

NONCARDIAC SURGERY

Relevant Guidelines

ESC 2022 Guidelines on noncardiac surgery

2022 ESC Guidelines on cardiovascular assessment and management of patients undergoing non-cardiac surgery.
Eur Heart J. 2022

AHA/ACC 2024 Guideline on noncardiac surgery

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

CARDIOVASCULAR ASSESSMENT AND MANAGEMENT OF NONCARDIAC SURGERY

Risk Stratification

Cardiovascular morbidity and mortality in patients undergoing noncardiac surgery are determined by patient-related risk and type of surgery or procedure. Major perioperative cardiac events such as MI are estimated to complicate between 1% and 3.9% of non-cardiac surgery procedures.^{1,2} At 6 months after perioperative myocardial infarction, 36.2% of patients are rehospitalized, and the overall risk of in-hospital death (during the index admission or first rehospitalization) is 17.6%.³ Overall, approximately 1.5% of patients die within 30 days following noncardiac surgery and cardiac complications are the leading cause of postoperative deaths.⁴

Preoperative risk assessment is mandatory in patients with known CVD being considered for noncardiac surgery.^{5,6} Surgical risk estimate according to type of surgery or intervention is presented in Table 1. General recommendations are provided in Table 2 and Figures 1 and 2. There are several indices available for perioperative cardiovascular risk prediction. Perhaps the simplest and most commonly used is the RCRI, with 6 predictors of risk (1 point each):

Ischemic heart disease; Cerebrovascular disease; History of HF; Insulin therapy for diabetes;

Serum creatinine ≥ 2.0 mg/dL; Planned high-risk procedure (intraperitoneal, intrathoracic, or

Vascular surgery).

Although current perioperative risk prediction models place greater emphasis on CAD, patients with HF or AF have a significantly higher risk of postoperative mortality than patients with CAD, and even minor procedures carry a risk higher than previously appreciated.⁷ Laparoscopic procedures carry a similar risk with the open ones due to the pneumoperitoneum required for these procedures.⁸ Regarding vascular interventions, endovascular abdominal aortic aneurysm repair has lower short-term mortality and morbidity than open repair, whereas carotid stenting is associated with a higher rate of stroke or death compared to endarterectomy. Significant angina and the functional capacity of the patient is important for risk prediction. The inability to climb two flights of stairs or run a short distance (<4 METs) indicates poor functional capacity and is associated with an increased incidence of post-operative cardiac events.

For **functional capacity assessment** a tool such as the Duke Activity Status Index [DASI]

is used to stratify the risk of perioperative adverse cardiovascular events (AHA/ACC 2024 GL on Noncardiac Surgery, 2a B-NR) (Table 3).

Frailty assessment is performed using a validated tool such as the Clinical Frailty Scale.⁹

Recommendations are provided in Table 4.

Preoperative Testing

Recommendations are provided in Tables 5 and 6. Assessment of post-operative complications is presented in Figure 3. Specific recommendations for patients with known comorbidities are also provided in relevant Chapters.

Perioperative Medical Therapy

The practice of initiating perioperative beta blockers to reduce perioperative risk is not advised, but in patients already on beta blockers, they should be continued through the perioperative period.^{5,6} The role of pre-operative beta blockers has been questioned since there has been evidence that when started within 1 day or less before non-cardiac surgery and at high doses, they may decrease the rate of periprocedural MI but at the expense of increased strokes, hypotension, and overall mortality (POISE study).¹⁰ In addition, preoperative β -blocker use among patients undergoing non-emergent CABG surgery who have not had a recent MI, is not associated with improved perioperative outcomes.¹¹ They are beneficial in patients who undergo noncardiac surgery in the context of heart failure or a recent MI,¹² and in patients with at least three of the following prognostic factors: renal failure, coronary artery disease, diabetes, and surgery in a major body cavity.¹³ General recommendations are provided in Tables 7 and 8. Recommendations for thromboprophylaxis are presented in Table 9.

Complications

Myocardial injury after noncardiac surgery is defined by elevated postoperative cardiac troponin concentrations that exceed the 99th percentile of the upper reference limit of the assay (Troponin fourth generation ≥ 30 ng/L or hsTnT ≥ 20 – <65 ng/L with an absolute change of ≥ 5 ng/L or any elevation ≥ 65 ng/L or any absolute change ≥ 14 ng/L), and are attributable to a presumed ischemic mechanism, with or without concomitant symptoms or signs.¹⁴ Myocardial injury after noncardiac surgery occurs in $\approx 20\%$ of patients who have major

inpatient surgery, and most are asymptomatic. It is independently and strongly associated with both short-term and long-term mortality, even in the absence of clinical symptoms, electrocardiographic changes, or imaging evidence of myocardial ischemia consistent with myocardial infarction.¹⁴ Assessment and management are presented in Table 10, and Figures 4-6. Recommendations on anaemia are presented in Table 11, and intraoperative management in Table 12 and Figure 7.

References

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