Policy Change for Deep Vein Thrombosis: Effects on Length of Stay and Hospitalization Costs of Moving From Warfarin to Direct Oral Anticoagulants

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ABSTRACT

Purpose: Renown Health (Reno, Nevada), a large, locally owned, not-for-profit integrated health care network, has developed an institution-wide policy to shift the treatment of deep vein thrombosis (DVT) from a short-acting anticoagulant and vitamin K antagonist to the direct oral anticoagulant rivaroxaban combined with pharmacy-directed follow-up at an outpatient anticoagulation clinic. We examined data on hospitalizations and costs pre−/post−policy change.

Methods: Data were obtained from the electronic health records of adults with newly diagnosed DVT treated at Renown Health. A quasi-experimental design was used to evaluate patients who received a DVT diagnosis before versus after the policy change. Primary outcomes were number of all-cause inpatient nights at 30 and 60 days post−DVT index date. Secondary outcomes were costs of all-cause overnight stays at 30 and 60 days post−DVT index. Outcomes were evaluated in propensity-weighted logistic regression and generalized linear models.

Findings: There were 343 patients pre−policy change and 266 post−policy change. In the first 30 days postindex, the mean (95% CI) numbers of propensity-weighted all-cause inpatient nights were 1.27 (0.83−1.95) prechange and 0.66 (0.42−1.02) postchange ($P = 0.038$). Mean propensity-weighted estimated all-cause hospital costs in patients diagnosed as outpatients were $7848 ($4990−$12,344) prechange and $2466 ($1553−$3915) postchange ($P < 0.001$). Mean costs of all-cause overnight stays in inpatient-diagnosed DVT patients were $8907 prechange and $7449 postchange ($P = 0.600$). In the first 60 days postindex, the mean number of all-cause inpatient nights ($P = 0.219$) and mean costs of all-cause overnight stays ($P = 0.275$) were not significantly different before and after the policy change.

Implications: Changing institutional policy to increase the utilization of a direct oral anticoagulant and pharmacist-led outpatient anticoagulation clinics may reduce length of hospital stay and decrease health care expenditures in the treatment of DVT. (*Clin Ther*. 2019;41:269−279)

Key words: anticoagulant, deep vein thrombosis, hospitalization, length of stay, rivaroxaban, venous thromboembolism.

INTRODUCTION

Venous thromboembolism (VTE), including pulmonary embolism and deep vein thrombosis (DVT), is an important cause of morbidity and mortality and represents a major health care burden.[1,2] According to a conservative estimate from the Centers for Disease Control and Prevention, there are up to 600,000 VTE events in the United States each year.[1] The estimated prevalence of VTE in 2015 was 453 per 100,000 population in the United States, and this rate is expected to increase steadily as the population ages.[3] Among >7 million patients discharged from US acute

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care hospitals, VTE was estimated to be the second most common medical complication and one of the most common causes of excess length of hospital stay.[4] The estimated aggregate economic impact of incident or prevalent VTE cases on the US health care system ranges from US $7 to $10 billion per year.[2] Although many VTE risk factors have been identified,[5] nearly half of VTE events in middle-aged and elderly patients have an unknown etiology.[6]

For many years, the standard of care for the treatment of DVT consisted of initial therapy with a short-acting parenteral anticoagulant, such as heparin or low-molecular-weight heparin (LMWH; eg, enoxaparin), a period of overlapping therapy with a short-acting anticoagulant + a vitamin K antagonist (VKA; eg, warfarin), and then maintenance therapy with a VKA alone.[7,8] Given the many limitations of this approach, direct oral anticoagulants (DOACs) have recently been developed and approved for use in the treatment of DVT.[9,10] These DOACs include the factor Xa inhibitors rivaroxaban,[11,*] apixaban,[12,†] and edoxaban,[13,‡] and the direct thrombin inhibitor dabigatran.[9,14,§] The introduction of DOACs has permitted a reallocation of health care resources, making it possible to manage uncomplicated DVT primarily in the outpatient setting.[15,16] The EINSTEIN Acute DVT Study (Oral Direct Factor Xa Inhibitor Rivaroxaban in Patients With Acute Symptomatic Deep Vein Thrombosis)[17] showed that the efficacy of single-agent therapy with rivaroxaban is noninferior to that of conventional therapy with enoxaparin and a VKA, and that the safety profiles of rivaroxaban and conventional therapy are similar. A matched-cohort study in adults with DVT showed that the rate of inpatient hospital admission was significantly lower in patients treated with rivaroxaban than in those treated with a LMWH + warfarin (60% vs 82%, respectively; $P = 0.001$).[18]

Renown Health is a large, locally owned, not-for-profit integrated health care network serving a 17-county region in the United States comprising northern Nevada, Lake Tahoe, and northeast California. The network includes 5 hospitals, 14 medical group locations, and 9 urgent care centers. Conventionally, many Renown Health patients in need of evaluation for DVT presented to an urgent care facility, were referred to an emergency department, and were then hospitalized as inpatients for the initiation of short-term anticoagulant therapy and stabilization of VKA (primarily warfarin) therapy (Figure 1A). After discharge, most patients were managed through a pharmacy-directed outpatient anticoagulation clinic. Through the adoption of a system-wide clinical practice guideline on July 1, 2013, Renown Health shifted its initial treatment of DVT to rivaroxaban, coupled with prompt follow-up in the pharmacy-directed outpatient anticoagulation clinic (Figure 1B).

Using Renown Health's revised patient-flow algorithm, most patients diagnosed with uncomplicated DVT in an urgent care facility or emergency department are started on treatment with a DOAC at the point of care and referred to the outpatient pharmacist-directed anticoagulation clinic for prompt follow-up. In those who are diagnosed as inpatients, rapid transition to DOAC therapy at or before discharge with outpatient follow-up in the anticoagulation clinic is encouraged. Only patients who have other medical complications, are at high risk for complications from anticoagulation, have signs or symptoms likely of pulmonary embolism, or are deemed unlikely to cooperate with outpatient follow-up are recommended for admission to the hospital or continued hospitalization (Figure 1B). In patients who qualify for outpatient management, rivaroxaban is initiated at the approved dose of 15 mg BID at the point of diagnosis. Patients managed as outpatients are subsequently seen in the pharmacy-run anticoagulation clinic within 72 h of diagnosis. At the initial anticoagulation visit, further anticoagulation instructions are made per clinic protocol. In most patients, rivaroxaban is continued at a dose of 15 mg BID for 21 days, followed by 20 mg/d for the duration of therapy.[11] Patients who do not qualify for long-term rivaroxaban treatment receive an initial prescription for concurrent rivaroxaban + warfarin therapy. Rivaroxaban is continued until the patient's international normalized

* Trademark: Xarelto® (Janssen Pharmaceuticals, Inc., Raritan, New Jersey).

† Trademark: Eliquis® (Bristol-Myers Squibb, New York, New York).

‡ Trademark: Savaysa™ (Daiichi Sankyo, Parsippany, New Jersey).

§ Trademark: Pradaxa® (Boehringer Ingelheim Pharmaceuticals, Ridgefield, Connecticut).

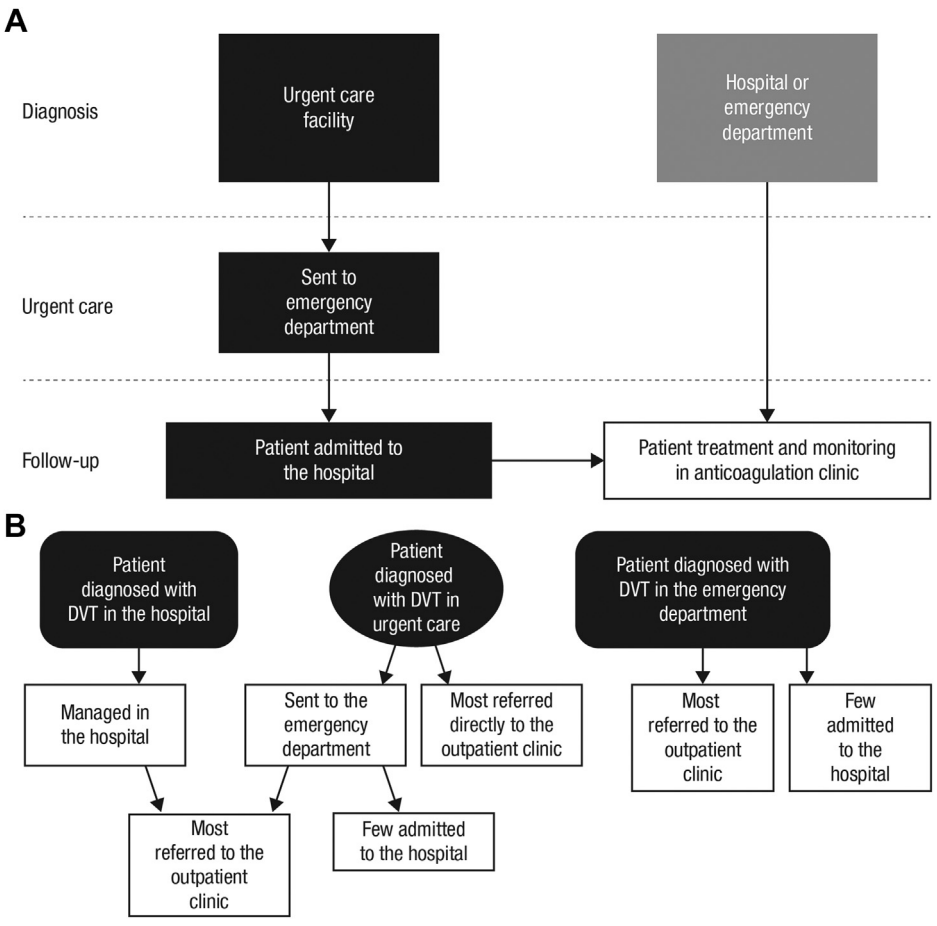

Figure 1. Patient flow before (A) and after (B) Renown Health policy change for DVT treatment. Patients may have been lost to follow-up or missing from the database if they sought care at a non–Renown-affiliated facility or a Renown facility that does not use the EPIC electronic medical records database (Verona, Wisconsin). DVT = deep vein thrombosis.

ratio (INR) is at least 2.2, at which point rivaroxaban is discontinued and the patient receives warfarin monotherapy with routine INR monitoring until the end of therapy. Patients who cannot safely continue rivaroxaban therapy (eg, those with severe renal insufficiency) are switched to a LMWH for bridge therapy to warfarin (Figure 2).

We hypothesized that this treatment approach, in which rivaroxaban treatment is initiated primarily in outpatient clinics, might reduce the duration and cost of inpatient hospitalization within the Renown Health system. Therefore, this retrospective cohort study was conducted to examine the length of inpatient hospitalizations and total costs of all-cause inpatient hospital stays before and after the date of the Renown Health policy change (July 1, 2013).

PATIENTS AND METHODS

Eligibility Criteria

Patients were men and women aged ≥18 years with evidence of DVT newly diagnosed within Renown Health between July 1, 2010, and September 30, 2015 (patients who simply had a DVT diagnostic code added to their charts, reflecting a historical diagnosis, were excluded). Patients had received a prescription for warfarin or rivaroxaban within 7 days following the DVT index date and had at least 1 record of activity occurring >180 days before and

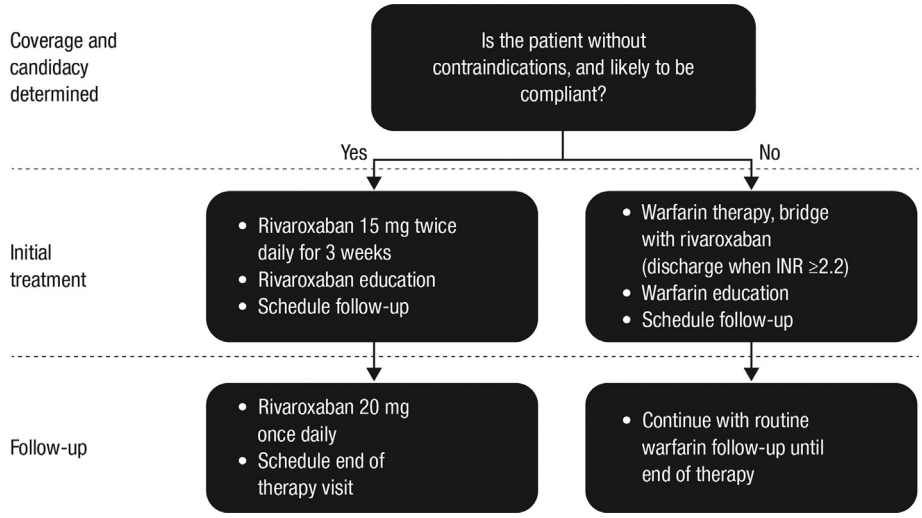

Figure 2. Outpatient clinic workflow. INR = international normalized ratio.

at least 1 record >60 days after the index date. Patients had no evidence of a diagnosis of concurrent pulmonary embolism (within 24 h of the DVT), and no evidence of use of any anticoagulant (eg, warfarin, DOAC, heparin, enoxaparin) during the 180 days before the index date. Eligible female patients had no evidence of pregnancy during the 180 days before or 60 days after the index date.

Study Design

After the study sample was identified, the Renown Health DVT policy change date (July 1, 2013) was used to divide patients into 2 cohorts: the pre–policy change cohort and the post–policy change cohort. The analysis used a quasi-experimental longitudinal cohort–control group design with propensity weighting to create a pseudo-population of pre–policy change patients whose pre–policy change characteristics matched those of the post–policy change patients. Mean treatment-effect-among-the-treated propensity weighting allowed for the estimation of treatment effects while adjusting for differences in baseline characteristics between cohorts (eg, age, sex, race, site of care, comorbidities). Comorbidity categories that were evaluated were based on the chapters of the *International Classification of Diseases, Ninth Revision—Clinical Modification*.[19]

Outcomes Measures

The primary outcomes measure was the total number of all-cause nights in an inpatient setting (ie, length of stay) during the first 30 and 60 days after the DVT index date. Secondary outcomes were the total costs of all-cause overnight stays in an inpatient setting for the first 30 and 60 days after the index date.

Statistical Analysis

Propensity scores were developed using a nonparsimonious logistic regression model. Variables that were not balanced, based on standardized differences of >0.1, were included in the final outcomes model. Any significant interactions with the policy-change variable were evaluated in stratified analyses. Data from the 180 days prior to the index date (ie, the preindex period) were used in a propensity model to balance the 2 cohorts. Data from 30 to 60 days after the DVT index date (ie, the postindex periods) were used for outcomes analyses. Primary analyses used propensity-weighted generalized linear models and a log link with the negative binomial distribution for total overnight stays and the γ distribution for costs. Odds of hospitalization were evaluated using propensity-weighted logistic regression. Cohort (pre– vs post–policy change) and location of initial DVT diagnosis (ie, site of referral, inpatient vs outpatient)

were evaluated as potential predictor variables. No adjustment for multiple testing was made.

RESULTS

Patient Characteristics

Study cohorts consisted of 343 patients in the pre–policy change cohort and 266 patients in the post–policy change cohort (Table I). The mean ages were 62.7 years in the pre–policy change cohort and 61.3 years in the post–policy change cohort, and most patients in both cohorts (85%) were white. The most common referral location in both cohorts was the inpatient setting. A higher percentage of patients were treated solely in the outpatient setting in the post–policy change cohort than in the pre–policy change cohort (48.5% vs 37.3%; $P = 0.0056$). A higher percentage of patients were uninsured before the policy change, while a higher percentage were covered by Medicare or other insurance after the policy change. There were no significant differences in comorbidity categories that were included in the propensity model.

Propensity Model

The purpose of the propensity model was to obtain weights that were used to balance potential differences in the pre– and post–policy change cohorts. Variables available from the electronic medical records that were included in the logistic regression model included the following: age at DVT index date, sex, race,

Table I. Demographic and clinical characteristics of the patients at baseline. Data are given as number (%) of patients (unless otherwise indicated).

Characteristic	Pre–policy Change Group (n = 343)	Post–policy Change Group (n = 266)	*P*
Mean (SD) age, y	62.7 (16.7)	61.3 (17.5)	0.3268
Sex			
Male	169 (49.3)	128 (48.1)	0.7781
Female	174 (50.7)	138 (51.9)	
Referral location/site of care			
Inpatient	197 (57.4)	131 (49.2)	0.0444
Outpatient	128 (37.3)	129 (48.5)	0.0056
Emergency department	18 (5.2)	6 (2.3)	0.0598
Insurance coverage/payer			
Self-pay	160 (46.6)	44 (16.5)	<0.0001
Medicare	98 (28.6)	101 (38.0)	0.0142
Other payer	57 (16.6)	68 (25.6)	0.0067
Commercial	16 (4.7)	24 (9.0)	0.0313
Medicaid	7 (2.0)	20 (7.5)	0.0011
Other government payers	3 (0.9)	6 (2.3)	0.1887
Workers' compensation	2 (0.6)	3 (1.1)	0.6578
Comorbidities*			
Circulatory system	38 (11.1)	25 (9.4)	0.4995
Endocrine, nutritional and metabolic diseases, and immunity disorders	26 (7.6)	16 (6.0)	0.4496
Injury and poisoning	26 (7.6)	27 (10.2)	0.2640
Musculoskeletal and connective tissue	23 (6.7)	21 (7.9)	0.5740
Neoplasms	10 (2.9)	9 (3.4)	0.7418

* Codes for comorbidities were from the *International Classification of Diseases, Ninth Revision—Clinical Modification*.[19]

Medicare insurance indicator, Medicaid insurance indicator, site of DVT diagnosis (ie, site of referral, inpatient vs outpatient), preindex comorbidities (circulatory, endocrine/metabolic, musculoskeletal, or immune disorders; injury and poisoning; neoplasm), preindex overnight hospitalization indicator, preindex inpatient costs, and preindex total hospital nights. Given the cohort design (ie, patients identified from the same hospital system at 2 different times), as expected, the standardized differences showed good balance between the cohorts for all but 1 variable. After weighting, the site of DVT diagnosis (inpatient vs outpatient) had a standardized difference that was >0.1; therefore, the site of referral variable was included in the final outcomes model along with the treatment-effect-among-the-treated propensity weight.

Outcomes for the First 30 Days After the DVT Index Date

For the first 30 days after the DVT index date, the propensity-weighted estimated mean number of all-cause nights in an inpatient setting across all patients was significantly lower in the post−policy change cohort than in the pre−policy change cohort (0.66 vs 1.27; $P = 0.038$) (Table II). Because there was a significant interaction between the policy change variable and the site of referral variable in the cost model, a stratified analysis was conducted. This analysis showed that the mean (95% CI) propensity-weighted estimated total all-cause hospital costs in patients diagnosed with DVT in the outpatient setting were $7848 ($4990−$12,344) before the policy change and $2466 ($1553−$3915) after the policy change (P <0.001) (Table II). Furthermore, mean total costs of all-cause overnight stays for DVTs diagnosed in an inpatient setting were $8907 in the pre−policy change cohort and $7449 in the post−policy change cohort ($P = 0.600$) (Table II).

Outcomes for the First 60 Days After the DVT Index Date

For the first 60 days after the DVT index date, the propensity-weighted estimated mean number of all-cause nights in an inpatient setting and the mean total costs of all-cause overnight stays in an inpatient setting were numerically lower in the post−policy change cohort than in the pre−policy change cohort, but the differences did not reach statistical significance (Table II). In the first 60 days, the mean number of all-cause inpatient nights were 1.60 (1.07−2.40) prechange and 1.12 (0.74−1.68) postchange ($P = 0.219$). Mean total costs of all-cause overnight stays for DVTs diagnosed in inpatients were $10,614 prechange and $8131 postchange ($P = 0.275$).

Table II. Health care resource utilization during the first 30 and 60 days after index date. Data are given as propensity-weighted estimated means (95% CI).*

Health Care Resource	Pre−policy Change Group (n = 343)	Post−policy Change Group (n = 266)	P
30 d			
No. of all-cause nights in an inpatient setting	1.27 (0.83−1.95)	0.66 (0.42−1.02)	0.038
Total costs of all-cause overnight stays for DVTs diagnosed in an inpatient setting, US $	8907 (5532−14,340)	7449 (4658−11,910)	0.600
Total costs of all-cause overnight stays for DVTs diagnosed in an outpatient setting, US $	7848 (4990−12,344)	2466 (1553−3915)	<0.001
60 d			
No. of all-cause nights in an inpatient setting	1.60 (1.07−2.40)	1.12 (0.74−1.68)	0.219
Total costs of all-cause overnight stays for DVTs diagnosed in an inpatient setting, US $	10,614 (7592−14,838)	8131 (5822−11,356)	0.275

DVT = deep vein thrombosis.
* Estimated means were from a propensity-weighted generalized linear model using the negative binomial distribution, a log link for number of nights, and a γ distribution for cost models.

DISCUSSION

This study examined the total number of all-cause nights in an inpatient setting and total costs of all-cause overnight stays in an inpatient setting for the first 30 and 60 days after the DVT index date in adult patients at Renown Health treated before and after the implementation of a policy change in the treatment of DVT. Patients in the pre–policy change cohort (treated before July 1, 2013) received conventional VKA-based treatment, typically with warfarin, and were often hospitalized in an inpatient setting. In contrast, patients in the post–policy change cohort (treated on or after July 1, 2013) mostly received outpatient treatment based on the DOAC rivaroxaban, coupled with prompt follow-up in a pharmacy-directed outpatient anticoagulation clinic.

Warfarin is a safe and effective oral anticoagulant as long as a therapeutic INR is properly maintained.[8] However, treatment with warfarin is difficult to manage in practice because its pharmacokinetic and pharmacodynamic properties are affected by genetic polymorphisms (such as those of the genes encoding cytochrome P450 2C9 and vitamin K epoxide reductase complex subunit 1), dietary vitamin K intake, concomitant medications, alcohol use, age, weight, and various disease states.[20] Furthermore, warfarin has a narrow therapeutic window, necessitating frequent coagulation monitoring and dose adjustments.[8,20] Because it takes many days to stabilize its anticoagulant effect, use of warfarin for the treatment of acute DVT requires the concurrent use of a shorter-acting anticoagulant, such as LMWH. Optimal warfarin management requires the establishment of specialized anticoagulation clinics, which are often staffed by highly trained pharmacists and nurses and include point-of-care testing devices, computerized warfarin-dosing algorithms, and patient self-testing and self-management programs.[21,22] Caring for treatment-related hemorrhagic complications and frequent INR monitoring represent a substantial economic burden on health care systems.[9,23]

Switching to a DVT care model focused on the use of a DOAC, such as the factor Xa inhibitor rivaroxaban, has the potential to overcome many of the limitations of VKA-based therapy.[20] The factor Xa inhibitors have good oral bioavailability and a rapid onset of action, thereby eliminating the need for bridge therapy with a parenteral anticoagulant in most situations.[8,20,24] The absorption of factor Xa inhibitors is not affected by vitamin K consumption, and factor Xa inhibitors have been associated with fewer potential drug–drug interactions than warfarin.[8,20,25] Patients treated with factor Xa inhibitors require minimal monitoring because the pharmacokinetic properties of these agents result in minimal variability in drug response and predictable anticoagulant activity.[26] Because of their relative ease of use and fixed dosing, factor Xa inhibitors are an attractive alternative to conventional anticoagulation for the outpatient management of DVT.[8]

Diagnosing DVT in an outpatient setting and treating it with a DOAC, such as rivaroxaban, could benefit patients by improving outcomes and benefit hospitals by reducing health care costs. For example, emergency-department overcrowding is associated with diminished quality of care and poor patient outcomes.[27] Fewer patient visits to the emergency department could allow health care providers more time to treat severely ill patients. Furthermore, treatment with a DOAC rather than a VKA has the potential to reduce the costs of inpatient hospitalization, since lack of the need for routine laboratory monitoring and dose adjustments may shorten the length of hospital stay.[16] A study that compared the rates of clinical events (recurrent VTE and VTE-related death, or bleeding events) in patients who received a factor Xa inhibitor versus patients who received conventional therapy showed that the lower event rates observed in factor Xa inhibitor recipients resulted in annual total medical cost reductions ranging from $344 to $918.[28]

The current study demonstrated several benefits of switching from conventional therapy to a policy that encourages treatment with rivaroxaban for acute, symptomatic, uncomplicated DVT in adults. During the first 30 days after the DVT index date, the mean number of all-cause nights in an inpatient setting was statistically significantly lower in the post–policy change cohort than in the pre–policy change cohort (receiving conventional therapy). Consistent with this finding, total costs of all-cause overnight stays for DVT diagnosed in an outpatient setting were significantly lower in the post–policy change cohort. Total costs of all-cause overnight stays for DVT diagnosed in an inpatient setting were numerically

but not statistically significantly lower in the post–policy change cohort. In the first 60 days after the DVT index date, both the number of all-cause nights in an inpatient setting and the total costs of all-cause overnight stays in an inpatient setting were numerically lower in the post–policy change cohort than in the pre–policy change cohort, although these differences were not statistically significant.

The results of this investigation are similar to the findings from other studies that have examined health care utilization in DOAC-treated patients with VTE. Two real-world retrospective analyses of data from adults with VTE showed that hospital inpatients treated with rivaroxaban had a significantly shorter mean length of stay for the index hospitalization than did those treated with warfarin.[29,30] In a study that included data from 1223 rivaroxaban-treated patients and 1223 warfarin-treated patients, the mean length of stay was 3.7 days with rivaroxaban compared to 5.2 days with warfarin (P <0.001).[29] In a study that included data from 72 rivaroxaban-treated patients and 203 warfarin-treated patients, the mean length of stay was 3.5 days with rivaroxaban and 7.0 days with warfarin.[30] An analysis of new all-cause hospitalizations following initial inpatient or outpatient treatment of VTE in the AMPLIFY study[31] found that patients who received apixaban had a significantly shorter mean length of stay compared with patients who received enoxaparin + warfarin (0.57 vs 1.01 days; P <0.0001).

As in the current analysis, many studies have shown that DOAC treatment for VTE results in lower health care costs than does VKA treatment. A retrospective study demonstrated that mean total inpatient costs of the index VTE admission were significantly lower in patients treated with rivaroxaban compared with those in patients treated with warfarin ($8688 vs $9823; P = 0.004).[29] In a 2-center case–control study in adults with low-risk DVT, median total hospital system charges in the first week after diagnosis and over 6 months were significantly lower in patients discharged immediately from the emergency department with rivaroxaban compared to those in patients treated with LMWH + warfarin (first week, $2746 vs $6662 [$P$ = 0.003]; 6 months, $4094 vs $9366 [$P$ = 0.002]).[32] A retrospective matched-cohort study using the MarketScan Hospital Drug Database found that mean total hospital costs for the index visit in adults with DVT (who were admitted and discharged the same day or who remained for at least 1 night) were significantly lower in patients receiving rivaroxaban than in those receiving LMWH + warfarin ($5257 vs $6764; P = 0.002).[33] In a large-scale, retrospective longitudinal cohort study in which 10,929 rivaroxaban-treated patients were matched to 21,858 warfarin-treated patients, mean total cumulative medical costs for the 12 months following the index DVT event were $19,487 with rivaroxaban compared to $20,857 with warfarin ($P$ = 0.0002).[34]

A study based on a hypothetical commercial health plan with 1 million members estimated the economic implications of switching 25% of 2068 patients with acute DVT to rivaroxaban from enoxaparin + a VKA.[35] The shift to rivaroxaban would reduce the mean inpatient length of stay from 5.4 to 4.7 days and mean per-patient medical costs from the initial DVT event from $16,058 to $15,870.[35] Cost-effectiveness studies that included hospital length of stay and costs, among other variables, showed that rivaroxaban is a cost-effective alternative to enoxaparin + a VKA[36] and that edoxaban is a cost-effective alternative to warfarin for the treatment of VTE.[37]

Previous research has established that patients managed on warfarin in dedicated anticoagulation clinics utilizing pharmacists have improved outcomes.[38–41] Many anticoagulation clinics have been slow to integrate and operationalize routine utilization of DOAC medications. The current study provides a framework for integrating the utilization of DOACs for the treatment of VTE into an established pharmacist-led anticoagulation practice.

Several limitations of the present study are noted. Before and after the DVT treatment policy change, data were available only from patients seen at Renown Health–affiliated urgent care centers, emergency departments, or hospitals through the EPIC electronic medical records database (Verona, Wisconsin), and were not available from outpatient settings that were not part of the Epic system (non–Renown-affiliated facilities). Complete follow-up data were not available from all patients, but it was assumed that missing data were balanced in the pre– and post–policy change cohorts. Since hospital length of stay has been gradually decreasing in the United States over the years,[42] it is difficult to determine whether the decreasing length of stay

observed in this study was the result of the DVT treatment policy change or a general trend. Furthermore, the sample size was limited, with 343 patients in the pre–policy change cohort and 266 patients in the post–policy change cohort. Finally, it was assumed that the rate of missing data did not change over time because the 2 cohorts were receiving treatment from the same health care system; missing data may have limited the external validity of the results.

CONCLUSION

Changing institutional policy to increase the utilization of DOACs and pharmacist-led outpatient anticoagulation clinics may reduce the length of hospital stay and decrease health care expenditures in patients with DVT.

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CONFLICTS OF INTEREST

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