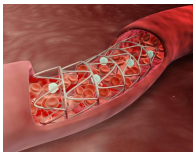
How to manage patients with recent coronary DES who require vascular operations or interventions: what to do about antiplatelet medications; how long to wait before stopping safely; what to do with urgent or emergent cases to avoid DES thrombosis.

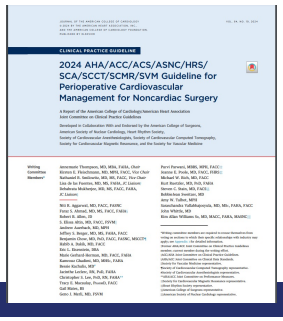
Caron Rockman MD
Chair, Department of Vascular Surgery
Hackensack University Medical Center
Professor of Surgery
Hackensack Meridian School of Medicine



Hackensack Meridian Hackensack University Medical Center

NO DISCLOSURES

Hackensack Meridian Hackensack University Medical Center



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

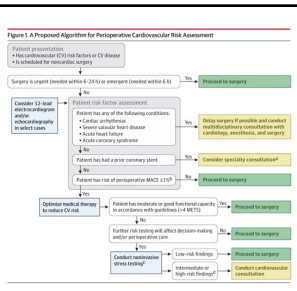
Developed in Collaboration With and Endorsed by the American College of Surgeons, American Society of Nuclear Cardiology, Heart Rhythm Society, Society of Cardiovascular Anesthesiologists, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and the Society for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

Hackensack Meridian Hackensack University Medical Center

- Approximately 17.2 million surgeries are performed annually in the US
- Multiple CV risk factors are present in 45% of patients > 45 years undergoing noncardiac surgery
- Myocardial injury occurs in up to 20% of patients after non cardiac surgery

Perioperative Cardiovascular Risk Assessment and Management for Noncardiac Surgery
A Review

Hackensack Meridian Hackensack University Medical Center

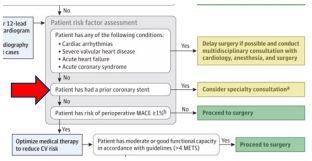


- The type of surgery is associated with the degree of MACE
- Vascular (7.7%), thoracic (6.5%), transplant (6.2%) and general (3.9%) surgeries are associated with the highest incidence of MACE

Perioperative Cardiovascular Risk Assessment and Management for Noncardiac Surgery
A Review

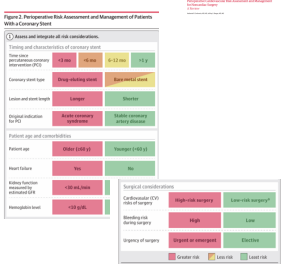
Hackensack Meridian Hackensack University Medical Center

- B blockers
- Antiplatelet medications
- Optimize lipid lowering therapy
- Avoid hemodynamic instability
- Prior coronary stent- DES
- Special considerations



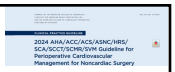
Hackensack Meridian Hackensack University Medical Center

- Should have surgery delayed until the risks associated with delaying surgery outweigh the thrombotic risks of stopping DAPT
- Elective NCS should be delayed for at least two weeks after balloon angioplasty, 30 days after BMS, and 12 months after DES
- Some evidence suggests that 3-6 months may be safe in certain circumstances
- Continuation of (at least) single antiplatelet therapy is recommended.
- Other factors associated with increased perioperative risks after coronary stent placement include longer lengths of the treated coronary lesion and a history of ACS as the indication for stent placement.



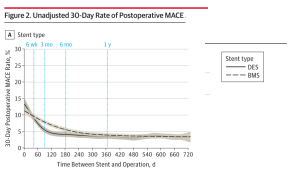
- Surgical trauma leads to:
- Catecholamine surges
- Inflammatory cytokines
- Activation of the clotting cascade
- Platelet activation
- Decreased fibrinolysis…..

- All of which contribute to a thrombotic milieu…….*despite maintaining antiplatelet medications.*



What is the data?

- VA Study of 28,029 patients undergoing 41,989 surgeries within 24 months of PCI reported MACE in:
- 11.6% or surgeries performed within 6 weeks
- 6.4% of surgeries performed 6 weeks – 6 months
- 4.2% of surgeries performed 6 months- 1 year
- 3.5% of surgeries performed > 1 year following PCI



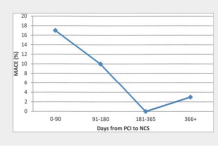
- What is the rate and temporal relationship of MACE in patients undergoing NCS after DES PCI?
- 282 patients analyzed who underwent NCS following PCI with 2nd generation DES
- MACE occurred in 15 patients (15.3%) including 11 deaths.
- Majority (69%) of patients took some form of antiplatelet therapy in the week preceding NCS
- DAPT within 7 days of procedure was highest for those undergoing surgery within 90 days of PCI

Time From PCI to NCS (d)	All Surgeries (n = 282) N	MACE, n (%)	OR (95% CI)	P*
0–90	41	7 (17.1)	6.4 (1.9–21.3)	.027
91–180	30	3 (10.0)	3.4 (0.8–15.3)	
181–365	51	0 (0.0)	—	
366+	160	5 (3.1)	Ref.	

Time From PCI to NCS (d)	Nonemergent Surgeries (n = 256) N	MACE, n (%)	OR (95% CI)	P*
0–90	30	3 (10.0)	3.2 (0.7–14.4)	.445
91–180	27	2 (7.4)	2.3 (0.4–12.7)	
181–365	48	0 (0.0)	–	
366+	151	5 (3.3)	Ref.	

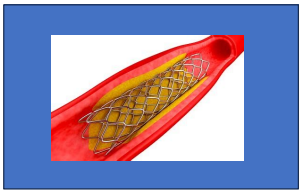
- Incidence of MACE
- 0-90 days 17.1%
- 91-180 days 10%
- 181-365 days 0%
- >366 days 3.1%

Perioperative MACE



- Rate of MACE was:
  - 6.8% for those on DAPT
  - 2.8% for those on aspirin
  - 6.7% for those who were *not* on antiplatelets for one week preceding NCS
- Rate of excessive surgical bleeding was 6.7% and was highest in those on DAPT, but this was not statistically significant
- Maintaining DAPT did not necessarily reduce the associated risk of MACE, and was potentially associated with increased bleeding

- Reviewed 221 patients who underwent 345 NCS following DES
- Incidence of NCS following DES was 4.5% at 1 year, 11.6% after 2 years and 15.4% at 3 years
- 11% had a perioperative complication including 2.2% incidence of major cardiac event.
- Perioperative stent thrombosis occurred definitively in 2 patients (0.7%)



Coronary Artery Disease/Stent Thrombosis After Non

Table 3
Incidence of complications according to time from DES implantation to noncardiac surgery

Time from DES Implantation to Noncardiac Surgery	Months			
	<1.5	≥1.5–6	≥6–12	≥12
All noncardiac surgeries (n = 345)				
Major bleeding	4/13 (30.8%)	2/31 (6.5%)	6/35 (17.1%)	9/266 (3.4%)
MACE	2/13 (15.4%)	1/31 (3.2%)	1/35 (2.9%)	6/266 (2.3%)
Stent thrombosis	0/13 (0%)	0/31 (0%)	0/35 (0%)	2/266 (0.8%)
Surgeries with second-generation DES (n = 278)				
Major bleeding	3/11 (27.3%)	2/27 (7.4%)	6/31 (19.4%)	5/209 (2.4%)
MACE	1/11 (9.1%)	1/27 (3.7%)	0/31 (0%)	4/209 (1.9%)
Stent thrombosis	0/11 (0%)	0/27 (0%)	0/31 (0%)	2/209 (4.1%)

Values are *n* (%).
DES = drug-eluting stent; MACE = major adverse cardiac event.

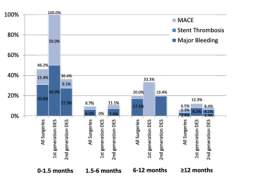
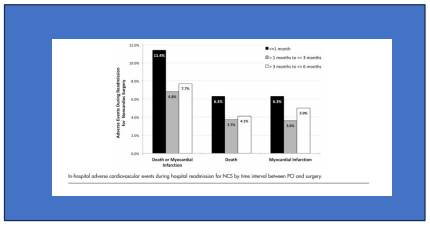


Figure 2. Rates of perioperative MACE, stent thrombosis, and major bleeding classified according to time from DES implantation to noncardiac surgery.

- Nationwide Readmission Database
- Despite clear guidelines to avoid surgery early after PCI, NCS was performed in 1 of every 29 patients with recent PCI
- Among 221,379 patients who underwent PCI and survived to discharge, 3.5% were readmitted for NCS within 6 months post PCI
- 41% of these hospitalizations were elective
- Early NCS was complicated by MI 4.7%, and 21% of perioperative MIs were fatal
- Bleeding noted in 32% of patients
- All cause mortality occurred in 4.4%
- The risk of death or MI was greatest with NCS performed within the first month after PCI

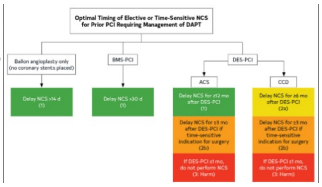


In-hospital adverse cardiovascular events during hospital readmission for NCS by time interval between PCI and surgery.

CLINICAL PRACTICE GUIDELINE

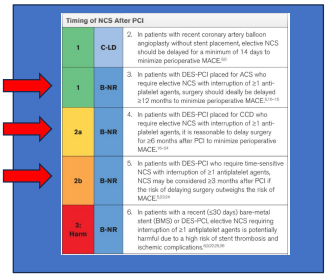
2024 AHA/ACC/ACS/ASNC/HRS/SCA/SCCT/SCMR/SVM Guideline for Perioperative Cardiovascular Management for Noncardiac Surgery

- **Risk of stent thrombosis highest in the first 4-6 weeks after PCI with BMS and in the first 3 months after DES**
- **When time sensitive NCS is necessary within 30 days of BMS or 3 months of DES, DAPT should be continued in the perioperative period if feasible from a surgical bleeding perspective**



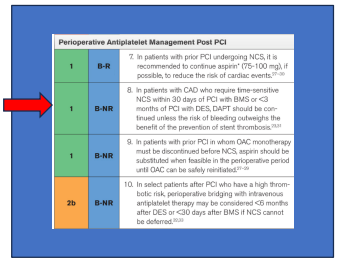
2024 AHA/ACC/ACS/ASNC/HRS/ SCA/SCCT/SCMR/SVM Guideline for Perioperative Cardiovascular Management for Noncardiac Surgery

Hackensack Meridian Hackensack University Medical Center



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

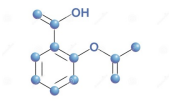
Hackensack Meridian Hackensack University Medical Center



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

Hackensack Meridian Hackensack University Medical Center

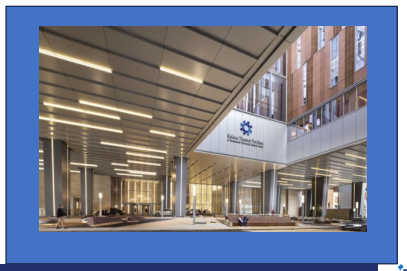
- **Management of patients who require NCS following PCI is complex**
- **Timing of antiplatelet interruption (if necessary) should be balanced against the risks of MACE and thrombotic complications**
- **Risk of perioperative stent thrombosis is likely greatest in the first 4-6 weeks following PCI**
- **Patients with PCI performed for MI have nearly three-fold higher risks of postoperative MACE as opposed to those with chronic coronary disease as the indication for PCI**
- **Ideally, NCS should be postponed at least one year after PCI for ACS, and six months after PCI performed for CCD**
- **When NCS is urgent and must be undertaken, the risks of perioperative MACE, bleeding and mortality remain high.**



Aspirin

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

Hackensack Meridian Hackensack University Medical Center



Hackensack Meridian Hackensack University Medical Center