

# Stratifying Ischemic and Bleeding Risk in Patients with NSTEMI: Balancing the Risks and Benefits of Treatment

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## Introduction

There are approximately 1.4 million hospital admissions annually due to acute coronary syndromes (ACS). Unstable angina (UA) and non-ST-segment myocardial infarction (NSTEMI) account for between 1 and 1.15 million, or approximately 80 percent of these. Furthermore, over 1.2 million percutaneous coronary interventions (PCIs) are performed every year in the United States.

Antithrombotic therapy, predicated upon thorough risk stratification, is the cornerstone of pharmacologic management of patients with ACS. Use of anticoagulant and antiplatelet agents, coupled with early, invasive management, reduces the risk for recurrent ischemic events but—as a direct consequence of the mechanism of action of these agents—may increase the risk for bleeding. In the tightly controlled environment of clinical trials, with optimized care and dosing, between 3 percent and 9 percent of patients with NSTEMI experience hemorrhagic complications; even higher rates have been reported in real-world clinical practice.

## Risk Stratification

Risk stratification has traditionally focused primarily on reducing downstream risk for ischemic events and mortality. Traditional risk stratification helps determine the identification of the site of care and drives the selection of early invasive versus selective invasive management and appropriate pharmacotherapy. While traditional risk stratification is valuable in reducing ischemic risk, the current regulatory and managed care environment places much emphasis on reducing risk of adverse events, most prominently, risk of bleeding. This focus takes on particular importance in the context of antiplatelet and anticoagulant agents, because the very mechanisms that confer their therapeutic benefit can also increase patients' risk for bleeding.

The CRUSADE Registry investigators developed a score for bleeding that was recently published in *Circulation* 2009;119. This allows the physician to better quantify the risk of bleeding and balance this risk against the risk of recurrent ischemic events.

## CRUSADE Bleeding Score Nomogram

Predictor	Range	Score
<b>Baseline hematocrit (%)</b>	<31	9
	31-33.9	7
	34-36.9	3
	37-39.9	2
	≥40	0
<b>Creatinine clearance (mL/min)</b> (Note: Cockcroft-Gault is truncated at >90 mL/min)	≤15	39
	>15-30	35
	>30-60	28
	>60-90	17
	>90-120	7
>120	0	
<b>Heart rate (bpm)</b> (Note: heart rate is truncated at	≤70	0
	71-80	1
	81-90	3
	91-100	6
	101-110	8
	111-120	10
≥121	11	
<b>Sex</b>	Male	0
	Female	8
<b>Signs of CHF at presentation</b>	No	0
	Yes	7
<b>Prior vascular disease</b> (defined as prior PAD or stroke)	No	0
	Yes	6
<b>Diabetes mellitus</b>	No	0
	Yes	6
<b>Systolic blood pressure</b> (mm Hg)	≤90	10
	91-100	8
	101-120	5
	121-180	1
	181-200	3
	≥201	5

**Total risk score for our patient: 39 (moderate risk)**

### Patient Risk Score and Corresponding Rate of Major Bleeding:

Very Low risk	Low risk	Moderate risk	High risk	Very high risk
≤20	21-30	31-40	41-50	>50
3.1%	5.5%	8.6%	11.9%	19.5%

continued

## Conclusion

No single model currently permits simultaneous estimation of ischemic/mortality risk and bleeding risk. Growing evidence suggests a direct link between risks associated with bleeding (individual risk factors, patient-clinical variables, or a combination of factors) and clinical outcomes in patients with ACS. Physicians examine risk stratification models for both bleeding and ischemia to help determine whether overlaps in clinical characteristics can be leveraged to maximize the beneficial anti-ischemic effects of antithrombotic/antiplatelet drugs in risk-stratified patients to minimize bleeding risk.

*Dr. Cohen is a fellow of numerous professional organizations, including the American College of Cardiology, the American College of Physicians, and the Society for Cardiac Angiography and Interventions. He serves on the Council on Clinical Cardiology, and the Council on Arteriosclerosis, Thrombosis and Vascular Biology of the American Heart Association. He has served as a consultant on the clinical-trial review committee of the National Heart, Lung and Blood Institute, and has participated in numerous clinical trials, serving as the lead investigator of the international, multicenter ESSENCE trial, ACUTE I and II, and the TETAMI trial, and he was the co-lead investigator for the PRISM trial.*

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**To learn more about the Saint Barnabas Heart Centers or risk stratification in patients with unstable angina and non-ST-segment myocardial infarction, please contact Dr. Cohen at 973.926.7852 or [marcohen@sbhcs.com](mailto:marcohen@sbhcs.com).**

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