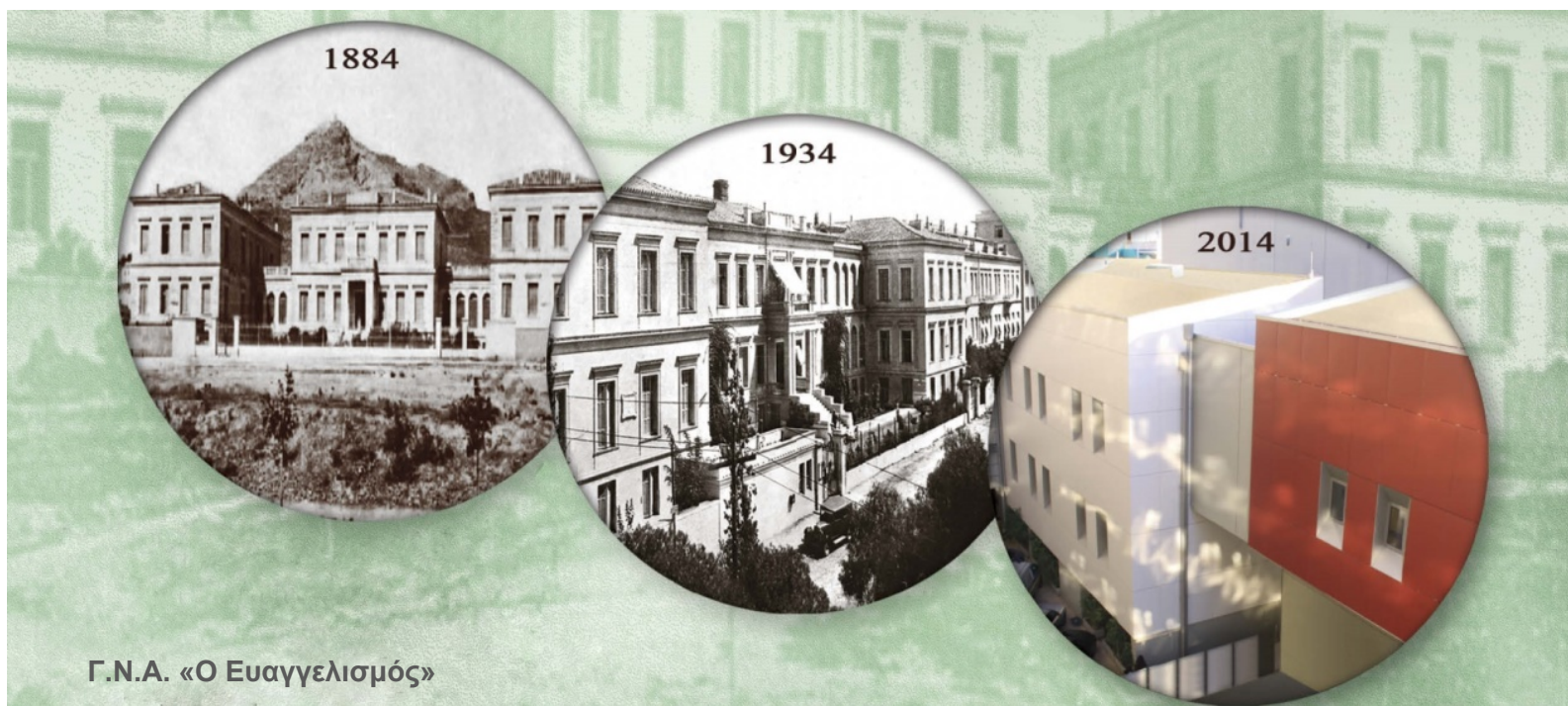




23^ο Ετήσιο Σεμινάριο Συνεχιζόμενης Ιατρικής Εκπαίδευσης

Καρδιολογικά θέματα για μη ειδικούς

Προεγχειρητική καρδιαγγειακή εκτίμηση και διαχείριση ασθενών που υποβάλλονται σε μη καρδιοχειρουργική εκτίμηση



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Β' Καρδιολογικό Τμήμα, Γ.Ν.Α. «Ο Ευαγγελισμός»

Conflict of Interest

Bayer, Boehringer-Ingelheim, Boston Scientific, Elpen, Medtronic,
Merck, Novartis, Pfizer, Servier

Non-cardiac Surgical Procedures

- 5.700.000 procedures in EU patients with increased risk of CV complications
- 167.000 (3%) cardiac complications due to non-cardiac surgical procedures
- 19.000 (3,5‰) life-threatening complications

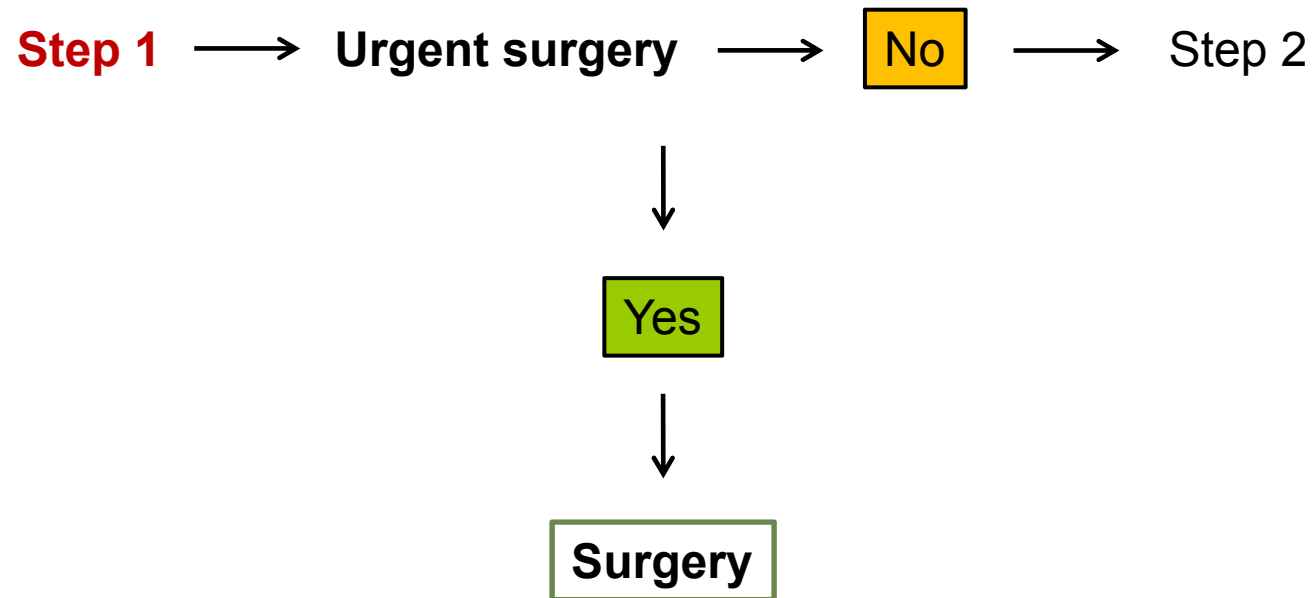
ESC Guidelines

- High incidence of peri-operative cardiac mortality and morbidity
- Impact of vascular disease and comorbidity on post-operative outcome
- Risk reduction strategies
 - Medications: b-blockers, statins, ACEi, PLT inhibitors, OACs
 - Coronary revascularizations: stents, DAPT duration
- Surgical strategies and techniques
- Type of anaesthesia

Stepwise approach

- **Step 1** - Urgent surgery
- **Step 2** - Active or unstable cardiac conditions
- **Step 3** - Risk of surgical procedure
- **Step 4** - Functional capacity of the patient
- **Step 5** - In patients with poor functional capacity consider risk of surgical procedure
- **Step 6** - Cardiac risk factors
- **Step 7** - Non-invasive tests

Stepwise approach



Stepwise approach

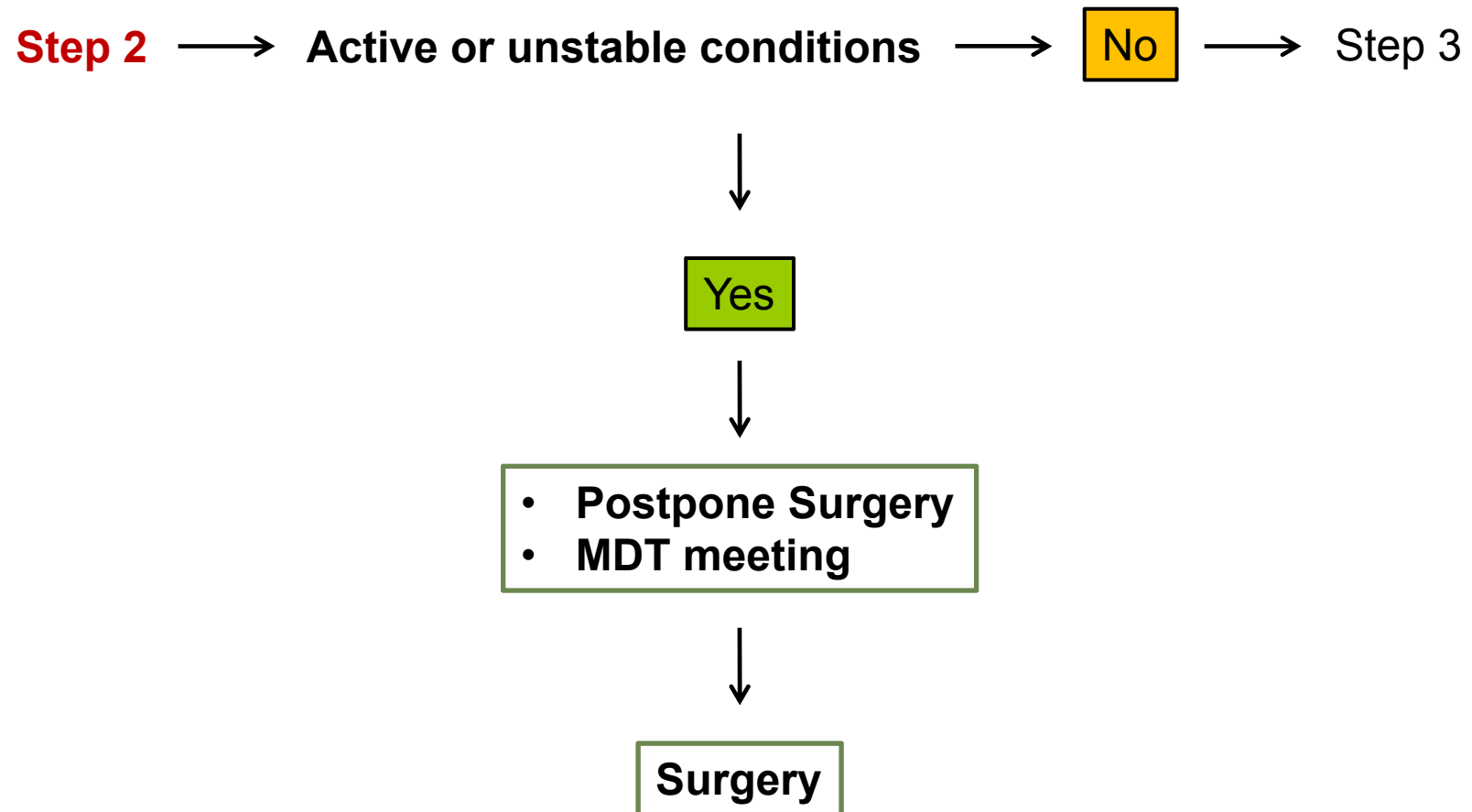
Step 2 → **Active or unstable conditions** → **No** → Step 3



Yes

- | |
|--|
| • Unstable angina pectoris |
| • Acute heart failure |
| • Significant cardiac arrhythmias |
| • Symptomatic valvular heart disease |
| • Recent myocardial infarction ^a and residual myocardial ischemia |

Stepwise approach



Stepwise approach

Surgical Risk Estimate: 30-day CV death and MI

Step 3 → Risk of surgical procedure

Low-risk: < 1%	Intermediate-risk: 1–5%	High-risk: > 5%
<ul style="list-style-type: none">• Superficial surgery• Breast• Dental• Endocrine: thyroid• Eye• Reconstructive• Carotid asymptomatic (CEA or CAS)• Gynaecology: minor• Orthopaedic: minor (meniscectomy)• Urological: minor (transurethral resection of the prostate)	<ul style="list-style-type: none">• Intraperitoneal: splenectomy, hiatal hernia repair, cholecystectomy• Carotid symptomatic (CEA or CAS)• Peripheral arterial angioplasty• Endovascular aneurysm repair• Head and neck surgery• Neurological or orthopaedic: major (hip and spine surgery)• Urological or gynaecological: major• Renal transplant• Intra-thoracic: non-major	<ul style="list-style-type: none">• Aortic and major vascular surgery• Open lower limb revascularization or amputation or thromboembolectomy• Duodeno-pancreatic surgery• Liver resection, bile duct surgery• Oesophagectomy• Repair of perforated bowel• Adrenal resection• Total cystectomy• Pneumonectomy• Pulmonary or liver transplant



Surgery

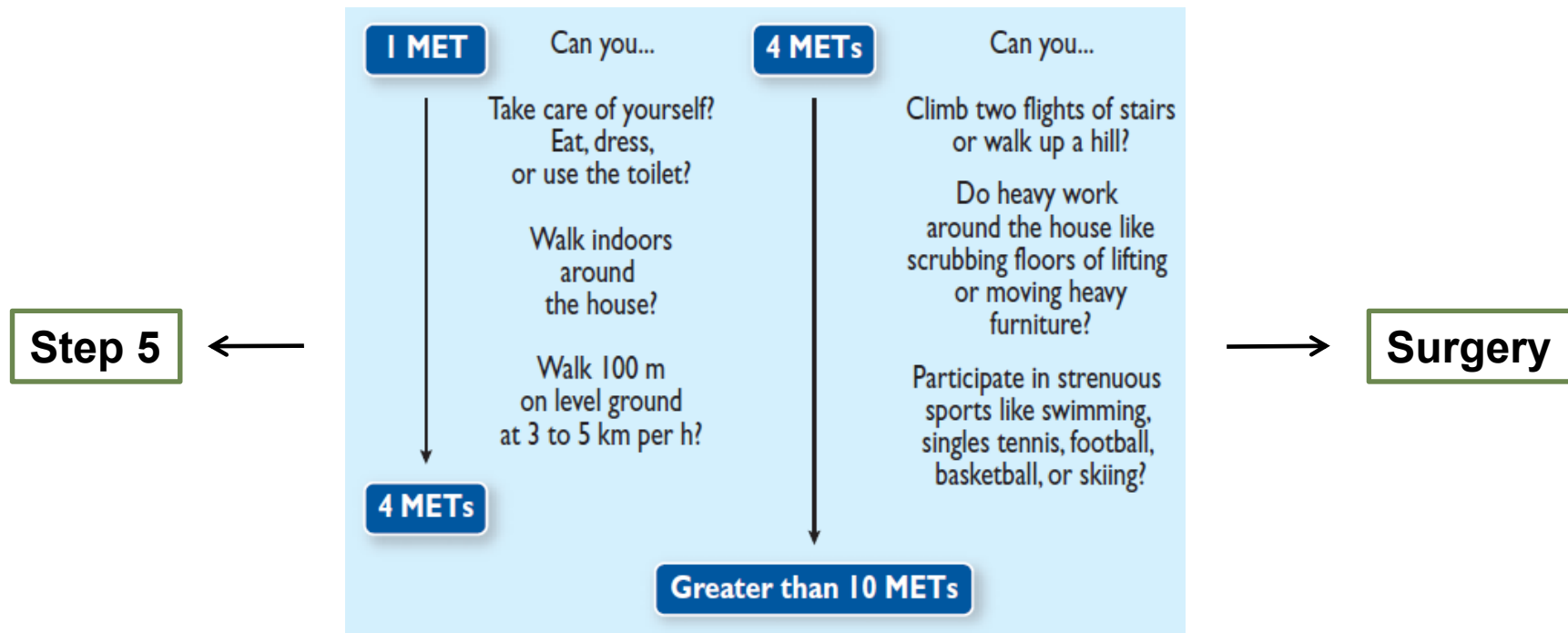


Step 4

Stepwise approach

Intermediate or High Risk Surgical Procedure

Step 4 \longrightarrow **Functional Capacity**



Stepwise approach

Functional capacity < 4 METS

Risk Factors

Step 5 →

Intermediate Risk Surgery

High Risk Surgery

- Ischaemic heart disease (angina pectoris and/or previous myocardial infarction^a)
- Heart failure
- Stroke or transient ischaemic attack
- Renal dysfunction (serum creatinine >170 µmol/L or 2 mg/dL or a creatinine clearance of <60 mL/min/1.73 m²)
- Diabetes mellitus requiring insulin therapy

↓
Step 6

Stepwise approach

Functional capacity < 4 METS

Risk Factors

Step 5 →

Intermediate Risk Surgery

High Risk Surgery

Imaging stress testing may be considered
before high- or intermediate-risk
surgery in patients with one or two
clinical risk factors and poor functional
capacity (<4 METs).^c

IIb

C

Step 6

Surgery

Stepwise approach

Functional capacity < 4 METS

High Risk Surgery

Step 6 →

Risk Factors ≤ 2



Recommendations	Class	Level
Number of risk factors ≤ 2 Rest echocardiography and biomarkers for evaluation of LV function may be considered.	IIb	B-C



Surgery

Risk Factors ≥ 3



Step 7

Stepwise approach

Functional capacity < 4 METS
High Risk Surgery

Risk Factors ≥ 3

Step 7 →

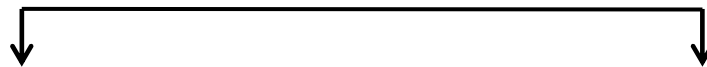
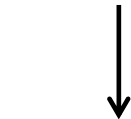
Cardiac Stress Testing

Extensive ischaemia

**No or moderate
Stress-induced ischaemia**

Step 7b

Surgery



Stepwise approach

Functional capacity < 4 METS

High Risk Surgery

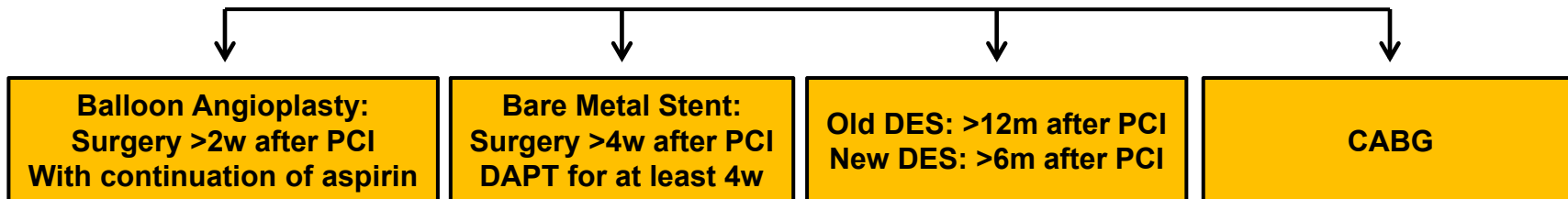
Risk Factors ≥ 3

Step 7b →

Cardiac Stress Testing



Extensive ischaemia



Surgery

Peripheral Artery Disease

Patients with PAD should be clinically assessed for ischaemic heart disease and, if more than two clinical risk factors (<i>Table 4</i>) are present, they should be considered for pre-operative stress or imaging testing.	IIa	C
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Recent (6months) TIA or Stroke

Pre-operative carotid artery and cerebral imaging are recommended in patients with a history of TIA or stroke in the preceding 6 months.	I	C
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Echocardiography in asymptomatic

- without signs of cardiac disease
- without ECG abnormalities

Recommendations	Class ^a
Rest echocardiography may be considered in patients undergoing high-risk surgery.	IIb
Routine echocardiography is not recommended in patients undergoing intermediate- or low-risk surgery.	III

Imaging Stress Testing in asymptomatic

Imaging stress testing is recommended before high-risk surgery in patients with more than two clinical risk factors and poor functional capacity (<4 METs). ^c	I	C
Imaging stress testing may be considered before high- or intermediate-risk surgery in patients with one or two clinical risk factors and poor functional capacity (<4 METs). ^c	IIb	C
Imaging stress testing is not recommended before low-risk surgery, regardless of the patient's clinical risk.	III	C

Timing of non-cardiac surgery

cardiac-stable/asymptomatic patients with previous revascularization

It is recommended that, except for high-risk patients, asymptomatic patients who have undergone CABG in the past 6 years be sent for non-urgent, non-cardiac surgery without angiographic evaluation. ^d	I	B
Consideration should be given to performing non-urgent, non-cardiac surgery in patients with recent BMS implantation after a minimum of 4 weeks and ideally 3 months following the intervention. ^d	IIa	B
Consideration should be given to performing non-urgent, non-cardiac surgery in patients who have had recent DES implantation no sooner than 12 months following the intervention. This delay may be reduced to 6 months for the new-generation DES. ^d	IIa	B

Recommendations for b-blockers

Peri-operative continuation of beta-blockers is recommended in patients currently receiving this medication.	I	B
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Recommendations for Statins

Peri-operative continuation of statins is recommended, favouring statins with a long half-life or extended-release formulation.	I	C
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Vitamin K bridging with LMWH

- AF with a CHA₂DS₂-VASc [Cardiac failure, Hypertension, Age ≥ 75 (Doubled), Diabetes, Stroke (Doubled) – Vascular disease, Age 65–74 and Sex category (Female)] score of ≥ 4] *or*
- mechanical prosthetic heart valves, newly inserted biological prosthetic heart valves, *or*
- mitral valvular repair (within the past 3 months) *or*
- recent venous thrombo-embolism (within 3 months) *or*
- thrombophilia,

NOACs discontinuation

	Dabigatran	Rivaroxaban	Apixaban	Edoxaban
Target	Ila (thrombin)	Xa	Xa	Xa
Application	Oral	Oral	Oral	Oral
Hours to C _{max}	1.25–3	2–4	3–4	1–2
Pro-drug	Yes	No	No	No
Food interactions	No	No	No	No
Bioavailability (%)	6.5	80–100	50	62
Drug interactions	P gp inhibitors or inducers	CYP3a4 inhibitors or inducers P gp inhibitors or inducers	CYP3a4 inhibitors or inducers P gp inhibitors or inducers	P gp inhibitors
Median half-life (hours)	12–14	7–11 (11–13 in the elderly)	12	6–11
Renal clearance (%)	85	33	27	37–50
Dose regimen	b.i.d.	q.d.	b.i.d.	q.d

Step	Urgency	Cardiac condition	Type of surgery ^a	Functional capacity	Number of clinical risk factors ^b	ECG	LV echo ^c	Imaging Stress Testing ^d	BNP and TnT ^e	β-Blockers ^{a,f}	ACE-inhibitors ^a	Aspirin ^a	Statins ^a	Coronary Revascularisation
I	Urgent surgery	Stable					III C	III C		I B (continuation)	IIa C ^h (continuation)	IIb B (continuation)	I C (continuation)	III C
2	Urgent surgery	Unstable ^g												IIa C
	Elective surgery	Unstable ^g				I C ^k	I C ^k	III C	IIb B					I A
3	Elective surgery	Stable	Low risk (< 1%)		None	III C	III C	III C	III C	III B	IIa C ^h	I C ^m	IIa B ^j	III B
					≥ 1	IIb C	III C	III C		IIb B ⁱ	IIa C ^h	I C ^m	IIa B ^j	III B
4	Elective surgery	Stable	Intermediate (1–5%) or high risk (>5%)	Excellent or good			III C	III C	III C	IIb B ⁱ	IIa C ^h	I C ^m	IIa B ^j	III B
5	Elective surgery	Stable	Intermediate risk (1–5%)	Poor	None	IIb C	III C ^k		III C ^k	IIb B ⁱ	IIa C ^h	I C ^m	IIa B ^j	III B
					≥ 1	I C	III C ^k	IIb C		IIb B ⁱ	IIa C ^h	I C ^m	IIa B ^j	III B
6	Elective surgery	Stable	High risk (>5%)	Poor	1–2	I C	IIb C ^k	IIb C	IIb B ^{i,k}	IIb B ^j	IIa C ^h	I C ^m	IIa B ^j	IIb B
					≥ 3	I C	IIb C ^k	I C	IIb B ^k	IIb B ^j	IIa C ^h	I C ^m	IIa B ^j	IIb B



1884



1934



2014



Γ.Ν.Α. «Ο Ευαγγελισμός»

Pre-operative ECG

Recommendations	Class ^a	Level ^b
Pre-operative ECG is recommended for patients who have risk factor(s) ^d and are scheduled for intermediate- or high-risk surgery.	I	C
Pre-operative ECG may be considered for patients who have risk factor(s) and are scheduled for low-risk surgery.	IIb	C
Pre-operative ECG may be considered for patients who have no risk factors, are above 65 years of age, and are scheduled for intermediate-risk surgery.	IIb	C
Routine pre-operative ECG is not recommended for patients who have no risk factors and are scheduled for low-risk surgery.	III	B