

Anticoagulation in Atrial Fibrillation: Impact of Mental Illness

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Atrial fibrillation and atrial flutter (AF, collectively) affect almost 7 million Americans¹— including 6% of people aged over 65 years old²—and account for at least 15% of the 700,000 strokes per year in the United States.³ Anticoagulation with warfarin can decrease ischemic stroke risk in AF by more than 60%.⁴ However, warfarin has a narrow therapeutic window: subtherapeutic and supratherapeutic anticoagulation can cause ischemic and hemorrhagic stroke, respectively, making ongoing laboratory monitoring and dose titration necessary. Consequently, certain clinical scenarios preclude safe warfarin use, such as situations in which the risk of hemorrhage is high or the likelihood is low that the patient will be able to achieve and maintain good anticoagulation control.^{5,7} Healthcare providers may include patients with mental health conditions (MHCs) in the latter group due to concerns (founded or not) about effectiveness or safety of anticoagulation (eg, related to comorbidities, concomitant medications, or anticipated nonadherence). The Veterans Health Administration (VHA) has invested considerable resources in maintaining a robust anticoagulation care infrastructure, but does not provide explicit guidance on anticoagulation in the context of mental illness,⁷ despite the high prevalence of MHCs among VHA patients.⁸ Other national guidelines have provided scant input on this issue,^{5,6} and little research characterizes warfarin receipt among AF patients with MHCs.⁹⁻¹¹

We therefore performed a descriptive study of national data to determine: 1) whether AF patients with versus without MHCs differ in eligibility for anticoagulation; and 2) whether, among AF patients eligible for warfarin, warfarin receipt differs for patients with versus without MHC. The study was approved by the Institutional Review Board at Stanford University, Stanford, California.

ABSTRACT

Objectives: To characterize warfarin eligibility and receipt among Veterans Health Administration (VHA) patients with and without mental health conditions (MHCs).

Study Design: Retrospective cohort study.

Methods: This observational study identified VHA atrial fibrillation (AF) patients with and without MHCs in 2004. We examined unadjusted MHC-related differences in warfarin eligibility and warfarin receipt among warfarin-eligible patients, using logistic regression for any MHC and for specific MHCs (adjusting for sociodemographic and clinical characteristics).

Results: Of 125,670 patients with AF, most (96.8%) were warfarin-eligible based on a CHADS2 stroke risk score. High stroke risk and contraindications to anticoagulation were both more common in patients with MHC. Warfarin-eligible patients with MHC were less likely to receive warfarin than those without MHC (adjusted odds ratio [AOR], 0.90; 95% CI, 0.87-0.94). The association between MHC and warfarin receipt among warfarin-eligible patients varied by specific MHC. Patients with anxiety disorders (AOR, 0.86; 95% CI, 0.80-0.93), psychotic disorders (AOR, 0.77; 95% CI, 0.65-0.90), and alcohol use disorders (AOR 0.62, 95% CI 0.54-0.72) were less likely to receive warfarin than patients without these conditions, whereas patients with depressive disorders and posttraumatic stress disorder were no less likely to receive warfarin than patients without these conditions.

Conclusions: Compared with patients with AF without MHCs, those with MHCs are less likely to be eligible for warfarin receipt and, among those eligible, are less likely to receive such treatment. Although patients with AF with MHC need careful assessment of bleeding risk, this finding suggests potential missed opportunities for more intensive therapy among some individuals with MHCs.

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Take-Away Points

- Patients with atrial fibrillation and mental health conditions (MHCs) may not receive anticoagulation treatment, even when they exhibit indications for anticoagulation for stroke prevention.
- Atrial fibrillation patients with MHCs are a clinically complex group; stroke prevention decision making with this group of patients must be particularly deliberative.
- Clinicians should consider MHCs when developing an anticoagulation treatment plan, though presence of MHCs should not be considered an absolute contraindication to anticoagulation.

METHODS

Data

We created a database containing variables characterizing AF care for all VHA patients with prevalent AF, as of the first day of fiscal year 2004. This database was created through a series of processing steps, quality checks, merges, and variable creation from VHA's centralized inpatient and outpatient treatment and pharmacy databases, linked to Medicare inpatient and outpatient treatment claims data. Medicare pharmacy records were not available.

Cohorts

Figure 1 describes cohort construction. We used Veterans Affairs (VA) encounter data to identify all veterans using VHA outpatient care during 2004 who had AF as of the first day of 2004. AF was defined as the presence of at least 1 *International Classification of Diseases, Ninth Revision (ICD-9-CM)* AF diagnosis code 427.31 or 427.32 in 2002, and at least 1 confirmatory AF diagnosis in 2003 in VHA or Medicare inpatient or outpatient encounter records (based on records involving a face-to-face visit with a clinician). We excluded patients institutionalized for the majority of 2004, and those who received some of their 2004 VHA care outside of the continental United States (who thus might have incomplete data capture for processes of care). We also excluded patients whose MHC status could not be determined (see description of MHC variable creation below) to create "cohort 1."

To examine warfarin receipt among patients with and without MHCs, we created "cohort 2," which was the subset of cohort 1 patients who were apparently eligible for warfarin based on the presence of diagnosed stroke risk factors and absence of diagnosed contraindications to anticoagulation.

Mental Health Conditions (independent variables)

Starting with the Agency for Health Research and Quality's Clinical Classifications Software (CCS),¹² we conducted an expert panel process to make modifications to the *ICD-9-CM* codes selected, and then mapped

ICD-9-CM codes uniquely to 5 common specific MHCs (depressive disorders, post-traumatic stress disorder [PTSD], other anxiety disorders, psychotic disorders, and alcohol use disorders) and "other" psychiatric disorders. A patient was considered to be "MHC Yes" if he/she had at least 1 instance of an *ICD-9-CM* code falling into an MHC condition category during 2002-2003, plus at least 1 confirmatory *ICD-9-CM* code in 2004 (ie, during the period in which warfarin receipt was assessed), in a VHA or Medicare record associated with an outpatient face-to-face visit with a clinician or an inpatient record. A patient was considered to be "MHC No" if he/she had no instance of an MHC *ICD-9-CM* code in the entire interval of 2002 to 2004. Patients for whom MHC status was uncertain (ie, those with an MHC diagnosis at baseline [2002-2003] or during the study period [2004], but not both) were excluded, allowing for direct comparisons between the 2 distinct groups of "MHC Yes" and "MHC No."

Separate dichotomous indicator variables were created for each of the 5 specific MHCs and for "other" MHCs for each patient. A patient could have more than 1 diagnosed MHC.

Eligibility for Anticoagulation (independent variable)

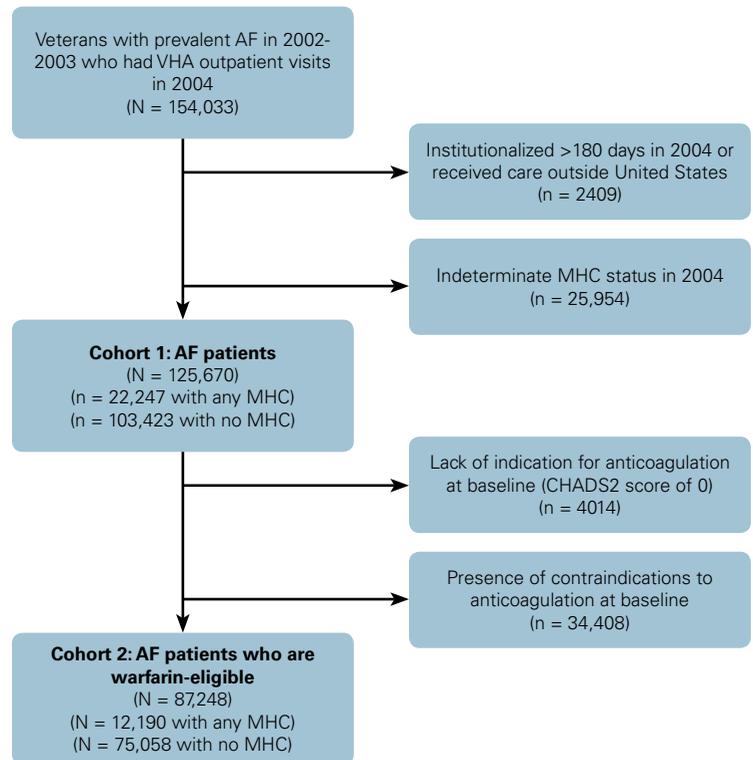
We examined patient characteristics suggesting greater eligibility for anticoagulation (ie, risk factors for stroke), and those suggesting less eligibility for anticoagulation (ie, risk factors for hemorrhage). To characterize stroke risk as of the start of the study period (ie, prior to 2004), we calculated the CHADS₂ score, which gives 2 point each for being 75 years or older, having congestive heart failure, hypertension, or diabetes; and 2 points for prior stroke or transient ischemic attack.¹³ Based on available national guidelines during the study period, CHADS₂ was recommended for stroke risk stratification, and warfarin was recommended for patients with AF who had a CHADS₂ score of 2 or higher. Warfarin was recommended, but not required, in patients with a CHADS₂ score of 1.⁵ Contraindications to anticoagulation included a history of intracranial hemorrhage, history of other hemorrhage, dementia, cirrhosis, seizure disorder, and end-stage renal disease.¹⁴ These conditions, and conditions included in the CHADS₂ score, were identified based on *ICD-9-CM* codes in 2001 to 2003 VA and Medicare encounter data.

Warfarin Receipt (dependent variable)

VHA Decision Support System (DSS) pharmacy records contain a record of dispensed medications from all

pharmacy orders entered by VHA clinicians. From the DSS data, we identified every outpatient warfarin prescription issued in the VHA in 2004 to patients in our warfarin-eligible analytic cohort (cohort 2). A patient was considered to have received warfarin if he/she received at least 2 VHA outpatient warfarin prescriptions in 2004, with at least 30 days between the start of one prescription and the start of another prescription. Although our focus was on warfarin receipt—rather than warfarin persistency or adherence, which would be better examined in a cohort of new warfarin users—we required 2 warfarin prescriptions to confirm that the patient was actively prescribed warfarin through the VHA, and that, for example, he/she had not merely been issued a single warfarin prescription as part of an emergency department visit. Prescriptions issued on the last day of an inpatient stay were counted as outpatient prescriptions because they represent discharge medications. Warfarin prescriptions issued by Medicare providers were not available to us.

■ **Figure 1. Construction of Study Cohorts**



Other Variables

Patient age, gender, race/ethnicity, and physical comorbidity index were derived from VHA and Medicare patient treatment databases. The Selim physical comorbidity index is a count of common nonpsychiatric medical conditions developed for VHA outpatient case-mix adjustment.¹⁵

Analytic Approach

In cohort 1 (AF patients, $n = 125,670$) and then in cohort 2 (AF patients eligible for warfarin, $n = 87,248$), we first compared those with versus without an MHC on sociodemographic characteristics, health status, and eligibility for anticoagulation (stroke and hemorrhage risk factors), using χ^2 for categorical and t tests for continuous variables. Next, in cohort 2 we descriptively examined the proportion of patients who received warfarin, first by MHC status, and then in the subgroups with the 5 most common MHCs or with “other” MHCs. Finally, we performed 4 logistic regression analyses on cohort 2 to calculate unadjusted and adjusted odds of warfarin receipt (overall and by CHADS2 score) for patients with versus without diagnosed MHCs (Model 1 unadjusted and adjusted), and for patients with versus without specific MHCs (Model 2 unadjusted and adjusted). Because a pa-

AF indicates atrial fibrillation/atrial flutter; MHC, mental health condition; VHA, Veterans Health Administration.

The CHADS2 stroke risk index is derived from: being 75 years or older and the presence of congestive heart failure, hypertension, diabetes mellitus, previous stroke or transient ischemic attack. Contraindications to anticoagulation include history of intracranial or other hemorrhage, dementia, seizure disorder, cirrhosis or end-stage renal disease. Indeterminate MHC status refers to patients with an MHC *International Classification of Diseases, Ninth Revision, Clinical Modification* diagnosis code at baseline or during the study period, but not both.

tient could have more than 1 specific MHC (for example, a patient might have a depressive disorder, PTSD, and alcohol use disorder), Model 2 included a binary indicator variable for each of the 5 most common MHCs, and a binary indicator variable for other MHCs in aggregate, in a single logistic regression model; each estimate represents the conditional effect of each specific MHC, controlling for the presence of the other specific MHCs. Multivariate logistic regression models controlled for age as a continuous variable, gender, and physical comorbidities; overall models additionally controlled for stroke risk (CHADS2).

RESULTS

After applying cohort selection and exclusion criteria, we identified 125,670 AF patients (cohort 1), and among them, 87,248 (69%) were apparently eligible for warfarin (cohort 2). Among cohort 1 patients, 22,247 (18%) had an

MHC. Compared with patients without an MHC, patients with an MHC were younger (18% versus 8%, respectively, were under age 65) and slightly less likely to be male or Caucasian (Table 1). Among cohort 2 patients, 12,190 (14%) had any MHC—the most common specific MHCs were depressive disorders (7% of cohort 2 patients), PTSD (2%), other anxiety disorders (3%), psychotic disorders (1%), and alcohol use disorders (1%).

Eligibility for Anticoagulation Among All AF Patients

In cohort 1, indications for anticoagulation based on CHADS2 stroke risk index were greater in patients with an MHC. Nearly all AF patients (97% in both MHC and no MHC groups) were warfarin-eligible, based on a CHADS2 score of 1 or more (Table 1). A slightly greater proportion of patients with MHC than without MHC had high levels of stroke risk (ie, CHADS2 score ≥ 2). Regarding specific stroke risk factors in patients with versus without an MHC: respectively, 54% versus 48% had congestive heart failure; 91% versus 90% had hypertension; 41% versus 40% had diabetes; 39% versus 31%, had prior stroke or transient ischemic attack (Table 1).

However, contraindications to anticoagulation (ie, risk factors for hemorrhage) were also more common in patients with MHC than in those without MHC: respectively, 1.4% versus 0.6% had a history of intracranial hemorrhage; 27% versus 20% had a history of other hemorrhage; 17% versus 3% had a history of dementia; 2% versus 1% had a history of cirrhosis; and 0.6% versus 0.5% had a history of end-stage renal disease. ($P < .05$ for all comparisons) (Table 1).

Receipt of Warfarin Among AF Patients Eligible for Warfarin

Among warfarin-eligible patients with AF, 50.6% of those with MHC and 52.4% of those with no MHC received warfarin ($P < .0001$). Figure 2 additionally shows the rate of receipt of warfarin for patients with each of the 5 most common specific MHCs or with any other MHC. Although we did not specify a minimum prescription days' supply, 99% of patients who received warfarin had at least 60 days of warfarin coverage in 2004.

Warfarin-eligible patients with an MHC were less likely to receive warfarin than those without an MHC (Model 1: unadjusted OR, 0.93, 95% CI, 0.90-0.97; adjusted OR, 0.90, 95% CI, 0.87-0.94). In the adjusted model, differences persisted in CHADS2-stratified analyses (Table 2).

We also analyzed warfarin receipt for patients with specific MHCs, which is important because clinical presentation differs by MHC. Patients with some types of MHC might have particular difficulty understanding or adhering

to a complex medication regimen, or their provider's perception might be that they would. The Model 2 estimates presented in Table 2 represent the marginal differences in warfarin receipt associated with any one specific MHC, controlling for the presence of the other specific MHCs.

The association between MHC and warfarin receipt varied substantially by specific MHC type (Table 2, Model 2). After adjustment, patients with anxiety disorders (OR, 0.86; 95% CI, 0.80-0.93), psychotic disorders (OR, 0.77, 95% CI 0.65-0.90), and alcohol use disorders (OR, 0.62; 95% CI, 0.54-0.72) were less likely to have received warfarin than were patients with absence of the specific condition. In CHADS2-stratified analyses, adjusted odds of warfarin receipt was lower for patients with alcohol use disorders at a CHADS2 score of 2-3 (OR, 0.53; 95% CI, 0.43-0.64) than at a CHADS2 score of 1 (OR, 0.70; 95% CI, 0.55-0.90).

Sensitivity Analyses

Main findings (adjusted ORs for Model 1 and Model 2) remained robust across a series of sensitivity analyses: 1) we included the MHC-indeterminate patients as a third level of exposure; 2) we removed patients who died in 2004 or who developed a new contraindication to warfarin in 2004; and 3) we added clinic site (as a fixed effect) to the models.

DISCUSSION

Our study provides clinically relevant insights into the connection between mental illness and stroke prevention care in VHA. We found that AF patients with an MHC have an excess burden of both stroke risk factors and contraindications to anticoagulation. Among those apparently eligible for warfarin, patients with an MHC were less likely to receive warfarin, although this association varied by specific MHC type.

Our findings suggest that special clinical decision-making challenges may arise in the management of AF patients with an MHC. On the one hand, patients with an MHC have excess burden of stroke risk factors: therefore, many of them have strong indications for anticoagulation for stroke prevention. On the other hand, AF patients with MHC also have an excess burden of risk factors for hemorrhage, and thus, may have disproportionate rates of contraindications to anticoagulation. In such a setting, assessment of risk versus benefit of warfarin receipt must be individualized, and shared decision-making approaches^{16,17} may be particularly relevant.

Our findings in a national sample of more than 12,000 warfarin-eligible patients with AF with an MHC are consistent with, and expand upon, a prior single-site chart-review

Table 1. Sociodemographic Characteristics, Health Status, Indications for Anticoagulation, and Contraindications to Anticoagulation Among Atrial Fibrillation Patients With and Without Mental Health Conditions

	AF Patients (cohort 1) ^a (N = 125,670)			AF Patients (cohort 2) ^b (N = 87,248)		
	No MHC (N = 103,423)	MHC ^c (N = 22,247)	P	No MHC (N = 75,058)	MHC ^c (N = 12,190)	P
Sociodemographic characteristics and health status						
Age, years: mean (SD)	75.5 (7.6)	73.4 (9.8)	<.0001	75.7 (7.4)	73.3 (9.4)	<.0001
Age, years: %						
<65	7.9	18.1	<.0001	7.2	17.9	<.0001
65-74	31.0	27.1	<.0001	31.1	28.9	<.0001
75+	61.1	54.8	<.0001	61.7	53.3	<.0001
Male, %	98.7	97.9	<.0001	98.7	97.9	<.0001
Race/ethnicity, %						
White, non-Hispanic	94.7	93.3	<.0001	95.4	94.6	<.0001
African American	3.8	4.8	<.0001	3.3	3.8	<.01
Asian	0.2	0.2	.45	0.2	0.2	.59
North American Native	0.1	0.2	.02	0.1	0.2	.75
Hispanic	1.0	1.5	<.0001	0.8	1.2	<.0001
Other/unknown	1.0	1.0	.82	0.9	1.2	<.01
Physical comorbidity index, mean (SD) ^d	7.4 (3.7)	8.5 (4.0)	<.0001	7.1 (3.4)	7.8 (3.7)	<.0001
Indications for anticoagulation:						
CHADS2 score, %						
0	3.2	3.2	.75	–	–	–
1+	96.8	96.8	.76	100.0	100.0	–
2+	81.6	83.2	<.0001	82.6	83.1	.18
3+	56.8	61.7	<.0001	55.4	58.2	<.0001
4+	33.0	39.6	<.0001	31.0	34.3	<.0001
5+	17.0	22.5	<.0001	15.2	18.2	<.0001
CHADS2 components, %						
CHF	48.2	54.0	<.0001	46.3	51.2	<.0001
Diabetes	39.5	40.6	<.01	39.6	40.7	.02
Hypertension	89.9	90.8	<.0001	92.3	93.5	<.0001
Prior stroke or TIA	31.1	39.1	<.0001	29.6	34.1	<.0001
Contraindications to anticoagulation						
History of intracranial hemorrhage	0.6	1.4	<.0001	–	–	–
History of other hemorrhage	20.0	26.8	<.0001	–	–	–
Dementia	2.8	16.5	<.0001	–	–	–
Seizure disorder	0.5	1.2	<.0001	–	–	–
Cirrhosis	2.5	6.0	<.0001	–	–	–
End-stage renal disease	0.5	0.6	<.05	–	–	–

AF, atrial fibrillation/atrial flutter; MHC, mental health condition; TIA, transient ischemic attack.

CHADS2 stroke risk index is derived from being 75 years or older, and presence of congestive heart failure, hypertension, diabetes mellitus, previous stroke or transient ischemic attack.

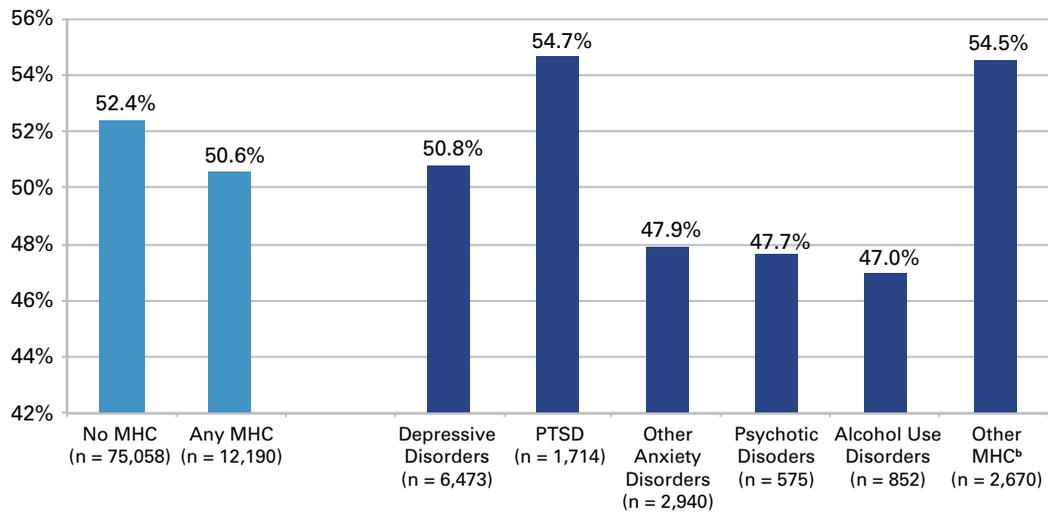
^aCohort 1 consists of veteran patients with prevalent AF between 2002 and 2003 with 1 or more VHA outpatient visits (face-to-face with a clinician) in 2004 who received their VHA care exclusively in the continental United States, who were institutionalized less than 180 days in 2004 and whose mental health status could be determined.

^bCohort 2 consists of veteran patients from cohort 1 who were eligible for anticoagulation based upon having an indication for anticoagulation (CHADS2 score ≥ 1) and lack of any diagnosed contraindications to anticoagulation as of the first day of 2004.

^cMHCs include depressive disorders, PTSD, anxiety disorders, psychotic disorders, alcohol use disorders, and other psychiatric disorders.

^dThe Selim comorbidity index, physical component, is a count of common nonpsychiatric medical conditions.

■ **Figure 2.** Warfarin Receipt Among 87,248 Patients With and Without Mental Health Conditions^a



MHC indicates mental health condition; PTSD, posttraumatic stress disorder.

^aVertical axis truncated to highlight variance.

^bOther MHC category includes acute stress disorders, adjustment disorders, bipolar disorders, drug use disorders, personality disorders, conduct/impulse control disorders, eating disorders, dissociative disorders, psychogenic disorders, and other uncommon psychiatric disorders.

analysis, which found lower odds of warfarin receipt in 66 warfarin-eligible AF patients with an MHC.¹¹ The lower frequency of warfarin receipt seen for patients with an MHC in our study is also in line with studies showing that patients with an MHC may be less likely to receive pharmacotherapy for various medical conditions,^{4,10,18} although such MHC-related disparities are not universally seen.¹⁹

We also found that the odds of warfarin receipt in eligible patients with AF varied by MHC type. This finding is not surprising, given the heterogeneity of the clinical presentation of different MHCs. Patients with alcohol use disorders were less likely to receive warfarin—perhaps related to concerns about drug-drug interactions between warfarin and alcohol, concerns about falls risk, or concerns about adherence²⁰; clinicians' expectations about whether a patient will adhere to treatment can directly influence their treatment decisions.²¹ Interestingly, this effect was even stronger at a higher level of stroke risk (CHADS₂ score of 2-3) than at a lower level of stroke risk (CHADS₂ score of 1). Although our study did not directly examine MHC severity, patients with psychotic disorders also were less likely to receive warfarin, which could reflect clinical impressions that their thought processes were too disorganized to support faithful use of a complicated medication regimen, and the fact that medication nonadherence in patients with psychotic disorders is known to be high.²²

In contrast, patients with depression and PTSD were no less likely than patients without these conditions to receive

warfarin, suggesting that clinicians respond to different mental health conditions differently. Future studies using qualitative methods or examining potential mediators at a more granular level may provide greater insight into drivers of medical decision making, especially now that new alternatives to warfarin (eg, dabigatran, rivaroxaban, apixaban) with decreased intracranial hemorrhage risk and less onerous laboratory monitoring requirements are available.

Limitations

Our results need to be interpreted in the context of several limitations. First, there is risk of misclassification of MHC status. MHCs often go undetected in a primary care setting; therefore, some patients in our “No MHC” group may have had an undetected MHC. If anything, this would be expected to bias our findings toward the null, given that patients with an undetected MHC probably would be less likely to receive warfarin. Furthermore, our decision to exclude patients with an indeterminate MHC status (MHC diagnoses present at baseline or during the study period, but not both) should have helped to minimize misclassification. There is also the potential for uncaptured processes of care (warfarin receipt). This study was conducted before Medicare Part D (prescription) data were available; thus, any prescriptions issued through Medicare were unavailable. Since VHA patients with an MHC tend to be less likely to receive care outside the VHA, it is possible that rates of warfarin receipt in

Table 2. Odds Ratios for Warfarin Receipt in 2004 Among 87,248 Warfarin-Eligible Patients With Versus Without Diagnosed Mental Health Conditions, Overall and by CHADS2 Score^a

	Received Warfarin (%)	Odds Ratio for Warfarin Receipt (95% CI):			
		Model 1 (unadjusted) ^b	Model 1 (adjusted) ^{b,c}	Model 2 (unadjusted) ^d	Model 2 (adjusted) ^{c,d}
No MHC (Ref)	52.4				
Any MHC	50.6	0.93 (0.90-0.97)	0.90 (0.87-0.94)		
		0.90 (0.82-0.99)	0.88 (0.80-0.97)	–	–
		0.97 (0.92-1.03)	0.91 (0.86-0.97)		
Depressive disorders	50.8			0.96 (0.91-1.01)	0.96 (0.91-1.02)
				0.99 (0.87-1.13)	1.00 (0.88-1.15)
				1.04 (0.97-1.12)	1.02 (0.94-1.10)
PTSD	54.7			0.86 (0.79-0.94)	0.89 (0.81-0.97)
				1.02 (0.87-1.12)	0.99 (0.84-1.17)
				0.87 (0.61-1.25)	0.86 (0.60-1.23)
Other anxiety disorders	47.9			0.89 (0.71-1.12)	0.87 (0.69-1.09)
				1.40 (1.04-1.88)	1.38 (1.02-1.86)
				0.84 (0.78-0.91)	0.86 (0.80-0.93)
Psychotic disorders	47.7			0.88 (0.74-1.05)	0.89 (0.75-1.06)
				0.84 (0.76-0.94)	0.87 (0.78-0.97)
				0.81 (0.71-0.93)	0.83 (0.72-0.94)
Alcohol use disorders	47.0			0.84 (0.71-0.99)	0.77 (0.65-0.90)
				0.89 (0.59-1.34)	0.82 (0.54-1.23)
				0.83 (0.66-1.04)	0.75 (0.59-0.96)
Other MHC	54.5			0.82 (0.62-1.10)	0.77 (0.58-1.03)
				0.81 (0.71-0.93)	0.62 (0.54-0.72)
				0.79 (0.62-1.00)	0.70 (0.55-0.90)
Other MHC	54.5			0.73 (0.60-0.88)	0.53 (0.43-0.64)
				1.09 (0.79-1.52)	0.90 (0.64-1.25)
				1.14 (1.00-1.30)	1.05 (0.92-1.19)
Other MHC	54.5			1.10 (0.82-1.46)	1.03 (0.77-1.38)
				1.30 (1.08-1.56)	1.16 (0.96-1.40)
				0.93 (0.73-1.18)	0.90 (0.70-1.15)

MHC indicates mental health condition; PTSD, posttraumatic stress disorder; Ref, reference.

CHADS2 stroke risk index is derived from being 75 years or older and the presence of congestive heart failure, hypertension, diabetes mellitus, previous stroke or transient ischemic attack. MHCs are not mutually exclusive (ie, a patient could have more than 1 MHC) and include depressive disorders, PTSD, anxiety disorders, psychotic disorders, alcohol use disorders, and other psychiatric disorders.

^aStatistically significant differences are bolded.

^bModel 1: any MHC versus no MHC.

^cAdjusted model is adjusted for age, gender, race/ethnicity, CHADS2, physical comorbidity index; the “overall” model is additionally adjusted for CHADS2, whereas the models stratified on CHADS2 score are not. The number in the denominator for each stratum: CHADS2 = 1 (n = 15,134), CHADS2 = 2-3 (n = 44,656), CHADS2 = 4-6 (n = 27,458)

^dModel 2: indicator variables for 5 specific MHCs and other MHC are included simultaneously in a single regression model.

the “No MHC” group were disproportionately underestimated, again tending to bias our warfarin-receipt findings toward the null.

Additionally, although warfarin remains the mainstay of AF stroke prevention treatment in VHA, AF stroke prevention care has evolved since 2004 when this study was conducted. However, the focus of this study was not on absolute rates of anticoagulation treatment, but rather

on MHC-related differences in anticoagulation treatment; such effects would not be expected to have changed substantially over this time period. Furthermore, a recent longitudinal study demonstrated that the rate of warfarin receipt in VA patients with AF remained fairly stable from 2004 (the year of the results presented here) through 2008 (the last year of data examined in that study).²³ Finally, this study examined warfarin receipt as a process

of care, and thus, we did not examine patient outcomes. Finally, results apply to atrial fibrillation patients who use VHA services, who are primarily men, and cannot necessarily be generalized to women, veterans who do not use VHA, or to nonveterans.

CONCLUSIONS

In a large national cohort of patients with AF, those with MHC were more likely than those without MHC to have contraindications to anticoagulation, suggesting that cautious assessment of bleeding risk factors prior to initiation of warfarin may be particularly salient for patients with MHC. Several recent studies suggest that outcomes of anticoagulation therapy in the presence of MHC may be somewhat worse, but that presence of MHC does not consistently preclude safe treatment with warfarin.^{11,24-26} In that context, our finding that warfarin-eligible patients with AF with an MHC were less likely than other AF patients to receive warfarin, raises concerns about potential missed opportunities for more intensive therapy among some patients with an MHC. This supports the recommendation that patients and their healthcare providers weigh the pros and cons of anticoagulation with warfarin versus other management approaches so as to maximize delivery of equitable, high-quality, patient-centered care.

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