In the Name of Allāh, the Most Gracious, the Most Merciful

“Looking similar does not mean they are the same”
Unstable angina risk stratification
What’s known?
What’s new?

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Risk stratification ... important?

Two main benefits:
1. Impacts decision making regarding treatment options.
2. Provides patients with some sense of what the future holds.
Clinical judgement .. or risk models?

Quantitative assessment of ischemic risk using risk scores is more superior to using clinical judgment alone.

It is recommended to use established risk scores for prognosis estimation.

Risk stratification

- Early: During hospital admission
- Late: After discharge
Early risk stratification

Some patients declare themselves as have **VERY HIGH RISK**.

They do **NOT** need formal risk stratification.

- Cardiogenic shock.
- Overt heart failure or severe LV dysfunction.
- Persistent rest angina despite intensive medical therapy.
- Hemodynamic instability due to mechanical complications e.g. acute MR.
- Unstable ventricular arrhythmias.

**Proceed to immediate coronary angiography (within 2 hours)**

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Early risk stratification

Patients who do **NOT** show criteria of “VERY-HIGH RISK” should undergo early risk stratification.

**WHY?**

Prediction of 30-day and long term outcome. For example; lower risk patients may experience MACEs at a rate as low as 6.7% at one year.

TIMI risk score

Data from TIMI 11B & ESSENCE trials.
Seven variables; give 0 if absent and 1 if present.

• Age ≥ 65 years.
• Presence of at least 3 risk factors for CHD.
• Prior coronary stenosis ≥ 50%.
• ST segment deviation on admission ECG.
• At least 2 anginal episodes within preceding 24 hours.
• Elevated serum cardiac biomarkers.
• Use of Aspirin within the previous week.


• Similar predictive value has been found at 30 days and 6 weeks post-discharge.

• Higher TIMI risk scores are associated with more severe angiographic findings as LM disease, visible thrombus and multi-vessel disease (PRISM-PLUS trial).

• In TACTICS-TIMI 18 trial, only patients with score ≥ 3 had benefit from an early invasive strategy.


TRI = (HR x \[\text{age/10} \] squared) ÷ SBP


GRACE risk model

Derived from GRACE registry; 92 hospitals in 14 countries.

More predictive than TIMI risk score.

Two models: one for in-hospital and one for 6-month outcome.

http://www.outcomes.umassmed.org/grace/acs_risk/acs_risk_content.html
GRACE risk model

<table>
<thead>
<tr>
<th>Risk category (tertile)</th>
<th>GRACE risk score</th>
<th>In-hospital death (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>≤108</td>
<td>≤1</td>
</tr>
<tr>
<td>Intermediate</td>
<td>109-140</td>
<td>1-3</td>
</tr>
<tr>
<td>High</td>
<td>&gt;140</td>
<td>&gt;3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk category (tertile)</th>
<th>GRACE risk score</th>
<th>Post discharge to six-month death (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>≤88</td>
<td>≤3</td>
</tr>
<tr>
<td>Intermediate</td>
<td>89-118</td>
<td>3-8</td>
</tr>
<tr>
<td>High</td>
<td>&gt;118</td>
<td>&gt;8</td>
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</tbody>
</table>


**Predictive ability sustained up to one year**


**A simpler tool ...**

Provides prognosis over 6-month, one year and 3 years.

Derived from over 30,000 patients & validated in a registry of over 3000 patients.

http://www.gracescore.org/WebSite/default.aspx?ReturnUrl=%2f

Other risk models

**Predicting In-Hospital Mortality in Patients With Acute Myocardial Infarction**

Robert L. McNamara, MD, MHS, a Kevin F. Kennedy, MS, b David J. Cohen, MD, MSc, c Deborah B. Diercks, MD, MSc, d Mauro Mosucci, MD, MBA, e f Stephen Ramee, MD, f Tracy Y. Wang, MD, MHS, MSc, g Traci Connolly, BSN, MS, h John A. Spertus, MD, MPH i

- Data from 243,440 patients
- C statistics of 0.88
- Reflects more contemporary practice with GRACE & TIMI scores.

**ACTION registry score, JACC 2016**


How could this be translated into daily practice?

Timing depends on risk level.
Intermediate-risk criteria
- Diabetes mellitus
- Renal insufficiency (eGFR <60 mL/min/1.73 m²)
- LVEF <40% or congestive heart failure
- Early post-infarction angina
- Prior PCI
- Prior CABG
- GRACE risk score >109

Low-risk criteria
- Any characteristics not listed above

• 8 RCTs, from 2000 to 2016, 5324 patients with total follow-up of 180 days, TIMACS trial (n=3031) was the largest one.

• Early invasive (< 24 hrs) VS. delayed invasive (up to 108 hrs).

All-cause mortality or non-fatal MI

1. Patients with elevated **Troponin** (HR 0.76, 95% CI 0.58-1.00).

2. Patients with **GRACE** score more than 140 (HR 0.70, 95% CI 0.52-0.95).

3. Patients with **age** ≥ 75 years (HR 0.65, 95% CI 0.46-0.93).

4. Patients with **DM** (HR 0.67, 95% CI 0.45-0.99).

**But some groups get benefit ...**

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**When ?**

Three to seven days after the event.

**Important ?**

Among all major cardiac events that occur between 6 to 8 weeks after event, more than one fourth occur after discharge!

**Components ?**

Assessment of LV function & stress testing for residual ischemia.

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 обслуживание

**Sabatine MS, McCabe CH, Morrow DA, et al.** Identification of patients at high risk for death and cardiac ischemic events after hospital discharge. *Am Heart J* 2002; 143:966.
• About **9 to 14%** of patients with UA and NSTEMI are found to have non-significant CAD after angiography. Those patients have good short- and long-term prognosis.

• Patients with LV systolic dysfunction & LVEF < 40% have much higher long term mortality and **50% probability** to have multi-vessel disease.

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For whom?
Patients who had just **partial** or **no** revascularization at all during admission.

Pre-requisites?
- Free of heart failure or anginal symptoms for at least 24 hrs.
- Stable ECG for at least 24 hrs.

Stress protocol?
Exercise is best, but it varies depending on patients’ characteristics, doctor preference and local expertise.
• All patients with UA should undergo early risk stratification. The results are used to help choose between immediate coronary angiography, an early invasive strategy, or a conservative approach.

• For early risk stratification, we prefer either the GRACE risk model or the TIMI risk score.

• Prior to discharge, patients who have been medically treated and those who have received incomplete revascularization should undergo noninvasive assessment for residual inducible ischemia.

• It’s still debatable whether early rather than delayed invasive management provides benefit to all patients with UA.