maintaining the defined therapeutic range of international normalized ratio (INR) which can also vary from patient to another.

Warfarin requires close and frequent monitoring with multiple dose adjustments to achieve efficacy while minimizing serious side effects such as bleedings and clotting [4,5] Because of

that, ACCP recommended the use of specialized Anticoagulation management services (AMS) [2]. One of the AMS models is the AMS managed by pharmacists. Many randomized controlled trials have shown that time in therapeutic range (TTR) for patients receiving warfarin is higher when anticoagulation INR is managed by a pharmacist as compared to usual care by their physicians [6-9]. Therefore, to improve the quality of anticoagulation management at Hallmark Health System, the Anticoagulation Management Services (AMS) was established to manage and optimize the beneficial outcomes while minimizing adverse event.

The Hallmark Health System Anticoagulation Management Service offers outpatient management for patients on warfarin. It is managed by medical director and pharmacists specialized in anticoagulation. Pharmacists including pharmacy residents monitor patients who are receiving anticoagulation to adjust

doses as necessary while providing education and counseling to the patients through the phone. Although pharmacists provide excellent interventions for patients on warfarin at our AMS, there are still approximately 22% present with TTR of less than 50%. A protocol for additional pharmacist intervention for patients with TTR<50% was developed and added to the AMS Policy with the goal of helping to achieve TTR in patients with TTR<50%. To our knowledge, this the first study that investigate the implementation of a pharmacist intervention protocol in an already established pharmacist led-AMS and specific patients with TTR<50% with individualized education that is related to the reason of not being in TTR.

Methods

The study is a prospective chart review. It was approved by the institutional review board (IRB). Patients with TTR<50% as well as number admissions and ER visits were identified using an electronic reporting system during a three-month period, December 2014 to February 2015. AMS pharmacy staff team includes pharmacist and pharmacy residents. Identified patients were flagged to be viewed by all pharmacy staff team at AMS. Once identified, patients were followed for a follow-up period of three months, May 2015 to July 2015.

A protocol for additional pharmacist intervention was developed and approved by the Pharmacy Department and Anticoagulation Subcommittee to be utilized in the included patients. The protocol is individualized to each patient based on the reasons of being out of the TTR (Figure 1a & 1b). The patients are extensively counseled and educated about warfarin management and options that AMS Clinic can offer to maximize warfarin efficacy and safety. The protocol was initiated for the identified patients over the follow-up period. During the three-month follow-up period, pharmacy staff team at AMS managed the identified patients according to the protocol flow sheet. Patient counseling related to warfarin was done over the phone and patients were educated on achieving TTR. After encountering the enrolled patients, pharmacy staff team at AMS, documented their intervention and counseling points that are related to the protocol in the electronic software system (Standing Stone CoagClinic).
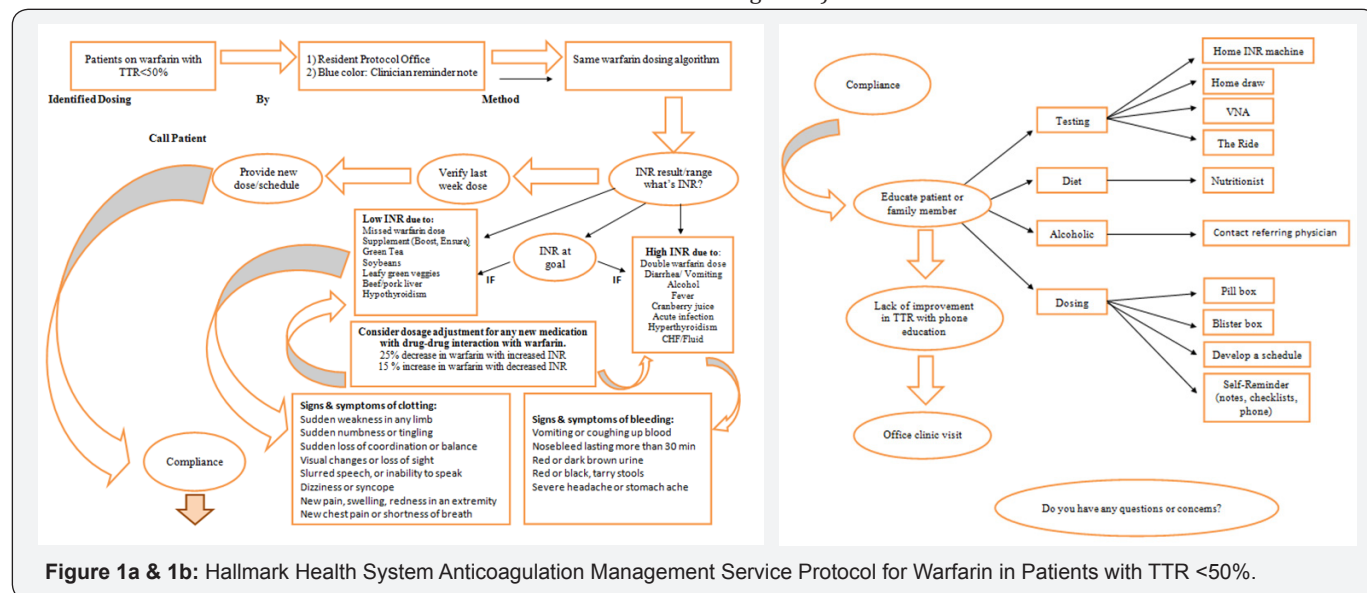
Figure 1a & 1b: Hallmark Health System Anticoagulation Management Service Protocol for Warfarin in Patients with TTR <50%.

The study included AMS adults (>18 years old) patients on warfarin with TTR<50%. Patients excluded if they have been on warfarin or on service for less than 90 days or if they are at TTR>50%. The primary endpoint was to assess the percentage of patients with TTR<50% who achieved TTR following the protocol of pharmacist intervention. Secondary endpoint was to compare the number of hospital/ER visits due to bleeding or clotting from warfarin in the same cohort of patients such as major bleeding, according to the criteria of the International Society on Thrombosis and Haemostasis (ISTH), any clotting (i.e. venous or arterial clotting DVT/PE, MI and stroke. Data collected from the electronic system include age, gender, INR, and bleeding/clotting events. McNemar test was used for categorical data. Student's t-test was used for all continuous data. P value was considered statistically significant if it was below 0.05.

Results

The study identified 204 patients in the first three months who have TTR<50%. During the follow-up period, 34 patients were lost due to discontinuation of service such as switching to oral anticoagulant other than warfarin, changing the clinic/location, admission to rehabilitation center, or death. At the end of three months follow-up period, number of included patients was 170. The average age was 74 years old, ranging between 34 years old to 95 years old. There were 58.8% males and 41.2% females (Table 1). The percentage of patients with TTR<50% who achieved TTR following the protocol of pharmacist intervention was 72.9%, P<0.05. The number of hospital/ER visits due to bleeding or clotting from warfarin in the same cohort of patients was four events in first three months period. During the follow-

up period, zero hospital/ER visits due to bleeding or clotting from warfarin was detected.

Table 1: Baseline Characteristics & Results.

Demographics	Pre-Intervention Group	Post-Intervention Group
Duration	Dec 2014 to Feb 2015	May 2015 to Jul 2015
Patient (n)	204	170
Discontinuation (n)	16% (34/204)	
Patient with TTR > 50% (n)	0.00% (0/204)	72.9% (124/170)
Patients with TTR < 50% (n)	100% (204/204)	27% (46/170)
Gender (n)	Male: 100 (59%) Female: 70 (41%)	
Age (years)	Mean: 74.2 Range: 34-95	

Discussion

The study showed the value impact of adding the protocol of pharmacist intervention in patients with TTR<50%. The percentage of patients achieving time to therapeutic range was higher after adding the protocol. Percentage of patients in TTR >50% was over 70% for the included patients whose TTR was <50% prior to using the protocol. No bleeding or clotting events were detected during the follow-up period but it is not for sure that all patients come to our ER/hospital for their warfarin related adverse events. Previous studies were done to compare TTR using pharmacists managed anticoagulation services to usual care by physician or other practitioners like nurses. They support using pharmacists managed anticoagulation services to improve the number of patients in TTR.7-10 This study aim was improving the pharmacist intervention in an already established pharmacist-led AMS and finding methods to improve the TTR through extensive patient education and counseling.

Some limitations exist in the study including a single center study. Study duration was short to evaluate the full impact of the protocol. Patients' level of understanding was not assessed during this study. Also, time spent with each patient was not recorded to compare the difference between before and after using protocol in term of workload. Not all the patients were managed by the same pharmacist for the entire period due to daily differences in the staffing schedule which can contribute to variability in the amount of provided education. Although there is a significant difference in TTR, we cannot necessarily assume this effect was due to the pharmacists' protocol. Future consideration includes a longer period of time and a larger sample size to assess the actual impact of protocol.

Conclusion

This project demonstrated an increase in the percentage of patients, who were managed using the developed protocol, within TTR as well as a decrease in the number of hospital/ER visits due to bleeding or clotting. This protocol can be added to AMS policy and considera more individualized approach to warfarin management.

References

1. Hirsh J, Fuster V, Ansell J, Halperin JL, American Heart Association, et al. (2003) American Heart Association/American College of Cardiology Foundation guide to warfarin therapy. J Am Coll Cardiol 107(12): 1692-1711.

2. You JJ, Singer DE, Howard PA, Lane DA, Eckman MH, et al. (2012) Antithrombotic therapy for atrial fibrillation: antithrombotic therapy and prevention of thrombosis, 9th ed: American college of chest physicians evidence-based clinical practice guidelines. Chest. 141(Suppl 2): e531S-e575S.

3. Witt DM, Nutescu EA, Haines ST (2011) Venous thromboembolism. In: DiPiro JT et al. (Eds.), Pharmacotherapy: A Pathophysiologic Approach. (8th edn), NY: McGraw-Hill, New York, USA, pp. 327-334.

4. Saokaew S, Permsuwan U, Chaiyakunapruk N, Nathisuwan S, Sukonthasarn A (2010) Effectiveness of pharmacist-participated warfarin therapy management: a systematic review and meta-analysis. J Thromb Haemost 8 (11): 2418-2427.

5. Hirsh J, Guyatt G, Albers GW, Harrington R, Schünemann HJ (2008) Executive summary: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). Chest 133(Suppl 6): 71S-109S.

6. Chiquette E, Amato MG, Bussey HI (1998) Comparison of an anticoagulation clinic with usual medical care: anticoagulation control, patient outcomes, and health care costs. Arch Intern Med 158(15): 1641-1647.

7. Wilson SJ, Wells PS, Kovacs MJ, Lewis GM, Martin J, et al (2003) Comparing the quality of oral anticoagulant management by anticoagulation clinics and by family physicians: a randomized controlled trial. CMAJ 169(4): 293-298.

8. Witt DM, Sadler MA, Shanahan RL, Mazzoli G, Tillman DJ (2005) Effect of a centralized clinical pharmacy anticoagulation service on the outcomes of anticoagulation therapy. Chest 127(5): 1515-1522.

9. Chan FW, Wong RS, Lau WH, Chan TY, Cheng G (2006) Management of Chinese patients on warfarin therapy in two models of anticoagulation service-a prospective randomized trial. Br J Clin Pharmacol 62(5): 601-609.

Global Journal of Pharmacy & Pharmaceutical Sciences

How to cite this article: Mustafa Alessa. Comparison of Time in Therapeutic Range (TTR) in Patients Enrolled in the Anticoagulation Management Services Following Pharmacist Intervention. Glob J Pharmaceu Sci. 2018; 4(3): 555640. DOI: 10.19080/GJPPS.2018.04.555640