



Disparities in Antithrombotic Management

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Abstract

Objective: To compare antithrombotic management in academic, community, and VA hospitals.

Methods: A randomized, retrospective cohort study of patients with a diagnosis of atrial fibrillation (AF), AMI, DVT/PE, and TKR or THR or hip fracture repair was performed in 38 hospitals. Twenty-one academic, 13 community, and 4 VA hospitals participated.

Results: Distribution of mean age and co-morbidities were similar with exception of the VA cohort (p<0.001) [academic: 63.5 years and 48.3% (1002/2077) ≥ 2 comorbidities; community: 69.5 years and 47.9% (620/1295) ≥ 2 co-morbidities; VA: 68.8 years and 60.6% (246/406) ≥ 2 co-morbidities]. VA hospitals more frequently followed AHA/ACC Guidelines. In the high-risk AF population, VA, academic, and community utilization of warfarin was 68.4% (65/95), 52.9% (229/433), and 52.8% (151/286), respectively (p<0.01). Surprisingly, neither aspirin nor warfarin was prescribed in 20.6% (168/814) of the high-risk population. In AMI patients, aspirin was administered on arrival to the hospital more frequently in academic hospitals (84.3%, 451/535) vs. community (65.8%, 219/333) and VA (60.2%, 59/98) hospitals (p<0.001). Low utilization of low molecular weight heparin was observed in the DVT/PE population (56.1%, 527/939). Only 26.6% (250/939) of all patients were discharged on bridge therapy despite a 4.1 day reduction in length of stay. Academic (29.1%, 150/517) and VA (32.3%, 33/101) hospitals more frequently discharged patients on bridge therapy than community hospitals (20.6%, 66/321, p<0.01). Adequate venous thromboembolism (VTE) prophylaxis was absent in 14.4% (134/928) of orthopedic patients. No anticoagulant was predominantly observed in the VA cohort (11.4%, 12/105) vs. academic (6.3%, 33/503) and community cohorts (4.0%, 12/320) (p<0.05).

Conclusions: With the exception of AF, academic hospitals more frequently followed national antithrombotic guidelines, albeit the absolute percentage difference for each indicator studied was typically < 15%. Most remarkable is our observation that evidence-based guidelines are not being followed by a broad sample of American hospitals. Further, that a significant percentage of patients at risk of stroke and VTE do not receive a risk-modifying agent.

Results

Demographics

	Teaching Hospitals (n = 2,077)	Community Hospitals (n = 1,295)	VA Hospitals (n = 406)
	n (%)	n (%)	n (%)
Mean Age (years)	63.5	69.5	68.8 *
Age Range			
≤ 65	1,075 (51.8)	441 (34.1)	149 (36.7)
66 - 75	453 (21.8)	316 (24.4)	112 (27.6) †
> 75	549 (26.4)	538 (41.5)	145 (35.7)
Gender			
Male	1,038 (50.0)	576 (44.5)	399 (98.3)
Female	1,039 (50.0)	719 (55.5)	7 (1.7)
Co-morbidities			
CAD / Atherosclerosis	709 (34.1)	464 (35.8)	168 (41.4) †
Diabetes	453 (21.8)	248 (19.2)	112 (27.6) †
Hypertension	1,206 (58.1)	784 (60.5)	273 (67.2) †
Inflammatory Bowel Disease	34 (1.6)	32 (2.5)	13 (3.2)
Liver Disease	78 (3.8)	19 (1.5)	4 (1.0)
Malignancy	350 (16.9)	216 (16.7)	89 (21.9) †
Nephrotic Syndrome	19 (0.9)	21 (1.6)	4 (1.0)
Peripheral Vascular Disease	150 (7.2)	95 (7.3)	66 (16.3) †
Renal Insufficiency	332 (16.0)	195 (15.1)	77 (19.0)
Co-morbidity distribution			
One co-morbidity	615 (29.6)	396 (30.6)	112 (27.6)
Two co-morbidities	527 (25.4)	320 (24.7)	113 (27.8)
Three or more co-morbidities	475 (22.9)	300 (23.2)	133 (32.8) †
No co-morbidities	460 (22.1)	279 (21.5)	48 (11.8)

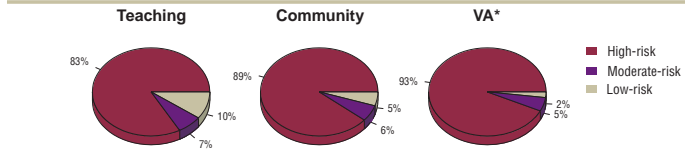
*Teaching sig lower than Community and VA p<0.01

†VA sig greater than Teaching and Community p<0.05

‡VA sig greater than Teaching and Community p<0.01

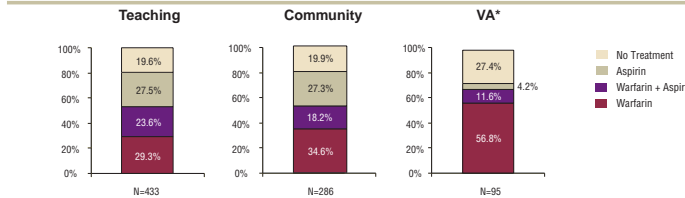
Atrial Fibrillation

Risk Stratification by Setting



*VA sig greater than Teaching p<0.01; VA sig greater than Community p<0.05

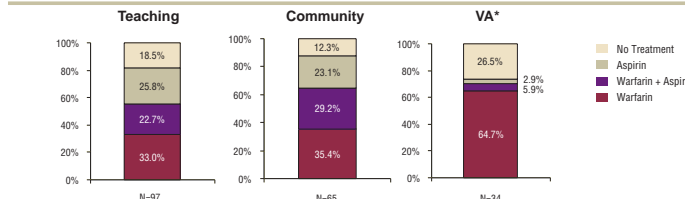
Treatment – High-risk Patients



*VA warfarin use sig greater than Teaching and Community p<0.01

High risk includes patients with one of the following risk factors: prior stroke, TIA or systemic embolus, hypertension, LV systolic dysfunction, age > 75 years, rheumatic mitral valve disease or prosthetic heart valve; or two of the following risk factors: Age 65 - 75, diabetes mellitus or coronary artery disease.

Treatment – Patients with Previous CVA/TIA or Systemic Embolic Event



Documented Contraindications in Patients not Receiving Warfarin

	Teaching Hospitals (n = 214)	Community Hospitals (n = 125)	VA Hospitals (n = 30)
	n (%)	n (%)	n (%)
Fall risk	87 (40.7)	53 (42.4)	14 (46.7)
Neuropsychiatric disorder	27 (12.6)	27 (21.6)	8 (26.7) *
Bleed history	34 (15.9)	12 (9.6)	8 (26.7) †
Peptic ulcer disease	16 (7.5)	19 (15.2)	12 (40.0) ‡
Aneurysm history	15 (7.0)	4 (3.2)	0 (0)
No documented contraindications	95 (44.3)	52 (41.6)	10 (33.3)

*VA sig greater than Teaching p<0.05

†VA sig greater than Community p<0.01

‡VA sig greater than Teaching and Community p<0.01

Acute Myocardial Infarction

Aspirin Administration

	Teaching Hospitals (n = 520)	Community Hospitals (n = 303)	VA Hospitals (n = 105)
	n (%)	n (%)	n (%)
Documented aspirin administration upon arrival to the hospital*	451/535 (84.3)	219/333 (65.8)	59/96 (60.2) ‡
Discharged on aspirin or warfarin†	448/500 (89.6)	263/300 (87.7)	71/89 (79.8) §

*Numerators include patients with documented aspirin administration within 24 hours of arrival, or within 8 hours of the event if AMI occurred following admission for another diagnosis.

†Excludes mortality

‡Teaching sig greater than Community and VA p<0.01

§Teaching sig greater than VA p<0.05

Orthopedic Surgery – Venous Thromboembolism Prevention

Treatment Selection

	Teaching Hospitals (n = 520)	Community Hospitals (n = 303)	VA Hospitals (n = 105)
	n (%)	n (%)	n (%)
Warfarin	190 (36.5)	154 (50.8)	48 (45.7) *
Unfractionated Heparin	75 (14.4)	15 (5.0)	8 (7.6) †
Low Molecular Weight Heparin	214 (41.2)	163 (53.8)	45 (42.9) ‡
Aspirin only	60 (11.5)	8 (2.6)	9 (8.6) §
No Treatment	33 (6.3)	12 (4.0)	12 (11.4) **

*Community sig greater than Teaching p<0.01

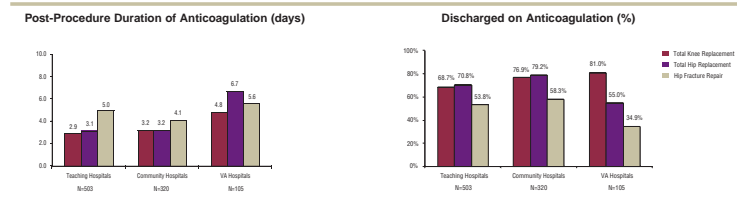
†Teaching sig greater than Community p<0.05

‡Community sig greater than Teaching and VA p<0.05

§Community sig less than VA and Teaching p<0.01

**VA sig greater than Community p<0.05

Duration of Treatment and Discharge Medication



Deep Vein Thrombosis/Pulmonary Embolism

Risk Distribution

	Teaching Hospitals (n = 517)	Community Hospitals (n = 321)	VA Hospitals (n = 101)
	n (%)	n (%)	n (%)
Major Surgery	106 (20.5)	71 (22.1)	21 (20.8)
DVT or PE History	148 (28.6)	81 (25.2)	34 (33.7)
Immobility	95 (18.4)	56 (17.4)	23 (22.8)
Malignancy	161 (31.5)	70 (21.8)	26 (25.7)
Obesity	163 (31.5)	82 (25.5)	38 (37.6) *
Idiopathic	159 (30.8) †	143 (44.5)	49 (48.5) †

*VA sig greater than Community p<0.05

†Teaching sig lower than Community and VA p<0.01

Use of Low Molecular Weight Heparin*

	Teaching Hospitals (n = 520)	Community Hospitals (n = 303)	VA Hospitals (n = 105)
	n (%)	n (%)	n (%)
Isolated DVT	160/251 (63.7)	95/181 (52.5)	31/63 (49.2) †
PE	92/158 (58.2)	38/81 (46.9)	17/28 (60.7)
DVT and PE	61/108 (56.5)	25/59 (42.4)	8/10 (80.0)

*Includes mortality

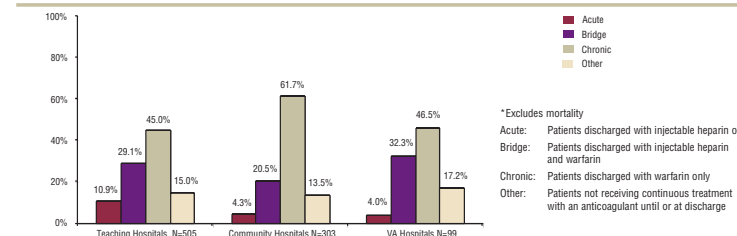
†Teaching sig greater than Community and VA p<0.05

Treatment Indicators – Bridge*

	Teaching Hospitals (n = 520)	Community Hospitals (n = 303)	VA Hospitals (n = 105)
	n (%)	n (%)	n (%)
INR ≥ 2.0 for 2 consecutive days prior to injectable heparin discontinuation	120/245 (49.0)	112/202 (55.4)	14/39 (35.9)
Discharged on bridge if INR not therapeutic at time of discharge	136/206 (66.0)	57/111 (51.4)	26/45 (57.8)

*Excludes mortality

Discharge Treatment*



*Excludes mortality

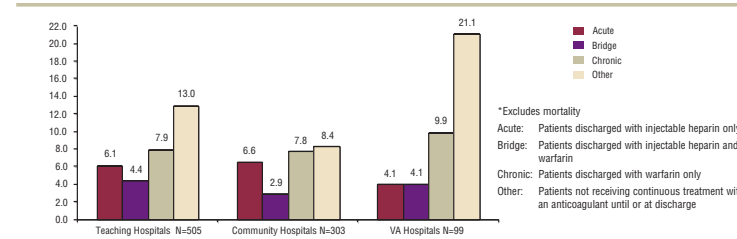
Acute: Patients discharged with injectable heparin only

Bridge: Patients discharged with injectable heparin and warfarin

Chronic: Patients discharged with warfarin only

Other: Patients not receiving continuous treatment with an anticoagulant until or at discharge

Length of Stay (days)*



*Excludes mortality

Acute: Patients discharged with injectable heparin only

Bridge: Patients discharged with injectable heparin and warfarin

Chronic: Patients discharged with warfarin only

Other: Patients not receiving continuous treatment with an anticoagulant until or at discharge

Conclusions

With the exception of AF, academic hospitals more frequently followed national antithrombotic guidelines, albeit the absolute percentage difference for each indicator studied was typically < 15%. Most remarkable is our observation that evidence-based guidelines are not being followed by a broad sample of American hospitals. Further, that a significant percentage of patients at risk of stroke and VTE do not receive a risk-modifying agent.