Optimizing VTE Prophylaxis Utilizing Risk-Assessment Models

Objectives

- Discuss the rationale for utilizing risk assessment models (RAMs)
- Identify factors which comprise the various RAMS
- Apply the RAM utilizing patient specific data
- Review factors that will evolve our understanding of risk assessment

Assessment of VTE Risk

Model	Surgical	Medical	Bleeding
Caprini	√	√	
Padua		√	
IMPROVE		√	√

Why Utilize a Risk Assessment Model?

- Surgical Patients
  - Identify risk beyond surgical procedure
- Medical Patients
  - Heterogeneity of the population
  - Universal approach has not impacted community VTE burden
  - Identify low risk patients (NPV ~99%)
  - Assess risk:benefit ratio
  - Identify candidates for post-discharge prophylaxis (future state)

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Surgical Patients

Caprini Risk Assessment

1 Point	2 Points	3 Points	5 Points
Age 41 – 60 yrs BMI > 25 mg/m^2	Age 61 – 74 yrs	Age ≥ 75 yrs	Stroke (< 1 mo)
Minor sx History of previous major sx	Arthroscopic sx Laparoscopic sx > 45 min Major open sx > 45 min	History of VTE	Elective arthroplasty Hip, pelvic or leg fracture Acute spinal cord injury (< 1 mo)
Sepsis (< 1 mo)	Malignancy	Thrombophilia	
Bedrest (Medical pt) Swollen legs Varicosities	Confined to bed > 72 hrs Immobilized plaster cast		
Abnormal pulm fxn Serious lung dz < 1 mo	Central venous access		
AMI, CHF (< 1 mo)			
Pregnancy or post-partum (<1 mo) Pregnancy loss OCPs/ Hormone			

Risk Category	Points
Very Low	0 – 1
Low	2
Moderate	3 – 4
High	≥5

Ann Surg 2010;251:344-350

Surgical VTE Risk

Non- Orthopedic Surgical Populations

Risk Category	Surgery	Caprini Score	Risk w/o Px %
Very Low	Same-day surgery	0 – 2	< 0.5
Low	Spinal w/o malignancy	1 - 2	1.5
Moderate	GYN (non-cancer), Cardiac, Thoracic Spinal Surgery	3 - 4	3.0
High	Bariatric Pneumonectomy TBI/SCI, Craniotomy GYN cancer Major Trauma Orthopedic	≥5	6.0+

Risk Level for general surgery including urologic, GI, vascular, breast and thyroid dependent on Caprini Score

CHEST 2012; 141(2)(Suppl):e227S–e277S

Medically Ill VTE Risk Assessment

Padua

Characteristic	Score
Active Cancer	3
Previous VTE (excluding superficial)	3
Reduced mobility (in bed more than 2/3 of day with BRP)	3
Thrombophilic condition	3
Recent trauma or surgery	2
Age > 70	1
Heart or respiratory failure	1
Acute MI or Ischemic stroke	1
Acute infection or hematologic disorder	1
Obesity (BMI > 30)	1
Ongoing hormonal treatment	1

High risk score $\geq$ 4

Barber et al J Thromb Haemost 2010;11:2450-7

Medically Ill VTE Risk Assessment

Improve

VTE Risk Factors	Score
Previous VTE	3
Thrombophilia	2
Lower limb paralysis	2
Cancer	2
Immobilization	1
ICU / CCU stay	1
Age > 60 years	1

Risk Category	Points
Low	0 – 1
Moderate	2 – 3
High	≥ 4

Spyropoulos Chest 2011;140: 706–714.

Bleeding Risk *IMPROVE*

High risk score ≥ 7

Bleeding Risk Factors	Score
Renal Dysfunction	
GFR 30 – 59 ml/min	1
GFR < 30 ml/min	2.5
Age	
40 – 80	1.5
> 80	3.5
Bleeding Risk	
Hepatic Failure INR > 1.5	2.5
Platelets < 50 x 10^9	4
Bleeding History in previous 3 months	4
Active GI Ulcer	4.5
Other	
Male Gender	1
Current Cancer	2
Rheumatic Disease	2
CV Catheter	2
ICU / CCU stay	2.5

Chest 2011;139: 69 - 70.

Balancing
Risk vs. Benefit

Factor	Bleeding	Clotting	Strategy
Risk	High	High	Mechanical +/- Chemoprophylaxis
		Low	Mechanical vs. None
	Low	High	Mechanical + Chemoprophylaxis
		Low	Mechanical vs. None

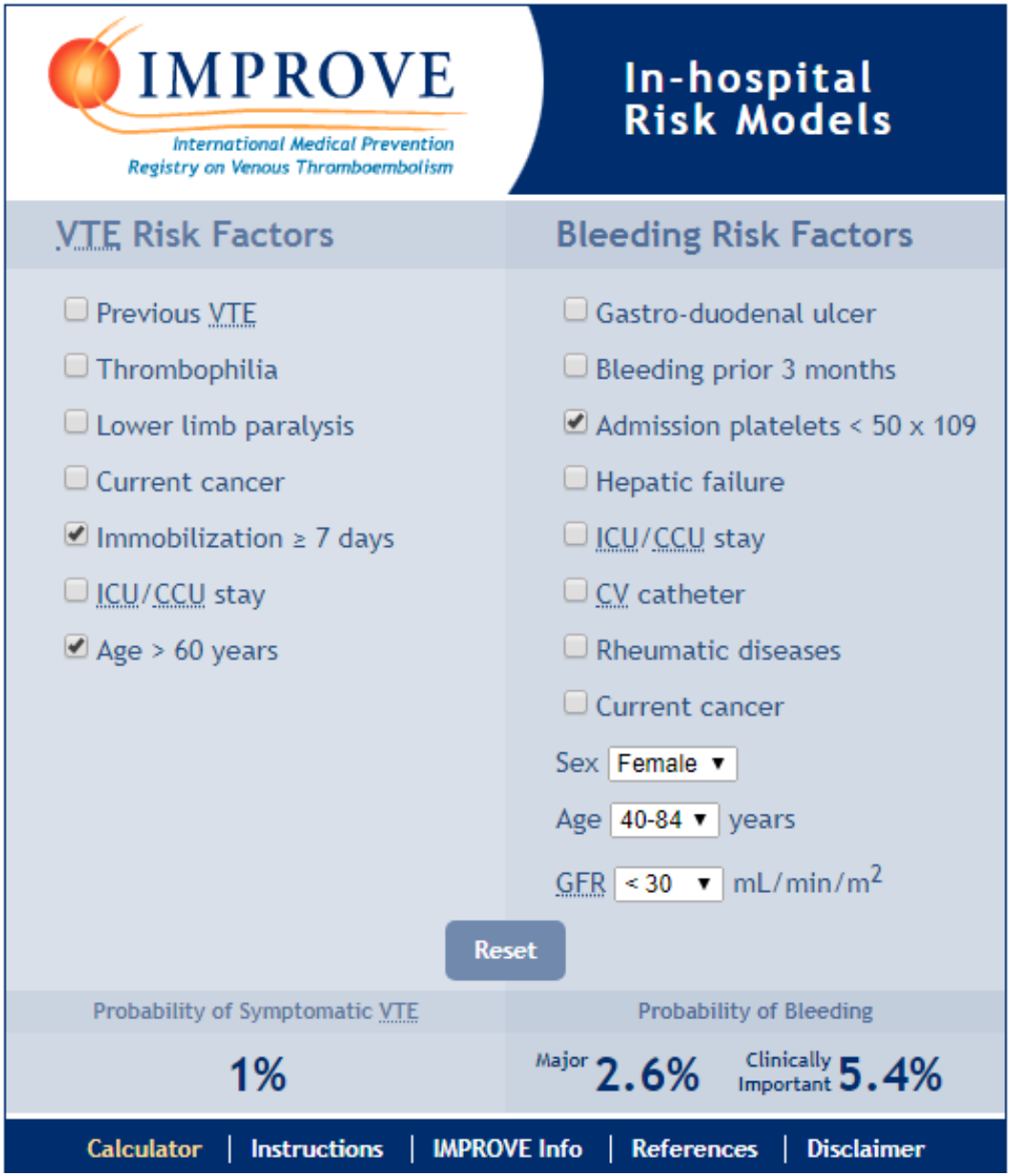
Emerging Data

- Duration of prophylaxis
  - Including the post-discharge period
  - Role of D-dimer
- Impact of a thromboembolic event of outcome based on concurrent illness
  - Cardiopulmonary Disease
- Overlap between CV disease and VTE
  - Risk factor modification

Case Study

- 65 yo female with a PMH COPD on home O_2, CHF w/ LVEF 35% (?EtOH)and CKD (GFR 25 ml/hr) is admitted with acute SOB, CXR shows pulmonary edema
- BMI 24 kg/m^2. HGB 8.5 g/dl and platelets 46K
- Recently hospitalized with similar symptoms 3wks ago
  - Poor adherence to diet/lifestyle
- Admitted to the cardiology service for management of HF exacerbation. Unable to ambulate due to SOB.

RAM	Score	Risk Level
Caprini	6	High
Padua	4	High
Improve	2	
Improve bleeding	8	



http://www.outcomes-umassmed.org/improve/risk_score/index.html
accessed 06/25/2018

Conclusions / Summary

- RAMs allow a systematic assessment of thrombosis risk
  - High NPV
- Thorough assessment includes bleeding risk assessment
- Risks may change during hospitalization
- Knowledge regarding thrombosis risk continues to evolve