Preoperative cardiovascular risk assessment and perioperative management for noncardiac surgery

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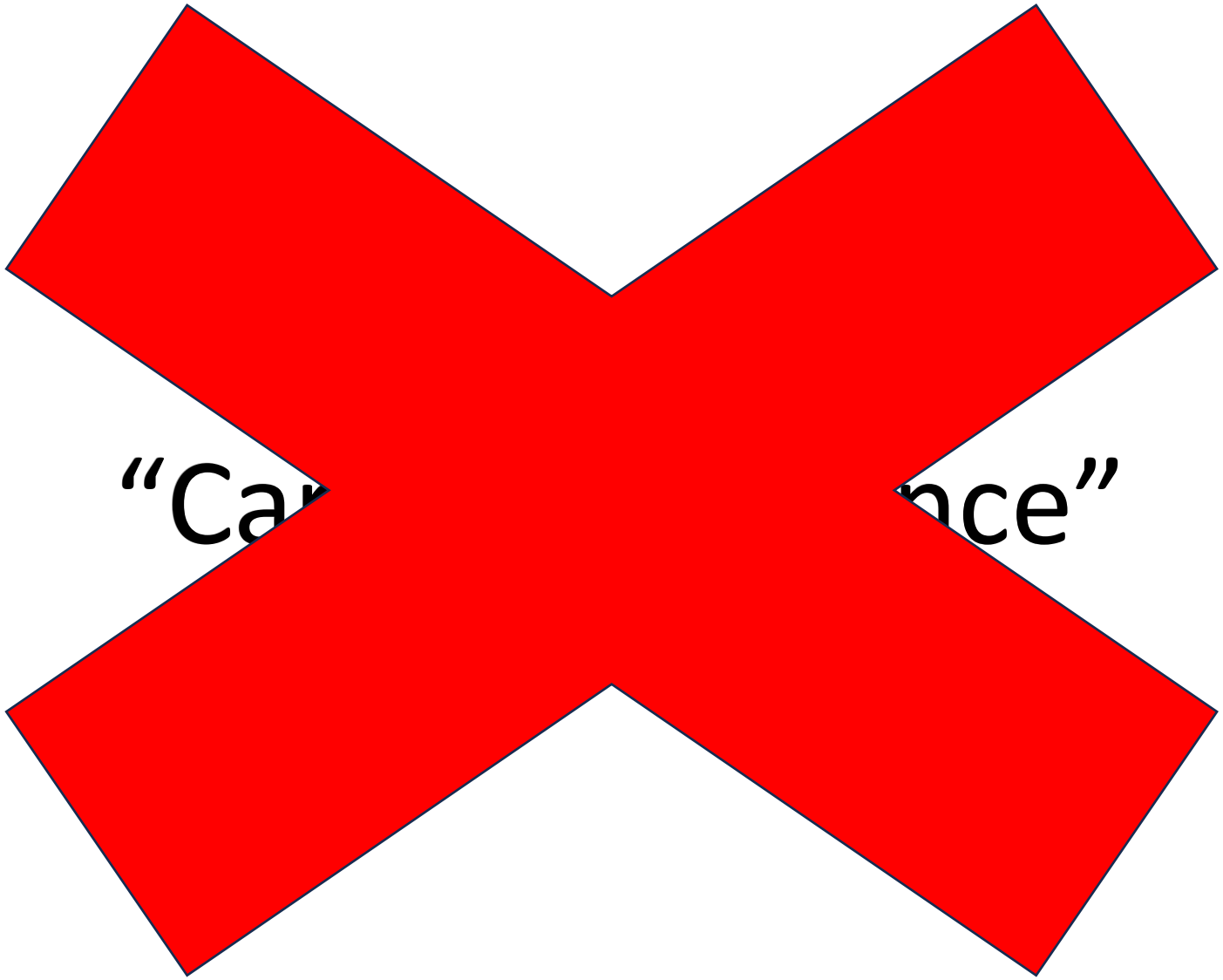


Guidelines

- First perioperative management guidelines developed in 1996
- 4 total updates since that time, last being in 2014
- Most recent update seeks to incorporate new data since 2014 and try to simplify perioperative management as well as cardiac risk
- Most recent guidelines September 2024

CLINICAL PRACTICE GUIDELINE

2024 AHA/ACC/ACS/ASNC/HRS/SCA/SCCT/SCMR/SVM Guideline for Perioperative Cardiovascular Management for Noncardiac Surgery

A Report of the American College of Cardiology/American Heart Association
Joint Committee on Clinical Practice Guidelines

Developed in Collaboration With and Endorsed by the American College of Surgeons,
American Society of Nuclear Cardiology, Heart Rhythm Society,
Society of Cardiovascular Anesthesiologists, Society of Cardiovascular Computed Tomography,
Society for Cardiovascular Magnetic Resonance, and the Society for Vascular Medicine

Guidelines

01	02	03	04	05
Class 1 Strong	Class 2a Moderate	Class 2b Weak	Class 3 No benefit	Class 3 HARM

TIMING	DEFINITION
Emergency	Immediate threat to life or limb without surgical intervention, where there is very limited or no time for preoperative clinical evaluation, typically <2 h.
Urgent	Threat to life or limb without surgical intervention, where there may be time for preoperative clinical evaluation to allow interventions that could reduce risk of MACE or other postoperative complications, typically ≥2 to <24 h.
Time-sensitive	Surgery may be delayed up to 3 mo to allow for preoperative evaluation and management without negatively impacting outcomes.
Elective	The surgical procedure can be delayed to permit a complete preoperative evaluation and appropriate management.

Cardiac risk

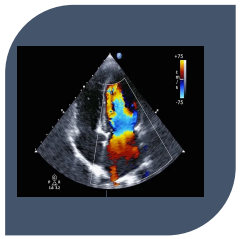
- Low
  - Combined surgical and patient characteristics predict a low risk of MACE <1%
- High
  - Combined surgical and patient characteristics predict an elevated risk of MACE >1%
- Choose your favorite risk calculator, RCRI, DASI (2a recommendation)

What's new?

- Perioperative
  - Risk assessment
    - Systematic approach to perioperative risk assessment
    - Very selective use of stress testing
    - Utilization of biomarkers
  - Medications
    - SGLT2i
    - OAC

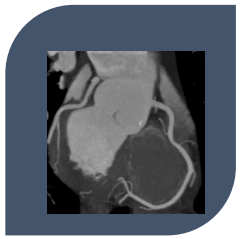
Preoperative cardiac testing

ECG

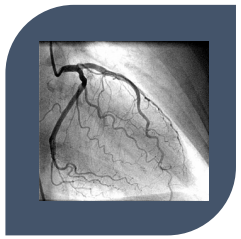


ECHO

STRESS TESTING

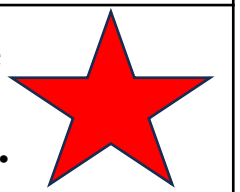


CORONARY CTA



CORONARY ANGIOGRAM

EKG

COR	LOE	Recommendations
2a	B-NR	1. For patients with known coronary heart disease, significant arrhythmia, peripheral arterial disease, cerebrovascular disease, other significant structural heart disease, or symptoms* of CVD undergoing elevated-risk surgery, a preoperative resting 12-lead electrocardiogram (ECG) is reasonable to establish a preoperative baseline and guide perioperative management.
2a	B-NR	2. In patients undergoing NCS with a preoperative ECG exhibiting new abnormalities†, further evaluation is reasonable to refine assessment of cardiovascular risk.
2b	B-NR	3. For asymptomatic patients undergoing elevated-risk surgeries without known CVD, a preoperative resting 12-lead ECG may be considered to establish a baseline and guide perioperative management.
3: No benefit	B-NR	4. For asymptomatic patients undergoing low-risk surgical procedures, a routine preoperative resting 12-lead ECG is not recommended to improve outcomes. 

Echo		
COR	**LOE**	**Recommendations**
1	**B-NR**	**1. In patients undergoing NCS with new dyspnea, physical examination findings of HF, or suspected new/worsening ventricular dysfunction, it is recommended to perform preoperative evaluation of LV function to help guide perioperative management.**
2a	**C-LD**	**2. In patients with a known diagnosis of HF with worsening dyspnea or other change in clinical status undergoing NCS, preoperative assessment of LV function is reasonable to help guide perioperative management.**
3: No Benefit	**B-NR**	**3. In asymptomatic and clinically stable patients undergoing NCS, routine preoperative evaluation of LV function is not recommended due to lack of benefit.** 

Stress Testing

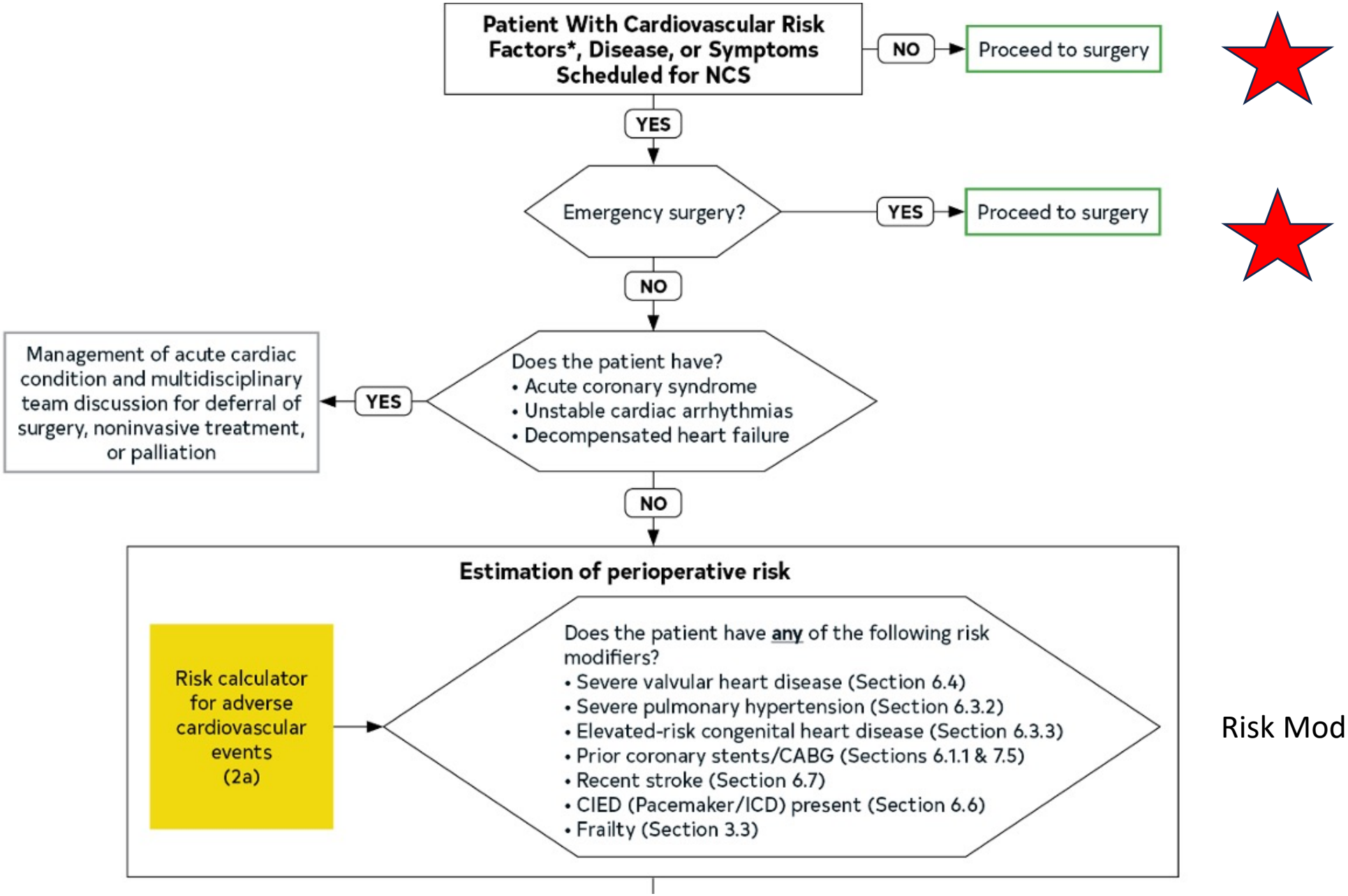
COR	LOE	Recommendations
2b	B-NR	1. For patients undergoing elevated-risk NCS with poor or unknown functional capacity and elevated risk for perioperative cardiovascular events based on a validated risk tool, stress testing may be considered to evaluate for inducible myocardial ischemia.
3: No benefit	B-R	2. In patients who are at low risk for perioperative cardiovascular events, have adequate* functional capacity with stable symptoms, or who are undergoing low-risk procedures, routine stress testing before NCS is not recommended due to lack of benefit.

No Class 1 indications for stress testing

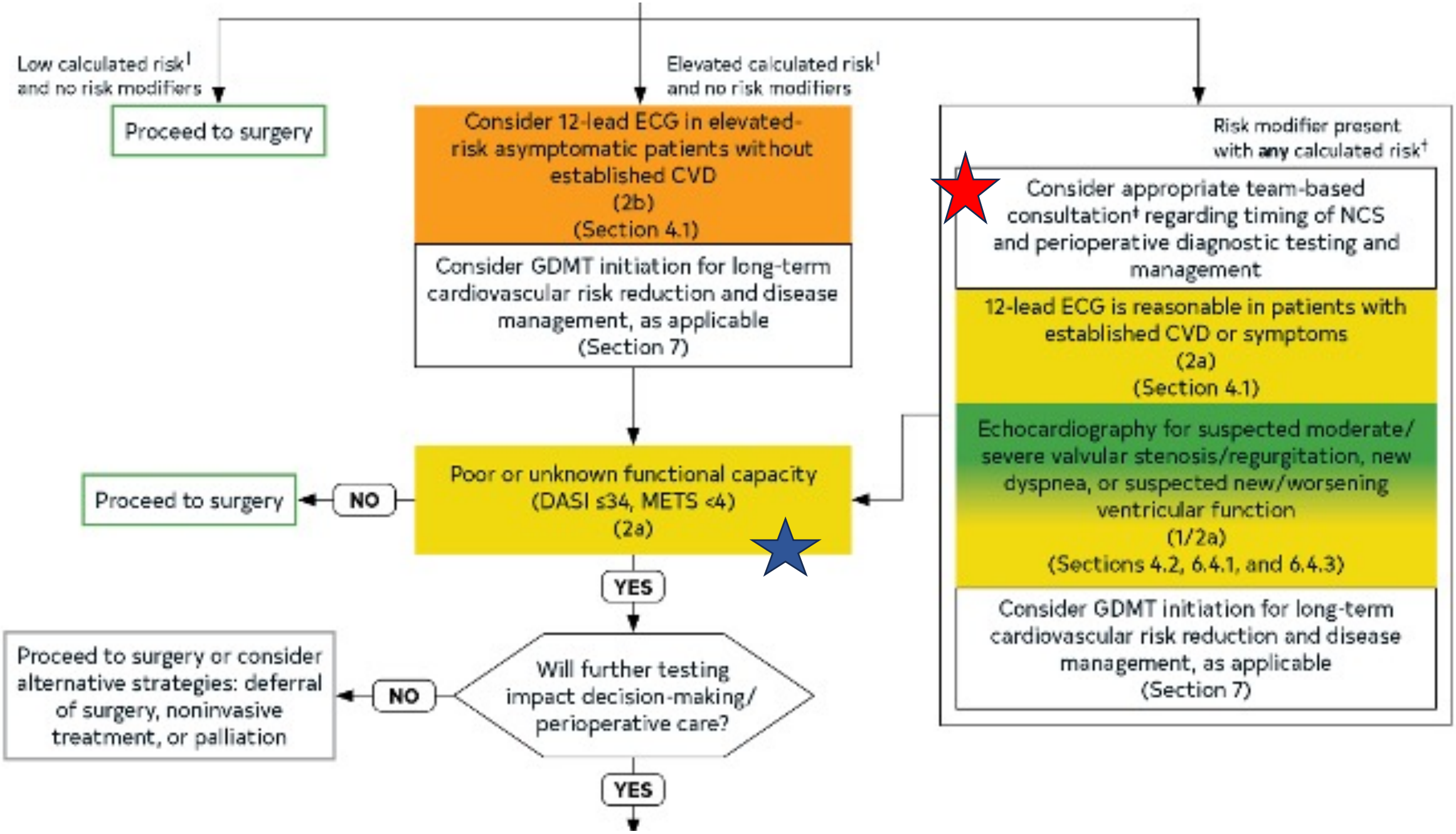
Coronary CTA

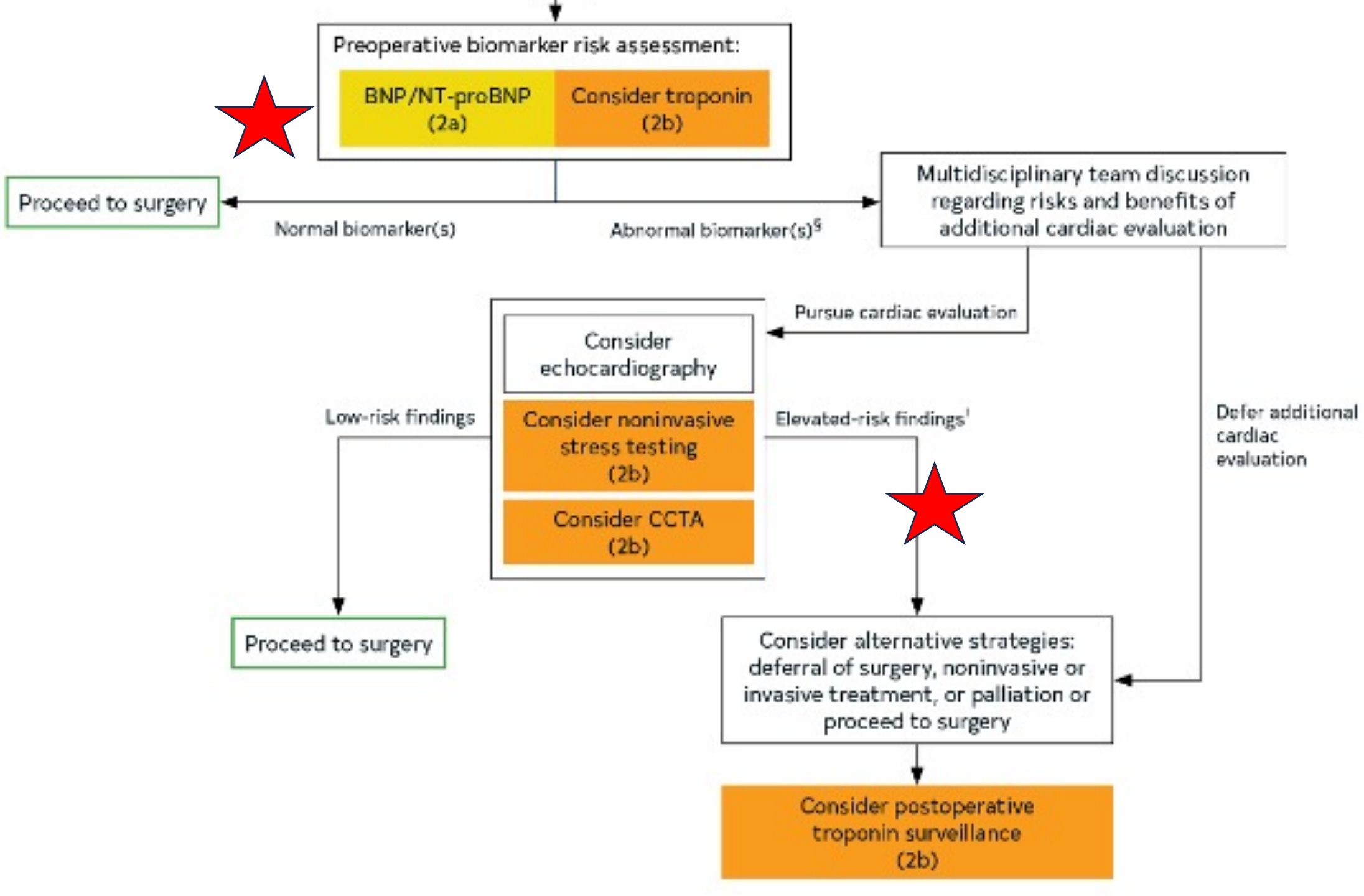
COR	LOE	Recommendations
2b	B-NR	1. For patients undergoing elevated-risk surgery with poor* or unknown functional capacity, and elevated risk for perioperative cardiovascular events based on a validated risk tool, coronary computed tomography angiography (CCTA) for the detection of high-risk coronary anatomy† may be considered.
3: No benefit	B-NR	2. In patients who are at low risk for perioperative cardiovascular events, have adequate* functional capacity with stable symptoms, or who are undergoing low-risk procedures, routine CCTA before NCS is not recommended due to lack of benefit.

Invasive Coronary Angiography		
COR	**LOE**	**Recommendation**
3: No benefit	**C-LD**	**1. In patients undergoing NCS, routine preoperative invasive coronary angiography (ICA) is not recommended to improve perioperative outcomes.**



Risk Modifiers


Low calculated risk[‡] and no risk modifiers
Proceed to surgery
Elevated calculated risk[‡] and no risk modifiers
Consider 12-lead ECG in elevated-risk asymptomatic patients without established CVD (2b) (Section 4.1)
Consider GDMT initiation for long-term cardiovascular risk reduction and disease management, as applicable (Section 7)
Poor or unknown functional capacity (DASI ≤34, METS <4) (2a)
NO
Proceed to surgery
YES
Will further testing impact decision-making/ perioperative care?
NO
Proceed to surgery or consider alternative strategies: deferral of surgery, noninvasive treatment, or palliation
YES
Risk modifier present with any calculated risk[†]
Consider appropriate team-based consultation[†] regarding timing of NCS and perioperative diagnostic testing and management
12-lead ECG is reasonable in patients with established CVD or symptoms (2a) (Section 4.1)
Echocardiography for suspected moderate/severe valvular stenosis/regurgitation, new dyspnea, or suspected new/worsening ventricular function (1/2a) (Sections 4.2, 6.4.1, and 6.4.3)
Consider GDMT initiation for long-term cardiovascular risk reduction and disease management, as applicable (Section 7)


Preoperative biomarker risk assessment:
BNP/NT-proBNP (2a)
Consider troponin (2b)
Proceed to surgery
Normal biomarker(s)
Abnormal biomarker(s)§
Multidisciplinary team discussion regarding risks and benefits of additional cardiac evaluation
Pursue cardiac evaluation
Consider echocardiography
Consider noninvasive stress testing (2b)
Consider CCTA (2b)
Low-risk findings
Elevated-risk findings‖
Defer additional cardiac evaluation
Proceed to surgery
Consider alternative strategies: deferral of surgery, noninvasive or invasive treatment, or palliation or proceed to surgery
Consider postoperative troponin surveillance (2b)

Preoperative assessment; keep it simple

- No risk factors, emergency surgery, or low cardiac risk with good functional status?
  - Proceed to surgery
- Low risk surgery/procedure (endoscopy, lap chole, etc)
  - Proceed to surgery
- Presence of patient modifiers
  - Consider additional workup
- Frailty and poor functional status
  - Consider additional workup
- Cardiac symptoms
  - Routine workup/management regardless of their need for surgery
- Biomarkers
- Routine coronary intervention for SIHD prior to surgery
  - Not recommended (3)
  - Left main (2a)
- Recent CVA or TIA
  - Delay surgery 3 months

Perioperative medication management

- Statin
  - Continue to reduce MACE (1b)
  - Statin naïve, if patient meets guidelines based on ascvd history of 10 year risk, initiate statin (1b)
- Renin-Angiotensin-Aldosterone System Inhibitors
  - If on for chronic HFrEF, continue (2a)
  - In select patients undergoing high risk surgery reasonable to hold for 24 hours (2b)
  - Poor surgical outcomes if systolic >180 mm Hg
- Clonidine- Do not begin perioperatively (3b)
- Antiplatelets
  - Timing is important
  - Prior CAD with remote pci continue aspirin
  - ACS with recent coronary intervention recommendations remain to continue for 12 months to minimize perioperative MACE (1)
  - PCI for chronic SIHD for elective surgery, reasonable to delay surgery 6 months (2a)
  - Other scenarios time sensitive surgery, 3 months (2b)

Perioperative medication management

- Beta Blockers
  - Patients on stable beta blockers should be continued (1b)
  - New indication for bb? OK to begin if far enough out from surgery, >7 days (2b)
  - In patients with no immediate need for beta blocker, they should not be initiated on the day of surgery due to increased post operative mortality (3b HARM)
- Oral anticoagulation
  - Not high risk, ok to hold
  - High risk?
    - Recent VTE (<3 months)
    - AF--> Elevated CHADSVASC >7 or score 5-6 with recent neuro event
    - AF with rheumatic heart disease
    - Mechanical mitral valve
    - Any mechanical vale with recent TIA/CA
    - Caged ball or tilting disc valve
    - LV thrombus (<3 months)
    - Recent cardioembolic stroke (<3 months)
    - Severe thrombophilia
    - Active cancer with high VTE risk

Bridging?		
2a	C-LD	2. In patients with CVD and high thrombotic risk (Table 14) undergoing NCS where interruption of vitamin K antagonist (VKA) is required, preoperative bridging with parenteral heparin can be effective to reduce thromboembolic risk.
3: Harm	C-LD	3. In most patients with CVD who are undergoing elective NCS where OAC interruption is warranted, routine periprocedural bridging is not recommended due to increased bleeding risk.
OAC Resumption		
2a	C-LD	4. In patients with preoperative OAC interruption, resumption of OAC is reasonable after hemostasis is achieved.

Perioperative medication management

- SGLT2i should be discontinued 3-4 days prior to non cardiac surgery to reduce risk of perioperative metabolic acidosis (1C)
- OK to continue metformin (2A)

Take home messages

- 1. Stepwise approach.
- 2. Cardiovascular screening and treatment of patients undergoing NCS should adhere to the same indications as nonsurgical patient.
- 3. Stress testing should be performed judiciously in patients undergoing NCS and only in patients in whom testing would be appropriate independent of planned surgery.
- 4. Team-based care.
- 5. SGLT2i should be discontinued 3 to 4 days before surgery to minimize the risk of perioperative ketoacidosis.
- 6. Patients with newly diagnosed atrial fibrillation (AF) identified during or after NCS have an increased risk of stroke. These patients should be followed closely.
- 7. Bridge only in high risk patients.

References

1. Thompson et al. 2024 AHA/ACC/ACS/ASNC/HRS/SCA/SCCT/SCMR/SVM Guideline for Perioperative Cardiovascular Management for Noncardiac Surgery: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. JACC. 2024 Nov, 84 (19) 1869–1969.
2. UofL Dept. of Medicine Grand Rounds. University of Louisville Department of Medicine. Oct. 10, 2024.
3. AHA Science. 2024 Guideline for Perioperative Cardiovascular Management for Noncardiac Surgery. Sep. 24, 2024.
4. Bhave SD, et al. JACC. 2024; 10.1016/j.jacc.2024.08.018



If questions feel free call your friendly FHP cardiologist!