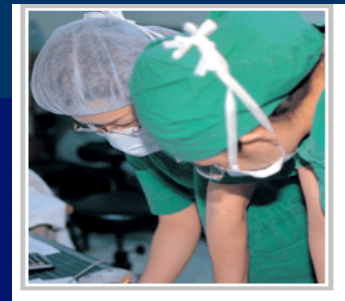


Perioperative Cardiology Consultations for Noncardiac Surgery *Ischemic Heart Disease*

울산의대 울산대학병원
심장내과 이상곤





ECG

CLASS IIb

1. Preoperative resting 12-lead ECG may be reasonable in patients with at least 1 clinical risk factor who are undergoing intermediate-risk operative procedures. (*Level of Evidence: B*)

CLASS III

1. Preoperative and postoperative resting 12-lead ECGs are not indicated in asymptomatic persons undergoing low-risk surgical procedures. (*Level of Evidence: B*)

Evaluation of Resting LV function

CLASS IIa

1. It is reasonable for patients with dyspnea of unknown origin to undergo preoperative evaluation of LV function. (*Level of Evidence: C*)
2. It is reasonable for patients with current or prior HF with worsening dyspnea or other change in clinical status to undergo preoperative evaluation of LV function if not performed within 12 months. (*Level of Evidence: C*)

CLASS IIb

1. Reassessment of LV function in clinically stable patients with previously documented cardiomyopathy is not well established. (*Level of Evidence: C*)

CLASS III

1. Routine perioperative evaluation of LV function in patients is not recommended. (*Level of Evidence: B*)

Case

- M/68
- Asymptomatic
- Osteoarthritis :
plan to operation
- Medical history :
 - Hypertension; 7yr DM; 5yr

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iCT 256
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6 Cm

Z:74.12%
L:90

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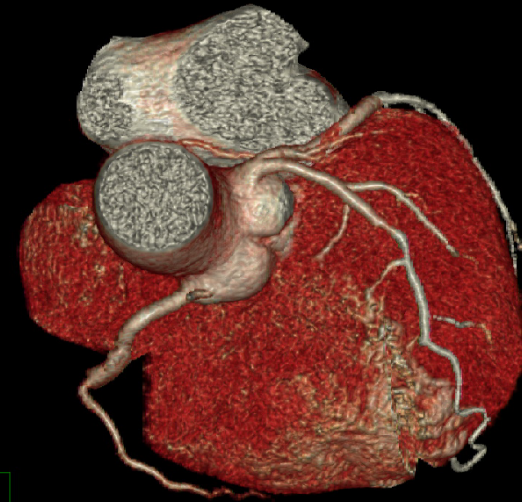
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5 cm

400 Pt

Z:83.59%
L:127

The Consultant, ...

- The goal of the consultation is the **optimal care of the patient**.
- A critical role of the consultant is to determine the **stability of the patient's CV status** and whether the patient is in **optimal medical condition** within the context of the surgical illness.
- No test should be performed unless it is likely to influence patients treatment.

Preoperative Cardiac Assessment

- Stepwise Approach:
 - Urgency of Surgery
 - Clinical Assessment
 - Surgical Risk
 - Functional Capacity
 - risk factor
- Disease Specific Issues

Active Cardiac Conditions

- Unstable coronary syndromes
 - unstable angina (CCS III/IV)
 - acute (~1 wk)/recent (1 wk-1 mo) MI
- Decompensated HF (NYHA IV, worsening/new-onset HF)
- Significant arrhythmia
- Severe valvular diseases
 - AS (PG>40mmHg, AVA<1.0cm²)
 - symptomatic MS

Surgery-Related Risk

High (>5%)

Aortic and other major vascular surgery
Peripheral vascular surgery

Intermediate (1–5%)

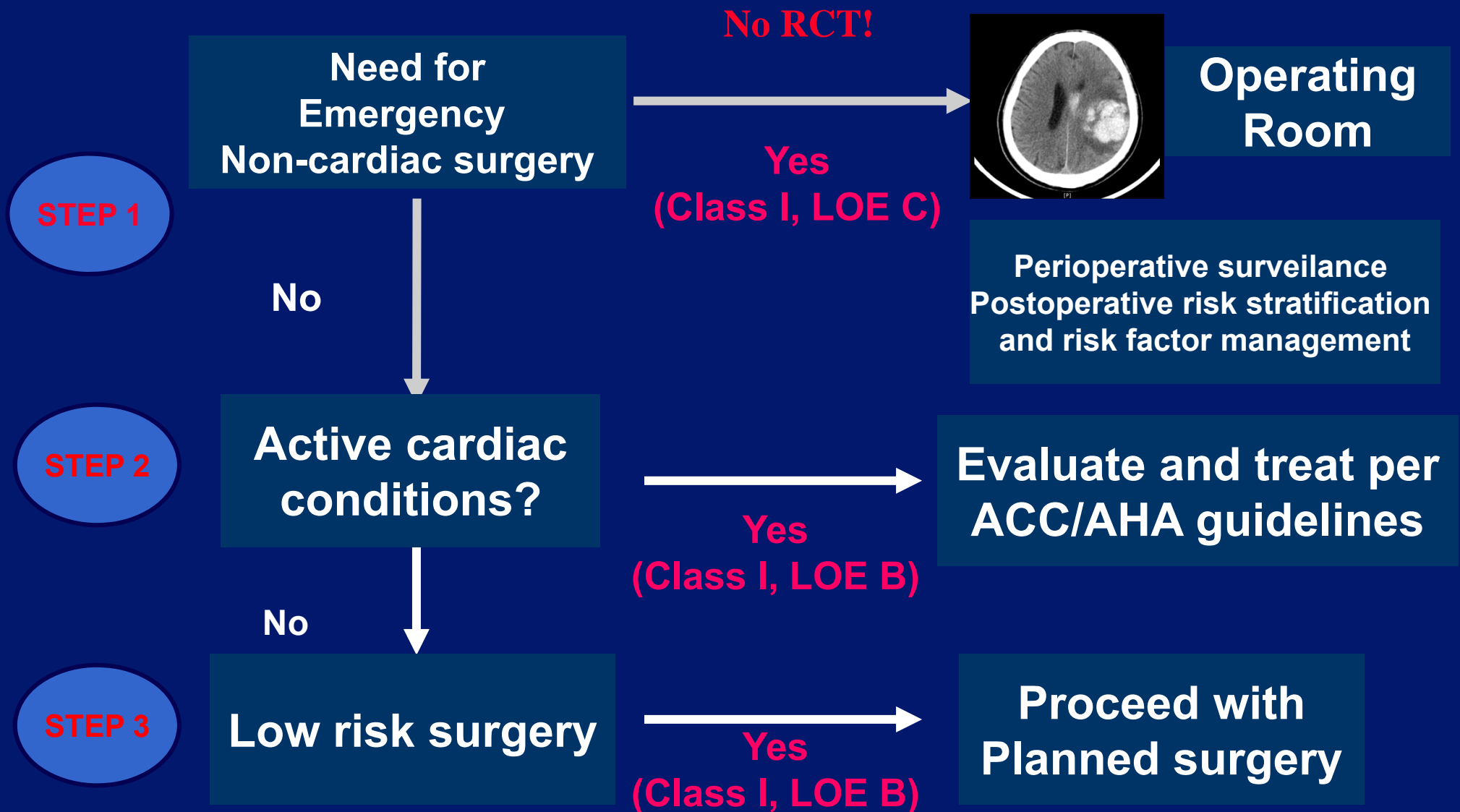
Carotid endarterectomy
Head and neck surgery
Intraperitoneal and intrathoracic surgery
Orthopedic surgery
Prostate surgery

Low (<1%)

Endoscopic procedures
Superficial procedures
Cataract surgery
Breast surgery
Ambulatory surgery

Cardiac risk=death/nonfatal MI

Stepwise Approach



Stepwise Approach

STEP 4

Good functional capacity
(**MET level greater than or
Equal to 4**: Light work
around the house) without Sx

Yes
(Class IIa, LOE B)

Proceed with
Planned surgery

Functional Capacity

Correlates with maximum oxygen uptake on treadmill testing

Demonstrated predictor of future cardiac events

In highly functional asymptomatic pts, management will rarely be changed based on the results of any further cardiovascular testing.

Stepwise Approach

STEP 4

Good functional capacity
(MET level greater than or
Equal to 4) without Sx

Yes
(Class I, LOE B)

Proceed with
Planned surgery

STEP 5

No or unknown

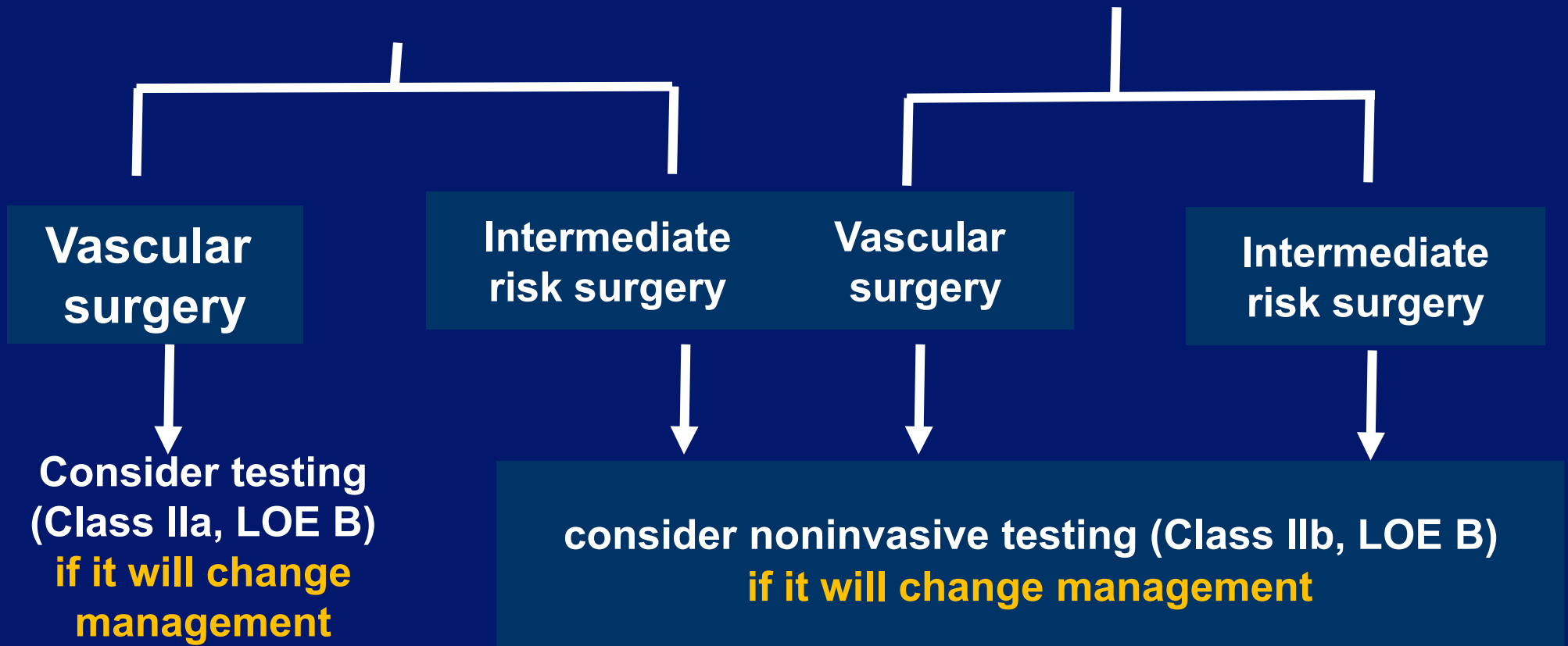
Consider testing
clinical risk factors

Ischemic Heart disease
Compensated or prior HF
Diabetes mellitus
Renal insufficiency
Cerebrovascular disease

Stepwise Approach

*3 or more
clinical risk factors*

*1 or 2
clinical risk factors*



Value of Myocardial Perfusion Imaging for Preoperative Assessment of Cardiac Risk

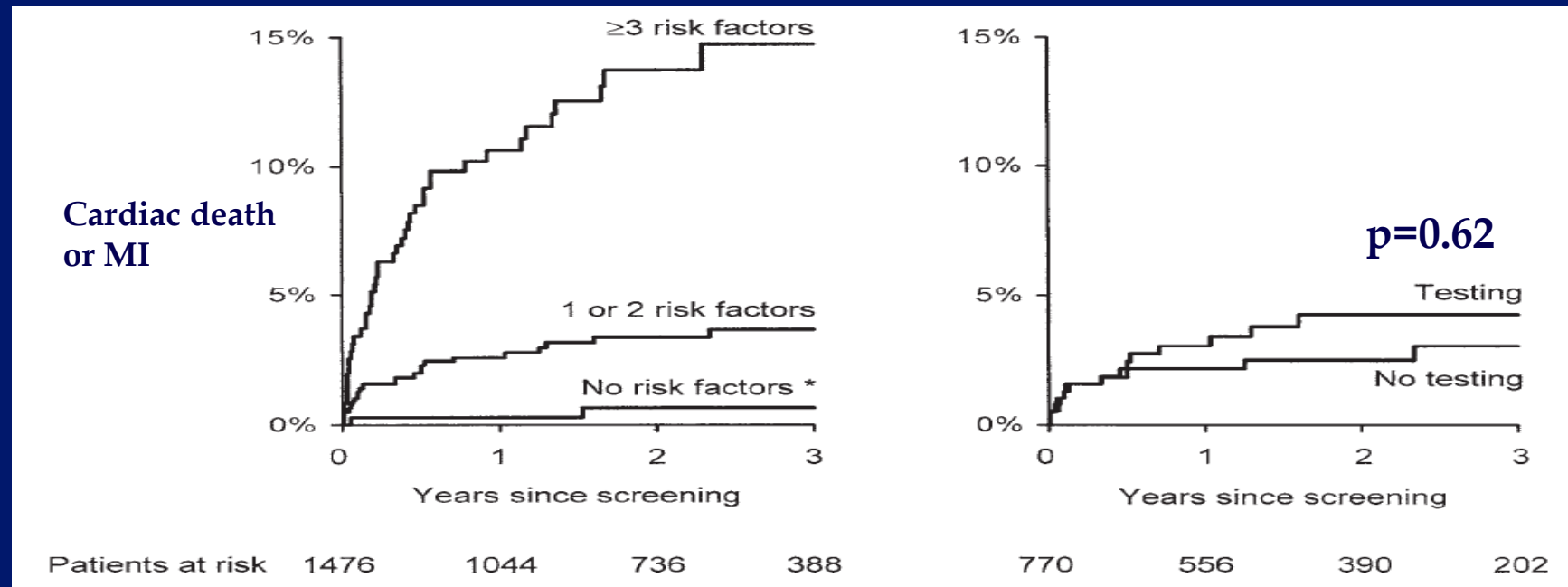
Study, n	Ischemia : Positive predictive value(%)	Normal: Negative predictive value(%)	<i>Events(%)</i>
Boucher et al, 48	19	100	6
Cutler et al. 116	20	100	10
Eagle et al. 200	16	98	8
Baron et al. 457	4	96	5
Koutelou et al. 106	6	100	3
Van Damme et al. 142	na	na	2
Huang et al. 106	13	100	5
Cohen et al. 153	4	100	4
Harafuji et al. 302	2	100	1.3

Value of Dobutamine Stress Echocardiography for Preoperative Assessment of Cardiac Risk

Study, n	Ischemia : Positive predictive value(%)	Normal: Negative predictive value(%)	Events(%)
Lalka et al, 60	23	93	15
Polderman et al. 131	14	100	4
Ballal et al. 233	0	96	3
Bossone et al. 46	25	100	2
Das et al. 530	15	100	6
Boersma et al. 1097	14	98	4
Morgan et al. 78	0	100	0
Tores et al. 105	18	98	10
Labib et al. 429	9	98	2

Utility of Cardiac Testing in Intermediate Risk Patients receiving adequate beta-blocker therapy(DECREASE-II)

Randomly assigned to cardiac testing(n=386) or no testing(n=384)



Cardiac testing can be safely omitted in intermediate- risk pts, provided that beta blockers are prescribed

- Perioperative cardiac risk appears to be directly proportional to the amount of myocardium at risk as reflected in the extent of reversible defects found on imaging.

- Because of the overall low positive predictive value of stress imaging, it is best used selectively in patients with a high clinical risk of perioperative cardiac events.

Preoperative Non-invasive Stress Testing

3 CRFs, FC <4 METs and vascular surgery (class IIa/LOE B)

1-2 CRFs, FC <4 METs & intermediate-risk or vascular surgery (IIb/B)

Most ambulatory patients

Treadmill Stress Test

Unable to exercise

Abnormal resting ECG (WPW, LBBB)

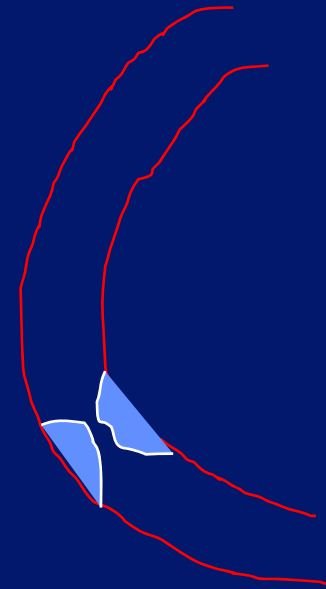
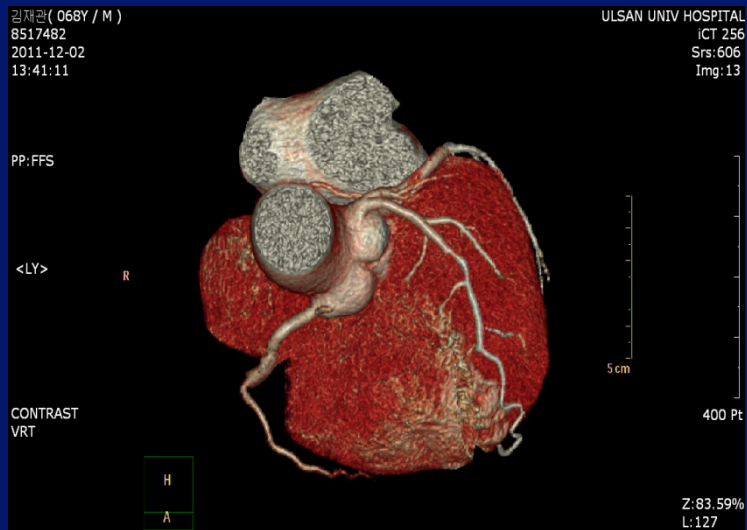
Cardiac arrhythmia
Large/sx aortic aneurysm

Dipyridamole/adenosine rMPI

Bronchospastic lung ds
Severe carotid stenosis

Dobutamine Stress Echo

Prophylactic Revascularization



- Eagle et al : **3368 patients in the CASS database (higher-risk surgical procedures)**

patients who had undergone prior CABG had a lower risk of death (1.7% versus 3.3%, $P=0.03$) and nonfatal MI (0.8% versus 2.7%, $P=0.002$) than patients without prior CABG

most benefit among patients with *multivessel CAD* and those with *more severe angina*.

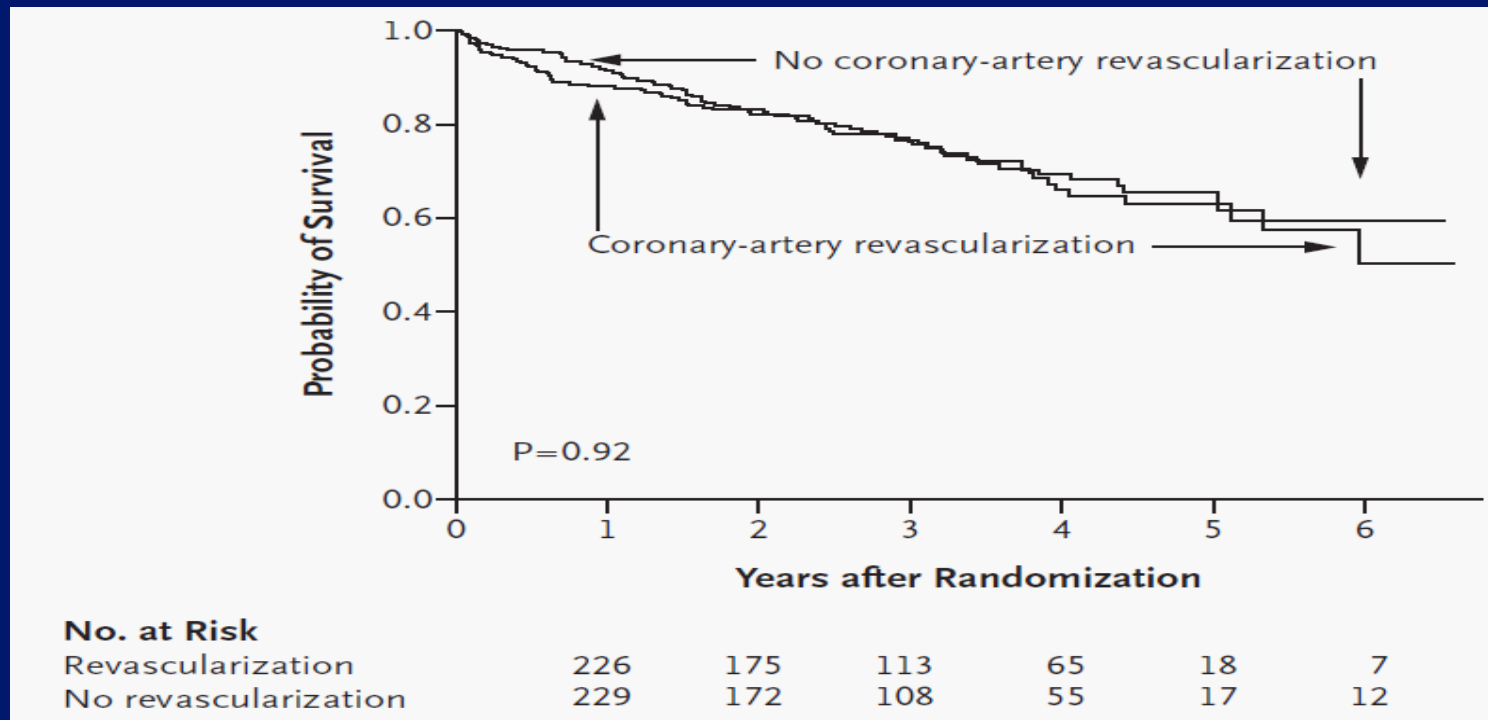
- Rihal and colleagues : **2000 patients enrolled in the CASS Study**

Compared with coronary bypass surgery in patients with *both CHD and peripheral vascular disease*, surgically treated patients with 3-vessel disease had significantly better long-term survival than those treated medically after adjustment for all covariates, including clinical measures of *disease stability, stress test results, and LV function*

Coronary Artery Revascularization Prophylaxis before Elective Major Vascular Surgery(CARP)

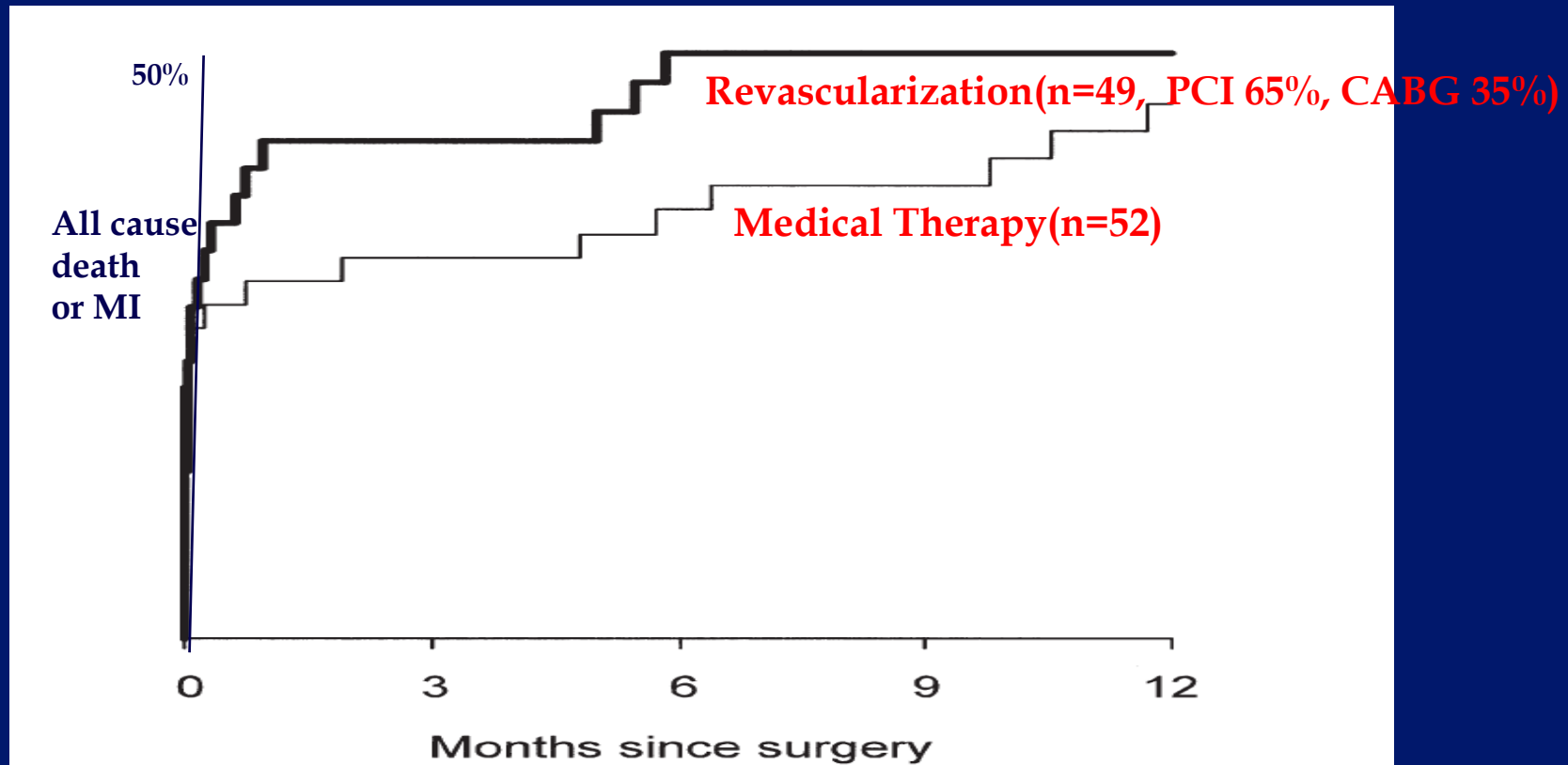
Randomly assigned 510 patients (74% intermediate risk, 80% beta blocker) with significant coronary stenosis among 5859 pts scheduled for vascular operations to either coronary artery revascularization(n=225) or no revascularization(n=237)

59% PCI and 41% CABG



Coronary revascularization before elective vascular surgery among pts with stable cardiac symptoms cannot be recommended.

Randomized Trial to Evaluate the Safety of a Noninvasive Approach in pts with >3 risk factors with Extensive Stress Induced Ischemia(DECREASE-V Pilot study)



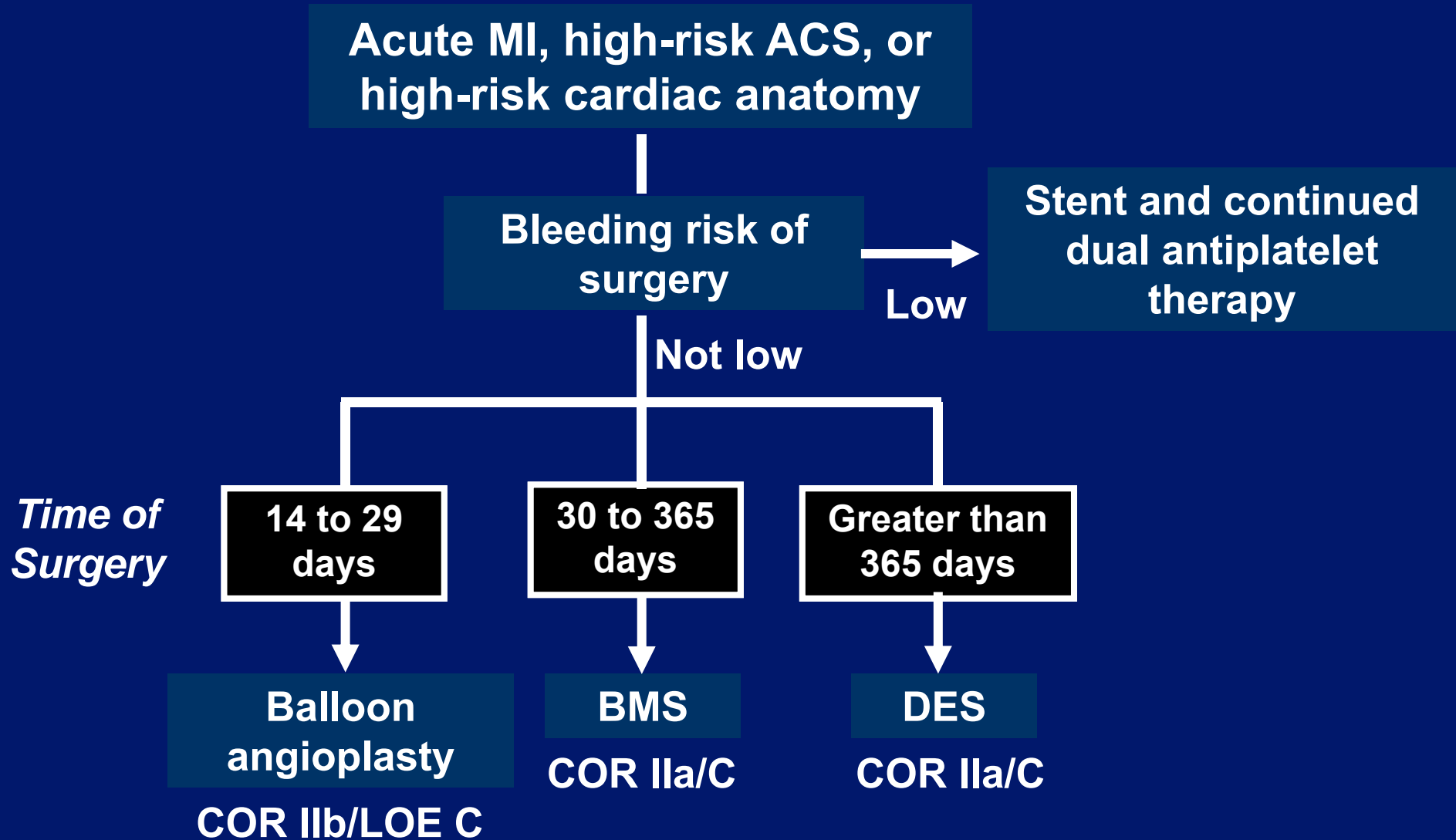
Prophylactic coronary revascularization in high risk pts with preop extensive stress induced ischemia was not associated with an improved outcome.

Indications for Revascularization

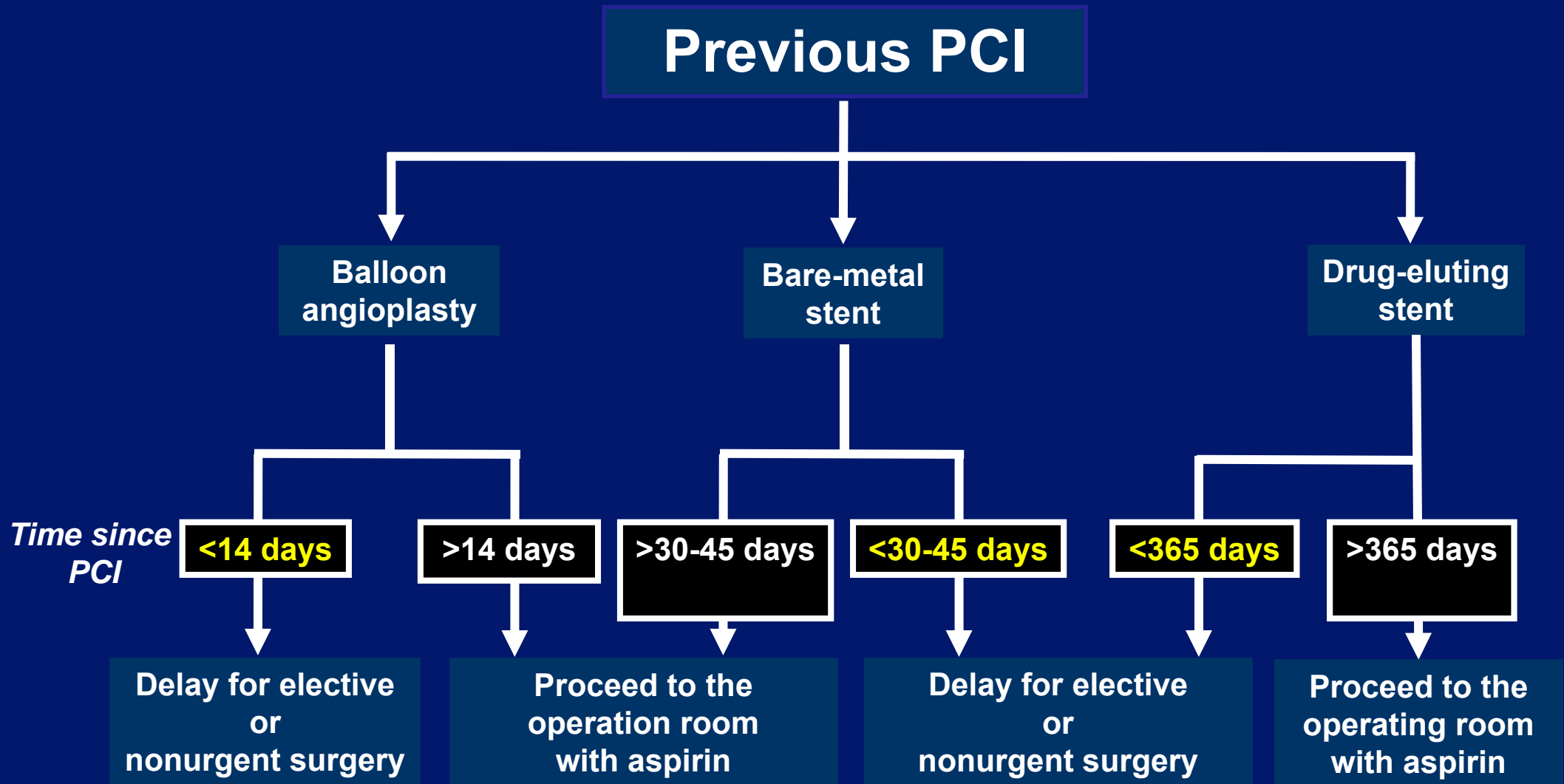
Class I (A)

- Significant left main disease
- Multi-vessel CAD with LV dysfunction
 - 3 vessels disease
 - 2 vessels disease with proximal LAD
- Acute coronary syndrome:
 - High-risk unstable angina
 - NSTEMI
 - STEMI

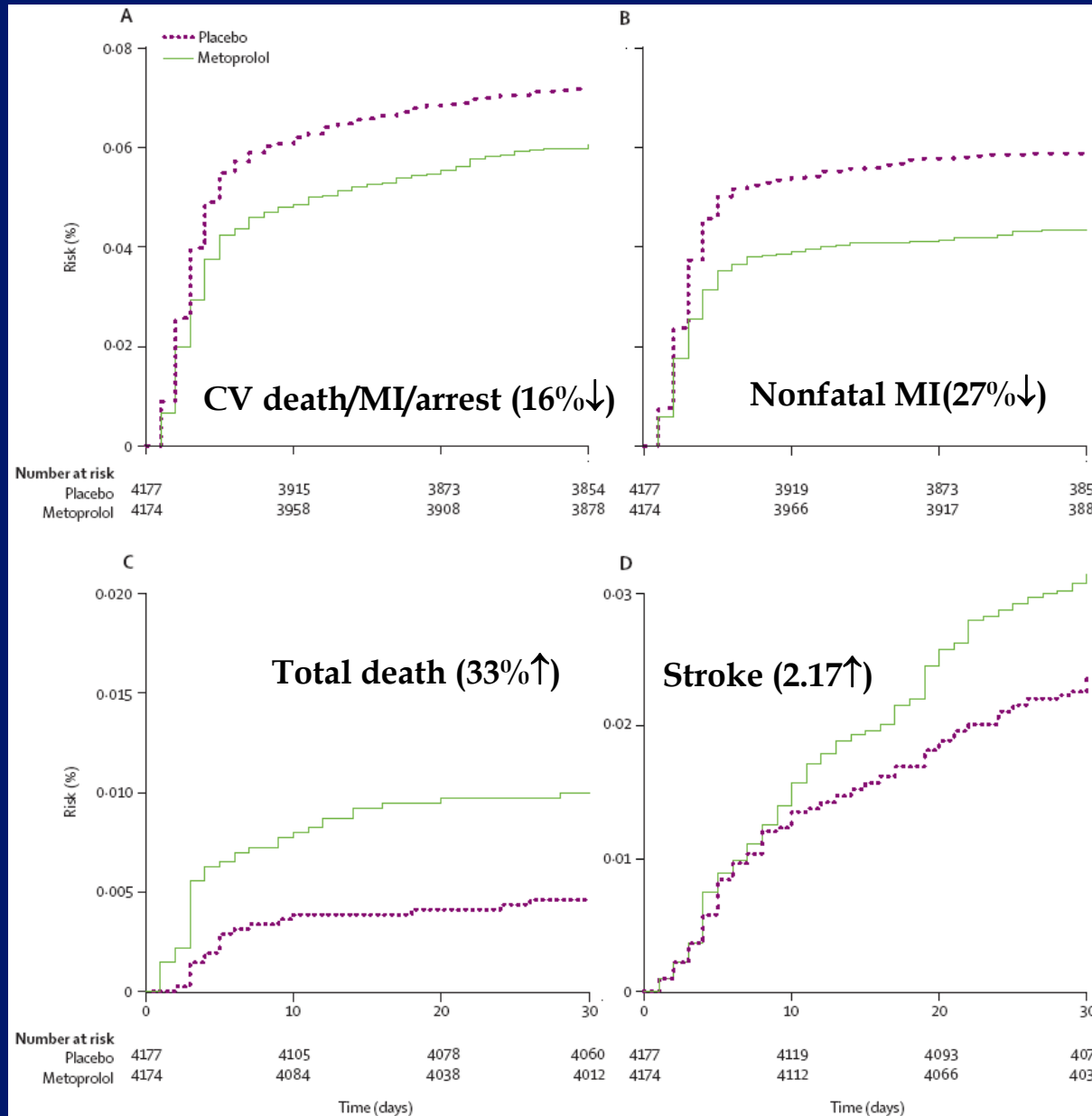
PCI before Anticipated Surgery



Timing of Surgery after PCI



Effects of extended-release metoprolol succinate in patients undergoing non-cardiac surgery (POISE trial)



Benefits & Risks

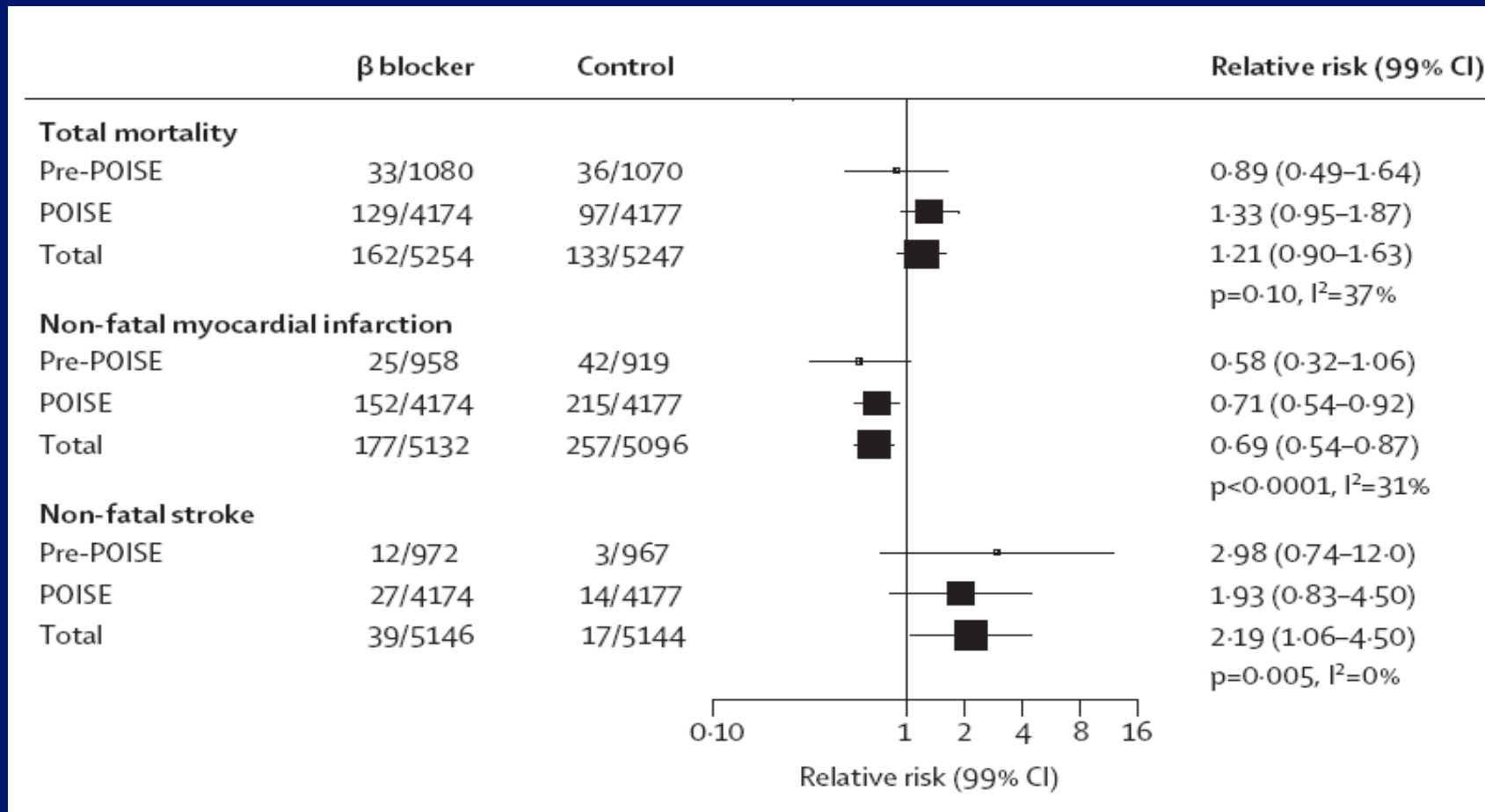
- ↓MI, revascularization, Af
- ↑death, stroke, hypotension, bradycardia

8,351 patients with, or at risk of, atherosclerotic disease who were undergoing non-cardiac surgery to receive extended-release metoprolol succinate (n=4174) or placebo (n=4177).

Study treatment (extended-release metoprolol 200mg/d) was started 2–4 h before surgery & continued for 30 days.

Lancet 2008;371:1839

Perioperative β -Blocker: **Metaanalysis**



Class III: Routine administration of high-fixed dose beta blockers in the absence of dose titration is not useful and may be harmful to patients not currently taking beta blockers who are undergoing noncardiac surgery. (Level of Evidence: B)

Perioperative β -Blocker Therapy

	No CRFs	≥ 1 CRFs	CHD or High Cardiac Risk	Taking BB
Vascular	IIb/B	IIb/B	<ul style="list-style-type: none"> ✓ Myocardial ischemia on pre-op testing (IIa/B) ✓ CHD on pre-op assessment (IIa/B) 	I/B
Intermediate risk	IIa/B	I/C
Low risk	I/C

Beta blockers titrated to heart rate and blood pressure

Conclusions (I)

- **Extensive testing is rarely needed to determine risk**
- **Evaluation/testing NOT needed if :**
 - **low risk surgery**
 - **good functional capacity & no cardiac sxS**
 - **no clinical risk factors**

Conclusions (II)

Revascularization (CABG/PCI) should be considered only if standard indications are present.

If PCI to be done, delay before non-cardiac surgery should be:

- POBA: 14 days
- BMS: 30-45 days
- DES: > 365 days

Outcomes in high risk patients optimized with:

- β blockers

How to best serve the patients?

*Careful teamwork &
communication are the key!*

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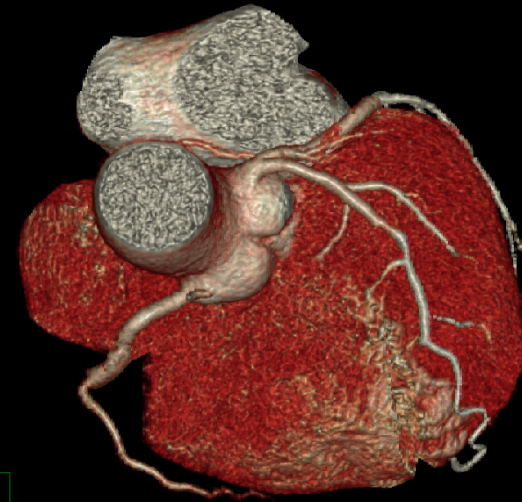
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경청해주셔서 감사합니다.

