



Anticoagulation 2013 for NSTEMI and STEMI

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Disclosures

- Research funding

- AstraZeneca, Johnson and Johnson, NHLBI, AHRQ

- Consultant

- Jansen, Bayer, Genzyme, Otsuka
- Off-label uses of drugs or devices may be discussed
- Bivalirudin for STEMI, Fondaparinux for NSTEMI ACS, Coronary stents for ACS

**“Every system is perfectly
designed to get the results it
gets”**

*Dr. Paul Batalden
Dartmouth College*



*Helping Cardiovascular Professionals
Learn. Advance. Heal.*

ACS Management: what are our goals and priorities?

Goals

- Treat Sx
- Attenuate myocardial damage
- Reduce the risk of recurrent ischemic events
 - Short-term (in-hospital)
 - Long-term

Priorities

- Rapid treatment
- Risk stratification
- Balance risk of thrombosis with risk of bleeding
- Integrate strategies into invasive or conservative management
 - Recognize duration of treatment course
- Reduce LOS/Costs

ACS Management: State-of-the-art

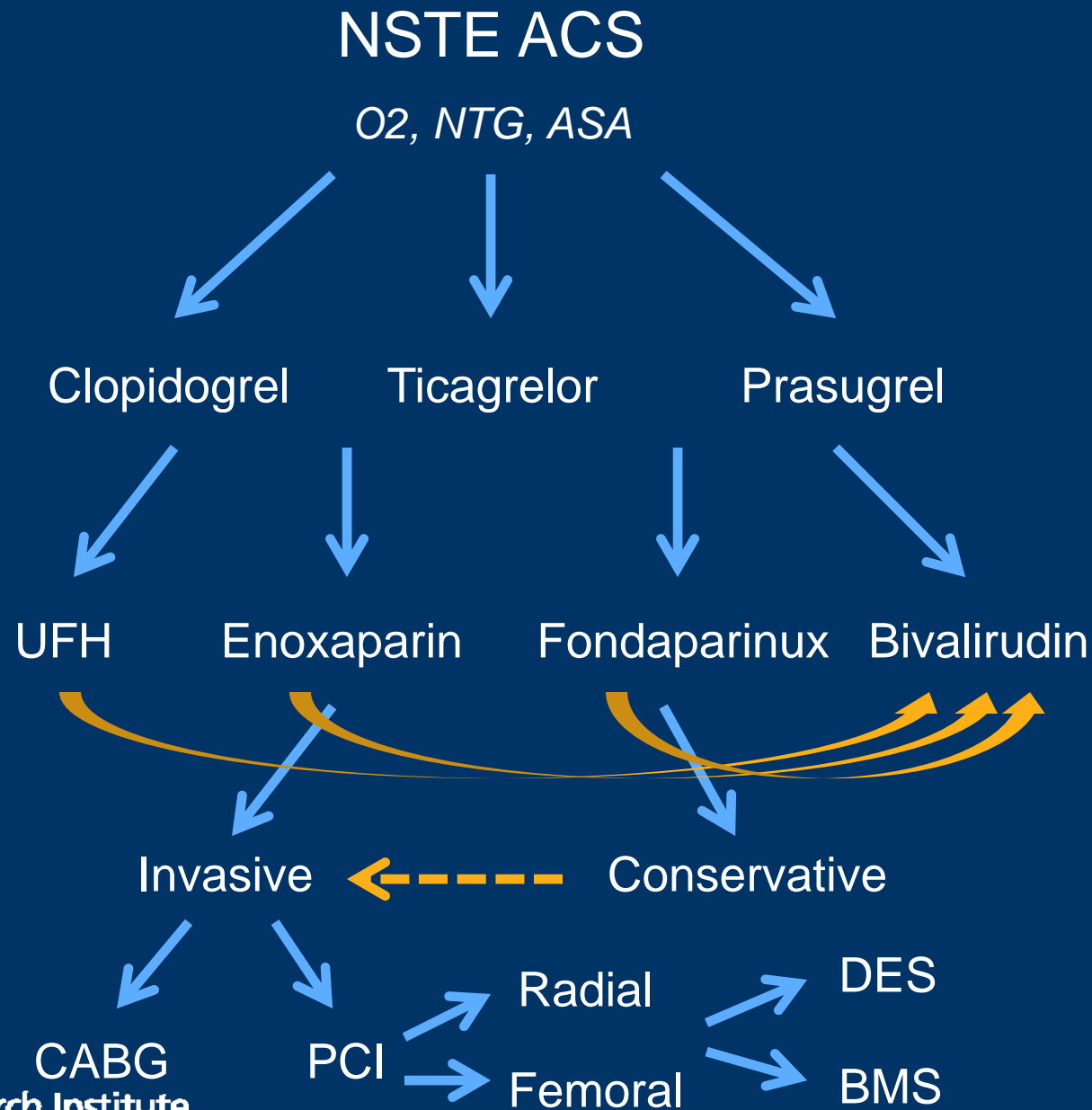
NSTE-ACS

- Management options
 - Individualized therapy vs. one-size-fits-all
- Risk stratification
 - Initial triage*
 - Invasive vs. conservative

STEMI

- STEMI Networks
- Pharmacotherapy
- Stent type
- Vascular access*

Management options – NSTEMI ACS



ACS Management in 2012 and beyond...

The old...



The new...



Risk scores and the guidelines

CLASS IIa

1. Use of risk-stratification models, such as the Thrombolysis In Myocardial Infarction (TIMI) or Global Registry of Acute Coronary Events (GRACE) risk score or the Platelet Glycoprotein IIb/IIIa in Unstable Angina: Receptor Suppression Using Integrilin Therapy (PURSUIT) risk model, can be useful to assist in decision making with regard to treatment options in patients with suspected ACS. (*Level of Evidence: B*)

ESC guidelines:

Bleeding complications?

- **Assessment of bleeding risk is an important part of the decision-making process and should be taken into account when deciding on a treatment strategy (I-B)**
- **Minor bleeding should be managed without interruption of active Rx (I-C)**
- **Major bleeding requires interruption/neutralization of antithrombotic Rx unless it can be adequately controlled (I-C)**
- **The decision to transfuse should be made individually but withheld in stable patients with Hct > 25% or Hgb > 8g/dl (I-C)**

GRACE Risk Score



CRUSADE Bleeding Score Nomogram

Predictor	Range	Score
Baseline Hematocrit (%)	< 31	9
	31-33.9	7
	34-36.9	3
	37-39.9	2
	≥ 40	0
Creatinine Clearance (mL/min)	≤ 15	39
	>15-30	35
	>30-60	28
	>60-90	17
	>90-120	7
	>120	0
Heart rate (bpm)	≤ 70	0
	71-80	1
	81-90	3
	91-100	6
	101-110	8
	111-120	10
	≥ 121	11
Sex	Male	0
	Female	8
Signs of CHF at presentation	No	0
	Yes	7
Prior Vascular Disease	No	0
	Yes	6
Diabetes Mellitus	No	0
	Yes	6
Systolic blood pressure (mm Hg)	≤ 90	10
	91-100	8
	101-120	5
	121-180	1
	181-200	3
	≥ 201	5



CRUSADE Bleeding Risk Score

- Patients were categorized into quintiles of risk groups based on their CRUSADE Bleeding Score

Risk	N	Min Score	Max Score	Bleeding
Very low	19,486	1	20	3.1%
Low	12,545	21	30	5.5%
Moderate	11,530	31	40	8.6%
High	10,961	41	50	11.9%
Very High	15,210	51	91	19.5%



TIMACS Trial

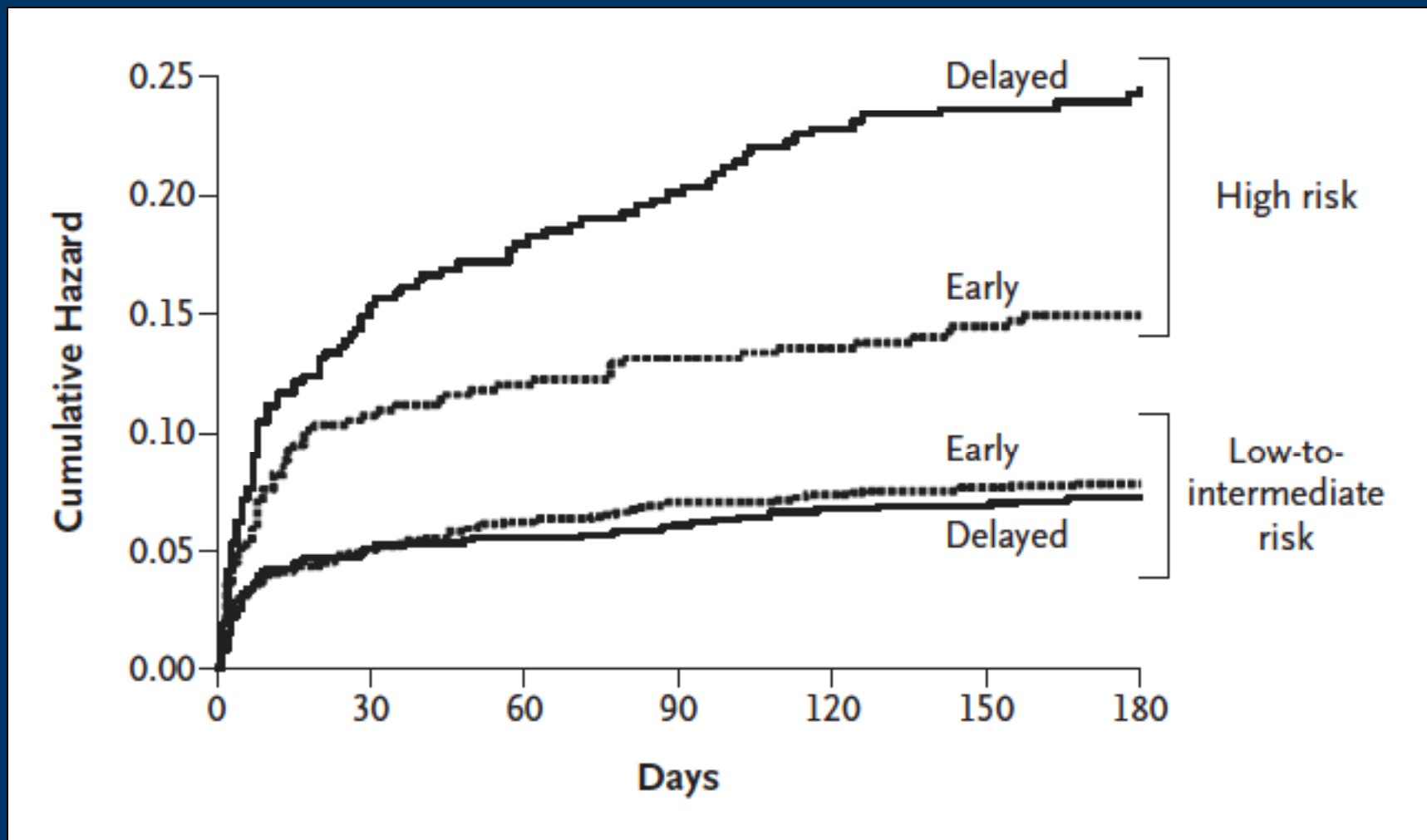
N=3031 ACS patients randomized to early or delayed angiography

End point	HR (95% CI)	p
Death, MI, stroke*	0.85 (0.68–1.06)	0.15
Death, MI, refractory ischemia	0.72 (0.58–0.89)	0.002
Death, MI, stroke, refractory ischemia, repeat intervention	0.84 (0.71–0.99)	0.039
Refractory ischemia	0.30 (0.17–0.53)	<0.00001

*Primary end point; Reference is delayed angiography

TIMACS Trial

N=3031 ACS patients randomized to early or delayed angiography



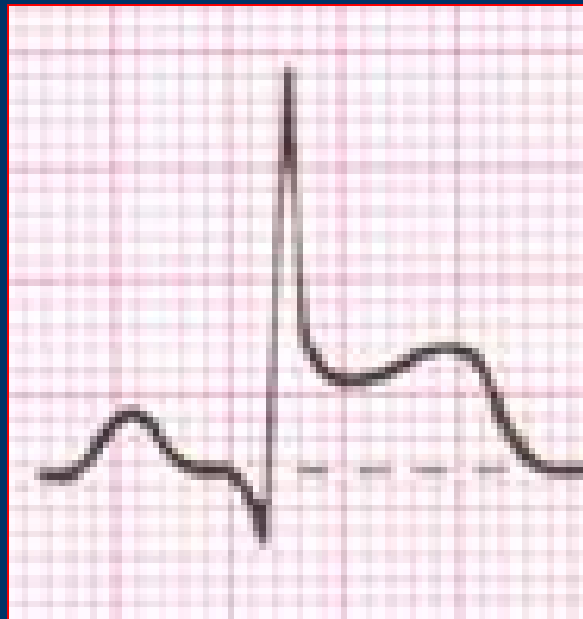
TIMACS

Rates of death, MI, or stroke within six months according to GRACE risk level and HR (95% CI)

Risk level by GRACE score*	Early (%)	Delayed (%)	HR (95% CI)	p
Low/ intermediate (n=2070)	7.7	6.7	1.14 (0.82–1.58)	0.43
High (n=961)	14.1	21.6	0.65 (0.48–0.88)	0.005

*Low/intermediate risk=GRACE score <140

High risk=GRACE score \geq 140



Duke ACS Algorithm

Symptoms of Acute Ischemia

Nurse Triage and ECG within 10 minutes

*pain-free, low-mod risk,
neg or nonspecific ECG
neg. CK-MB, TnT/I*

Enroll in Trials

ASA 325 mg initial dose;
81 mg qD until/at DC

*non ST \uparrow ACS,
mod-high risk*

Chest Pain Unit

ST \uparrow , LBBB

< 12h Sx

\geq 12h Sx

Primary PCI

Ticagrelor or Prasugrel*

Bivalirudin or UFH/GP IIb/IIIa

Antithrombotic Rx

Ticagrelor or Clopidogrel 600 mg load; 150 mg qD for 7d or until DC (if PCI)

Dynamic ST Δ s, pos. cardiac markers

NSSTT Δ s, neg. cardiac markers

Cath <24 hrs

Cath >24 hrs

No or delayed cath

UFH \dagger

Fondaparinux or enoxaparin

Or bivalirudin**

Anticoagulant Rx

no cath in 12h

cath in 12h

Fonda

UFH

*Prasugrel for primary PCI (if no h/o TIA or stroke); \dagger GP IIb/IIIa at time of PCI or if refractory ischemia; **Consider bivalirudin for

Duke ACS Algorithm

Symptoms of Acute Ischemia

Nurse Triage and ECG within 10 minutes

Consider for Clinical Trials

ASA 325 mg initial dose;
81 mg qD until DC

ST \uparrow , LBBB

< 12 h Sx

\geq 12 h Sx

*non ST \uparrow ACS,
mod-high risk*

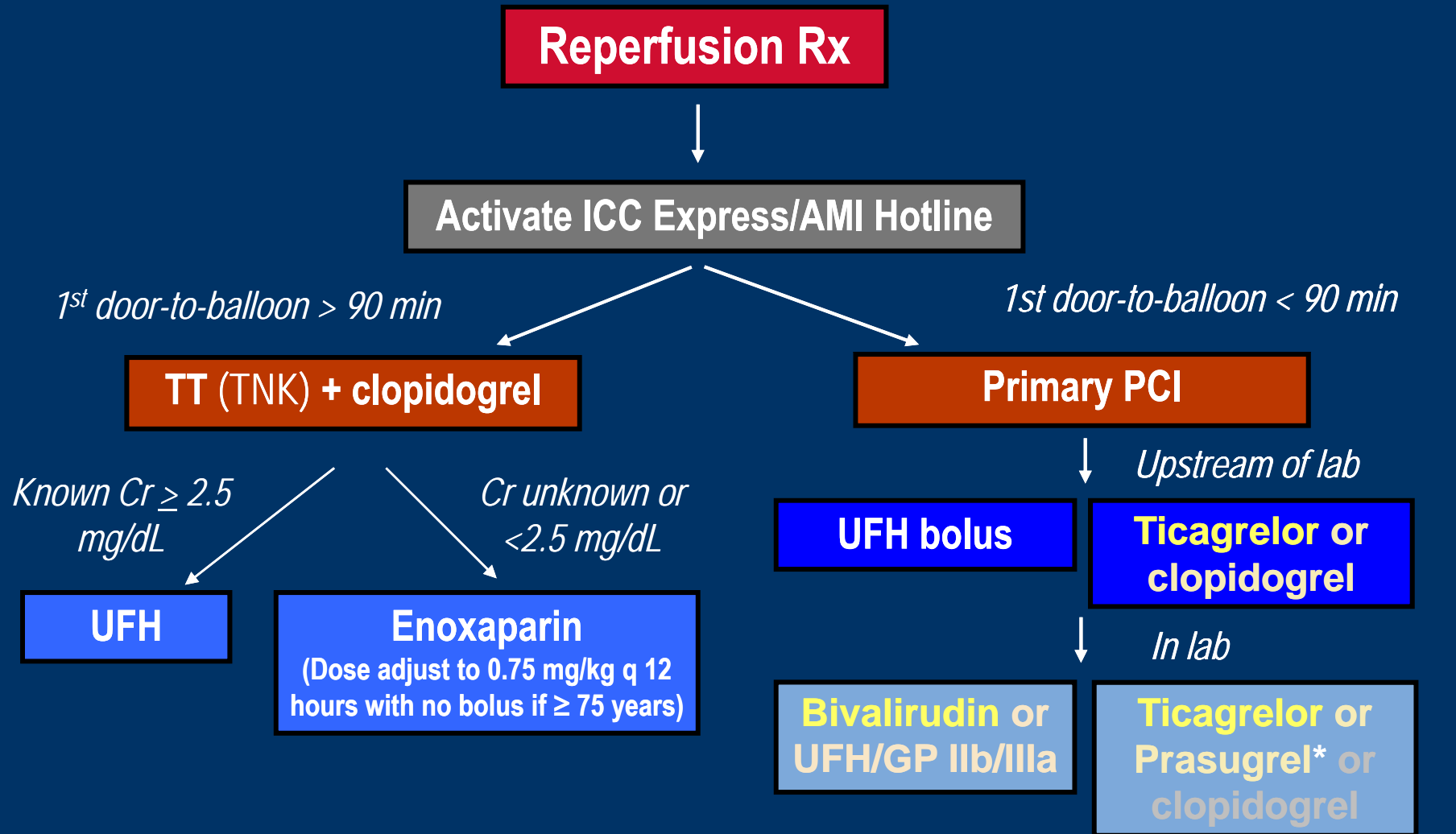
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Reperfusion Rx

Antithrombotic Rx

Chest Pain Unit

Duke ACS Algorithm: STEMI



***Presentation to Duke ED (no h/o TIA or stroke) and for clopidogrel failure; transferring RACE ERs will give clopidogrel; decision in lab if thienopyridine not administered upstream**

Duke ACS Algorithm

Symptoms of Acute Ischemia

Nurse Triage and ECG within 10 minutes

Consider for Clinical Trials

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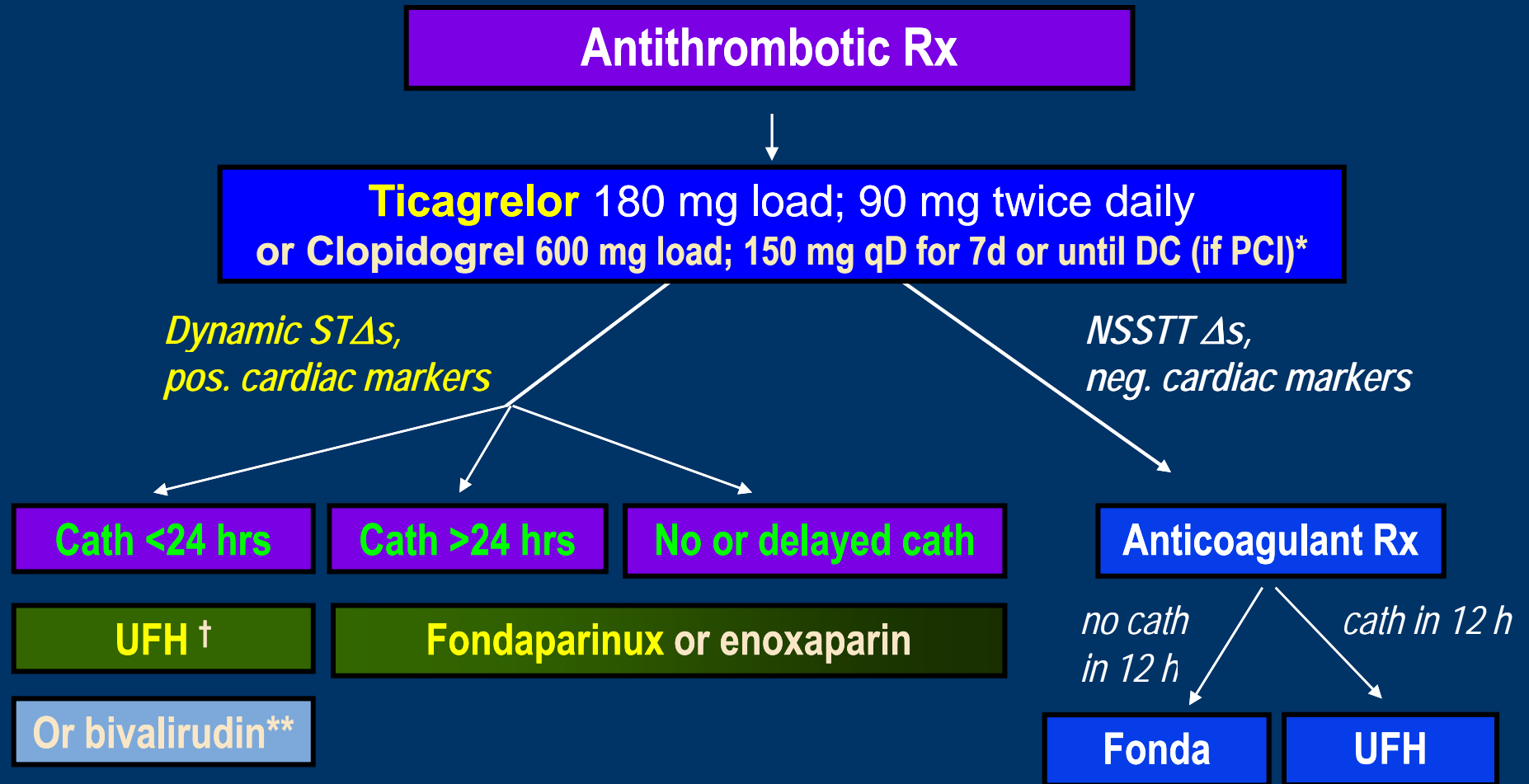
*pain-free, low-mod risk,
neg or nonspecific ECG
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Reperfusion Rx

Antithrombotic Rx

Chest Pain Unit

Duke ACS Algorithm: NSTEMI ACS



*Unless high bleeding risk; decrease to 75 mg qD at DC; 75 mg qD if no PCI

†GP IIb/IIIa at time of PCI or if refractory ischemia

**Consider bivalirudin for cath <12 hours

Factors in Choosing Which Anticoagulant

Condition	UFH	LMWH	Fonda	Bival
Severe renal insuff.	caution	avoid	avoid	best
↑ bleeding risk	neutral	avoid	yes	yes
Thrombocytopenia	worst	better	better	best
Early cath strategy	yes	generally avoid	avoid	yes

Continue anticoagulant until (effective)
revascularization or day 7/hospital discharge,
whichever comes first

What would she want from a cardiac procedure?



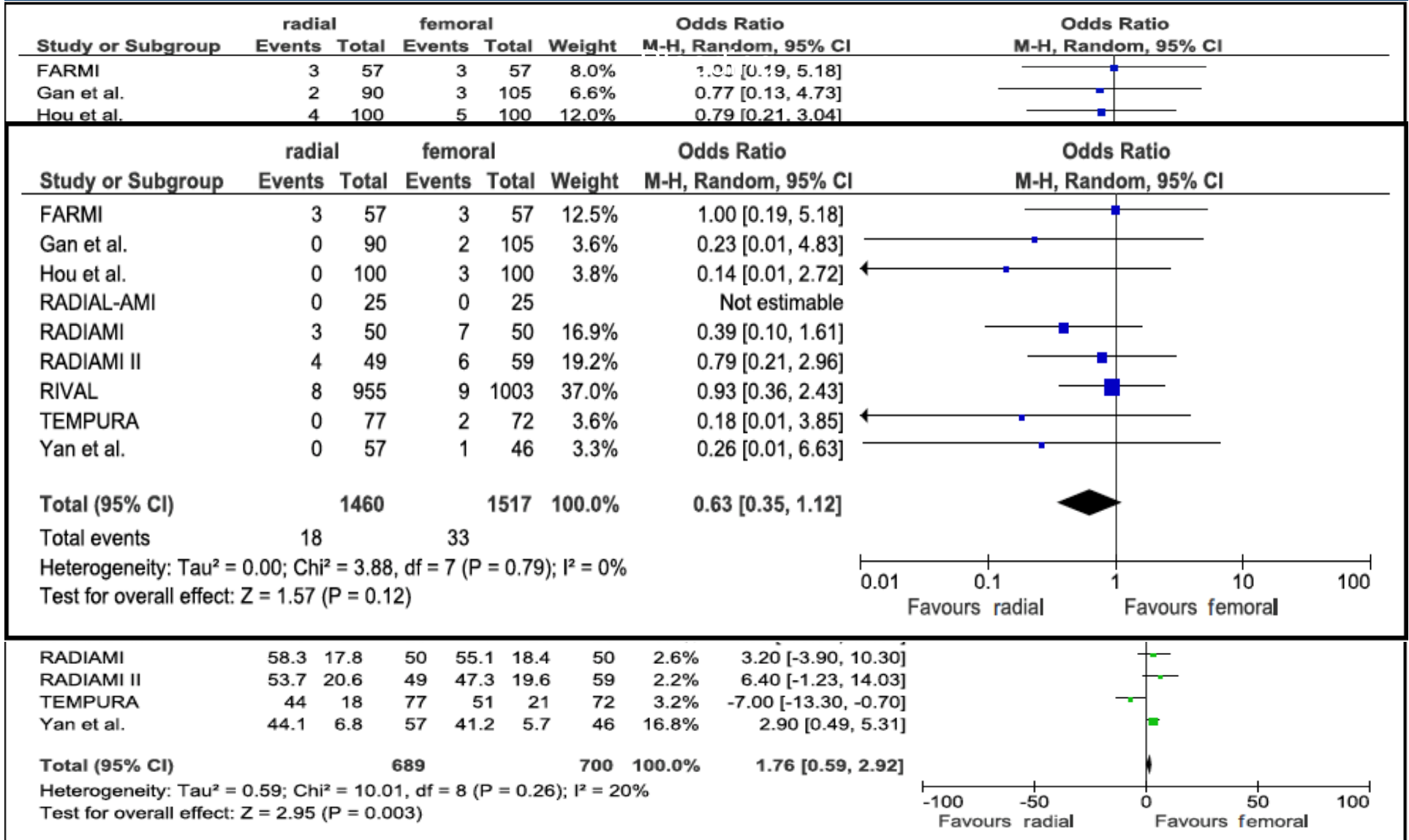
*The real voyage of discovery consists of not in seeking new landscapes,
but in having new eyes.*

Marcel Proust

Radial vs. Femoral in STEMI

N=3347 pts from randomized, case-control, and cohort studies incl. RIVAL

Mortality



ESC Updated STEMI Guidelines

- The guidelines also support the use of transradial primary PCI over the use of transfemoral, but ***only in the hands of experienced operators...***

ACS: State-of-the-art

- Accelerated developments in ACS management make the “optimal” strategy a constantly moving target
 - The benefit-risk ratio of the chosen strategy may be influenced by the patient’s baseline risk
- Nomograms to assess a patient’s risk of death, death/MI, and bleeding in the short- and intermediate-term are available
- STEMI care has improved significantly
 - The future is to reduce complications (bleeding, vascular), develop networks, STE-NoMI?
- Radial approach supported by trials, observational data, and guidelines
 - No D2B consistently reported, mechanism of benefit unclear
 - Need a large multicenter trial that reports clinical outcomes and D2B

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“Can we improve the system?”



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Questions