



The National Anticoagulation Benchmark and Outcomes Report (NABOR™): Evidence of a Significant Difference Between Guidelines and Actual Practice

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Abstract

Objective: To assess patient characteristics, risk factors, and antithrombotic treatment of atrial fibrillation (AF), venous thromboembolism (VTE), acute myocardial infarction (AMI), and prophylaxis in orthopedic surgery inpatients enrolled in a national multicenter database.

Methods: Data was retrospectively collected from hospital inpatient records at 38 US hospitals. Patients treated from July 2000 – June 2003 with an ICD-9-CM or procedure code for AF, pulmonary embolus (PE), DVT, pregnancy related PE or DVT, AMI, total knee, hip or knee replacement, and hip fracture surgery were randomly selected. Patients \leq 18 years of age, and those admitted from or discharged to another hospital were excluded. Clinical characteristics and anticoagulation management according to guidelines were analyzed.

Results: 3,778 patients were included (945 AF, 939 VTE, 966 AMI, and 928 orthopedic surgery). Mean age was 66.1 years with 53.3% male and 46.7% female. Co-morbidities included hypertension (59.9%), coronary artery disease (35.5%), diabetes (21.5%), and malignancy (17.3%). Surprisingly only 54.7% of AF patients with high stroke-risk received warfarin and 20.6% received no treatment. Only 50.6% of VTE patients had INR \geq 2.0 two consecutive days prior to discontinuing heparin. Only 60.5% of those without a therapeutic INR were discharged on bridge therapy. Length of hospitalization for bridged patients was significantly less than those discharged on chronic warfarin alone (4.0 vs. 8.1 days) ($P < 0.001$). Only 75.5% of AMI patients received aspirin on arrival to the hospital, although 88% were discharged on aspirin and/or warfarin. Only 85.6% of the orthopedic surgery population received prophylaxis with heparin or LMWH, the remaining received no anticoagulation.

Conclusions: These results suggest that evidence-based antithrombotic guidelines are not being consistently followed. Further evaluation of antithrombotic practices in those sites with the highest performance is warranted. It is hoped that this database will help demonstrate gaps between guidelines and actual practice.

Objective and Methods

- Retrospective, descriptive study designed to:
 - assess patient characteristics, risk factors, and antithrombotic treatment in relation to evidenced-based guidelines
 - foster performance improvement in antithrombotic management
- Thirty-eight hospitals participated
 - 21 Academic-teaching
 - 13 Community
 - 4 Veterans Administration
- CRF's completed by sites for patients treated between July 2000 and June 2003
 - Thirty-seven of thirty-eight sites, November 29, 2001 – April 28, 2003
- Participants received a report of their performance compared with the top and lower 25% quartiles, as well as the median

Inclusion and Exclusion Criteria

Inclusion	Exclusion	Study Period
Afib (427.31) PE (415.11, 415.19) Pregnancy-related PE (673.0-673.8) DVT (453.8) Pregnancy-related DVT (671.00-671.94) AMI (410.01-410.91) TKR (81.54) THR (81.51) Hip Fx Repair (820.0-821.9)	≤ 18 years of age Patients admitted from or discharged to another hospital	Admission through 30 days post discharge within admitting facility

Results

Demographics

	All Hospitals (38) (n = 3,778)
Mean Age (years)	66.1
Atrial Fibrillation	71.5
Acute Myocardial Infarction	66.7
DVT/PE	59.4
TKR, THR, Hip Fracture Repair	66.8

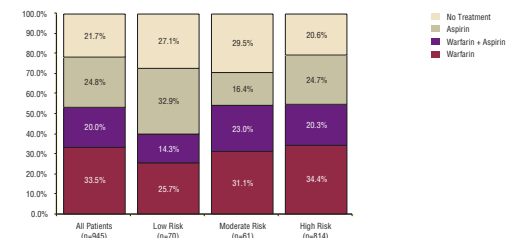
	n	(%)
Gender		
Male	2,013	(53.3)
Female	1,765	(46.7)

Diagnosis/Procedure	n	(%)
Atrial Fibrillation	945	(25.0)
Acute Myocardial Infarction	966	(25.6)
DVT/PE	939	(24.9)
TKR, THR, Hip Fracture Repair	928	(24.6)

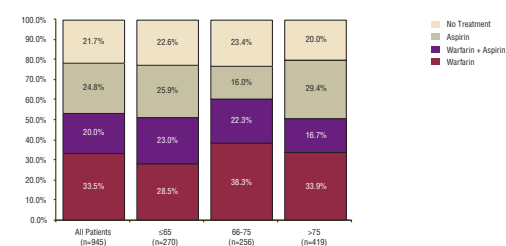
Co-morbidities	n	(%)
Hypertension	2,263	(59.9)
CAD/Atherosclerosis	1,341	(35.5)
Diabetes	813	(21.5)
Malignancy	655	(17.3)
Renal Insufficiency	604	(16.0)
Peripheral Vascular Disease	311	(8.2)

Co-morbidity Distribution	n	(%)
No co-morbidities	787	(20.8)
One co-morbidity	1,123	(29.7)
Two co-morbidities	960	(25.4)
≥ Three co-morbidities	908	(24.0)

Atrial Fibrillation Treatment by Risk Factors



Atrial Fibrillation Treatment by Age Factors



Utilization of Treatment Consistent with Evidence-based Guidelines*

Indicator	All Hospitals (n = 945)		Teaching Hospitals (21) (n = 522)		Community Hospitals (13) (n = 321)		VA Hospitals (4) (n = 102)	
	n	(%)	n	(%)	n	(%)	n	(%)
Compliance with Treatment Selection Guidelines in All Patients	539/945	(57.0)	294/522	(56.3)	174/321	(54.2)	71/102	(69.6)
Compliance with Treatment Selection Guidelines in High-risk Patients	445/814	(54.7)	236/443	(52.3)	144/276	(52.2)	65/95	(68.4)

*American College of Chest Physicians (ACCP)

Acute Myocardial Infarction Treatment

	Benchmark Performance			
	Teaching (n = 535)	Community (n = 333)	VA (n = 98)	
	n	(%)	n	(%)

Initial Treatment			
Received Aspirin on Arrival to Hospital or Within Eight Hours of Event if Hospitalized	451 (84.3)	219 (65.8)	59 (60.2)

Discharge Treatment	(n=500)*	(n=300)*	(n=89)*
Received Discharge Prescription for Aspirin and/or Warfarin	448 (89.6)	263 (87.7)	71 (79.8)

*Excludes mortality

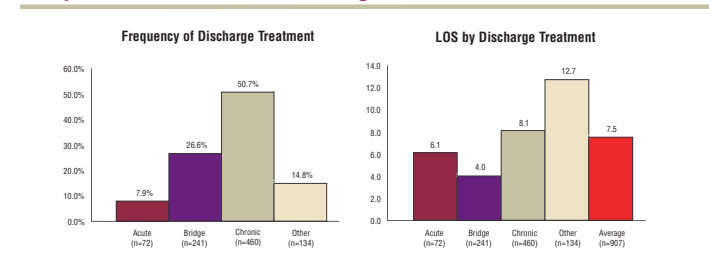
Deep Vein Thrombosis & Pulmonary Embolism Treatment*

	(n=939)			
	DVT (n = 495)	PE (n = 267)	DVT & PE (n = 177)	
	n	(%)	n	(%)

Unfractionated Heparin	256 (51.7)	185 (69.3)	121 (68.4)
Adjusted Dose Sub Q Heparin	45 (9.1)	23 (8.6)	10 (5.6)
Low Molecular Weight Heparin	286 (57.8)	147 (55.1)	94 (53.1)
Direct Thrombin Inhibitor	3 (0.6)	2 (0.7)	1 (0.6)

*Includes mortality

Deep Vein Thrombosis Discharge



Bridge Therapy Use

	Benchmark Performance			
	Teaching (n = 517)	Community (n = 321)	VA (n = 101)	
	n	(%)	n	(%)
Inpatient Bridge Treatment	(n=245)*†	(n=202)*†	(n=39)*†	
INR \geq 2.0 for two consecutive days prior to discontinuation of Heparin or LMWH	120 (49.0)	112 (55.4)	14 (35.9)	
Discharge Treatment	(n=206)*	(n=111)*	(n=45)*	
Discharged on warfarin alone when INR is not \geq 2.0 for two consecutive days prior to discharge	70 (34.0)	54 (48.6)	19 (42.2)	

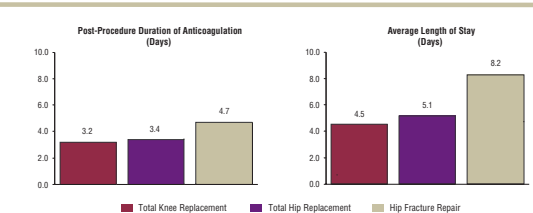
*Excludes mortality

†Excludes patients not receiving bridge therapy during hospitalization

DVT/PE Prophylaxis in Orthopedic Surgery

	(n=928)			
	TKR (n = 358)	THR (n = 284)	Hip Fx (n = 291)	
	n	(%)	n	(%)
Unfractionated Heparin	24 (6.7)	14 (4.9)	60 (20.6)	
Low Molecular Weight Heparin	163 (45.5)	129 (45.4)	132 (45.4)	
Warfarin	182 (50.8)	138 (48.6)	74 (25.4)	
Aspirin only	28 (7.8)	24 (8.5)	26 (8.9)	
No Prophylaxis	10 (2.8)	9 (3.2)	39 (13.4)	
Community Hospitals	2 (1.7)	3 (3.3)	7 (7.4)	
Teaching Hospitals	6 (3.0)	5 (2.9)	23 (14.9)	
VA Hospitals	2 (4.8)	1 (5.0)	9 (20.9)	

DVT/PE Inpatient Prophylaxis Duration of Treatment



Conclusions

Evidence-based guidelines are not consistently followed among participating organizations

- Recommended therapy in atrial fibrillation patients
 - 54.7% compliance with treatment selection guidelines in "high-risk" patients
- Acute Myocardial Infarction
 - 75.5% received aspirin on arrival to hospital
 - 88.0% discharged on aspirin and/or warfarin
- Prevention of VTE in orthopedic surgery (TKR, THR, hip fracture surgery)
 - 84.9% of patients received prophylaxis with heparin, LMWH, or warfarin
- Treatment of DVT/PE
 - 50.6% had an INR \geq 2.0 for two consecutive days prior to discontinuing heparin or low molecular weight heparin
 - 39.5% discharged on warfarin alone when INR is not \geq 2.0 for two consecutive days
- Two follow-up studies are ongoing
 - A Physician Knowledge Attitude and Belief study to identify prevalent attitudes toward risk-benefit equation in successful organizations
 - A Hospital Infrastructure assessment to identify processes and systems (e.g., standing orders, anticoagulation consultation services) common among successful organizations