Current Stress Testing Patterns in the U.S. Warrants Reconsideration

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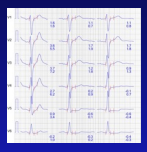
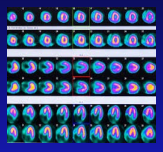
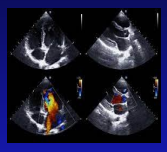

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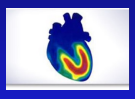
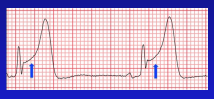
Disclosures

- None

Stress Testing

- There are nearly 4 million stress tests performed annually in the U.S. with an associated cost of $500 million.
- The American Heart Association (AHA) guidelines endorse stress testing for patients with perceived risk of a perioperative cardiac event.

AHA/ACC Guidelines

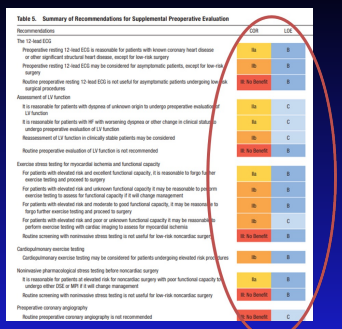


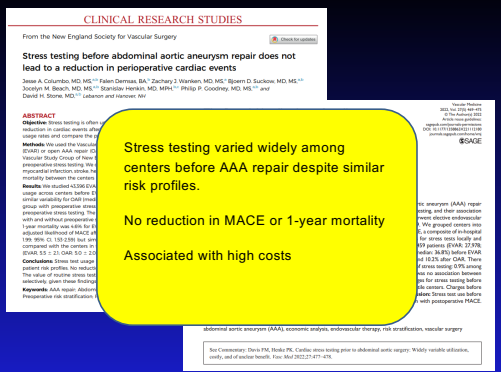
Table 5. Summary of Recommendations for Supplemental Preoperative Evaluation

Recommendations	COR	LOE
The 12-lead ECG		
Preoperative resting 12-lead ECG is reasonable for patients with known coronary heart disease or other significant structural heart disease, except for low-risk surgery	IIa	B
Preoperative resting 12-lead ECG may be considered for asymptomatic patients, except for low-risk surgery	IIb	B
Routine preoperative resting 12-lead ECG is not useful for asymptomatic patients undergoing low-risk surgical procedures	III: No Benefit	B
Assessment of LV function		
It is reasonable for patients with dyspnea of unknown origin to undergo preoperative evaluation of LV function	IIa	C
It is reasonable for patients with HF with worsening dyspnea or other change in clinical status to undergo preoperative evaluation of LV function	IIa	C
Reassessment of LV function in clinically stable patients may be considered	IIb	C
Routine preoperative evaluation of LV function is not recommended	III: No Benefit	B
Exercise stress testing for myocardial ischemia and functional capacity		
For patients with elevated risk and excellent functional capacity, it is reasonable to forgo further exercise testing and proceed to surgery	IIa	B
For patients with elevated risk and unknown functional capacity it may be reasonable to perform exercise testing to assess for functional capacity if it will change management	IIb	B
For patients with elevated risk and moderate to good functional capacity, it may be reasonable to forgo further exercise testing and proceed to surgery	IIb	B
For patients with elevated risk and poor or unknown functional capacity it may be reasonable to perform exercise testing with cardiac imaging to assess for myocardial ischemia	IIb	C
Routine screening with noninvasive stress testing is not useful for low-risk noncardiac surgery	III: No Benefit	B
Cardiopulmonary exercise testing		
Cardiopulmonary exercise testing may be considered for patients undergoing elevated risk procedures	IIb	B
Noninvasive pharmacological stress testing before noncardiac surgery		
It is reasonable for patients at elevated risk for noncardiac surgery with poor functional capacity to undergo either DSE or MPI if it will change management	IIa	B
Routine screening with noninvasive stress testing is not useful for low-risk noncardiac surgery	III: No Benefit	B
Preoperative coronary angiography		
Routine preoperative coronary angiography is not recommended	III: No Benefit	C

ACC/AHA Perioperative Guidelines. Circulation 2014

U.S. Stress Testing: Current State

- There is persistent variation in preoperative stress test utilization to optimally identify at risk patients.
- It is uncertain whether increased testing correlates with a reduction in perioperative cardiac events.



CLINICAL RESEARCH STUDIES

From the New England Society for Vascular Surgery

Stress testing before abdominal aortic aneurysm repair does not lead to a reduction in perioperative cardiac events

Jesse A. Columbo, MD, MS,[1,2] Falen Dermsas, BA,[1] Zachary J. Wanken, MD, MS,[1] Bjoern D. Suckow, MD, MS,[1,3] Jocelyn M. Beach, MD, MS,[1,4] Stanislav Henkin, MD, MPH,[1,2] Philip P. Goodney, MD, MS,[1,5] and David H. Stone, MD,[1,5] *Lebanon and Hanover, NH*

ABSTRACT

Objective: Stress testing is often

Methods: We used the Vascular

Results: We studied 4,558 EVAR

Conclusions: Stress test usage

Keywords: AAA repair; Abdomi

abdominal aortic aneurysm (AAA), economic analysis, endovascular therapy, risk stratification, vascular surgery

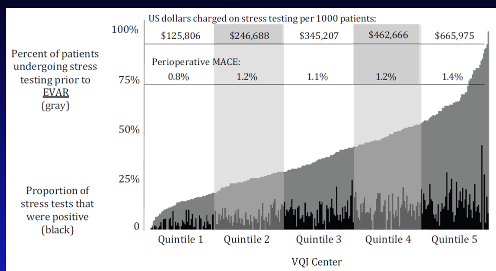
See Commentary: Davis FM, Henke PK. Cardiac stress testing prior to abdominal aortic surgery: Widely variable utilization, costly, and of unclear benefit. *Vasc Med* 2022;27:477–478.

Stress testing varied widely among centers before AAA repair despite similar risk profiles.

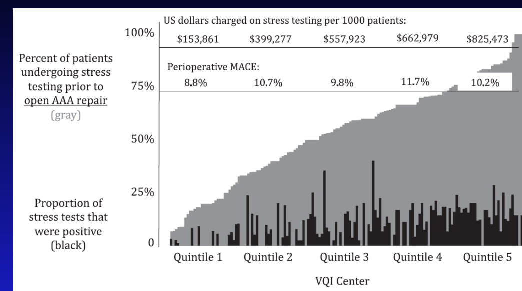
No reduction in MACE or 1-year mortality

Associated with high costs

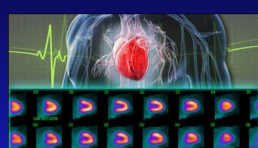
EVAR: MACE and Costs



Open AAA: MACE and Costs



Beyond AAA, what are the current trends in stress testing in American Surgery?



ASA Paper

Increased Preoperative Stress Test Utilization is Not Associated With Reduced Adverse Cardiac Events in Current US Surgical Practice

Jesse A. Columbo, MD, MS,*†‡✉ Salvatore T. Scali, MD,§||¶ Dan Neal, MS,§||¶ Richard J. Powell, MD,*† George Sarosi, MD,§|| Cristina Crippen, RN,§|| Thomas S. Huber, MD,§|| David Soybel, MD,*‡ Sandra L. Wong, MD, MS,*† Philip P. Goodney, MD, MS,*†‡ Gilbert R. Upchurch, MD,§|| and David H. Stone, MD*†‡

Objective: To measure the frequency of preoperative stress testing and its association with perioperative cardiac events.

Background: There is persistent variation in preoperative stress testing across the United States. It remains unclear whether more testing is associated with reduced perioperative cardiac events.

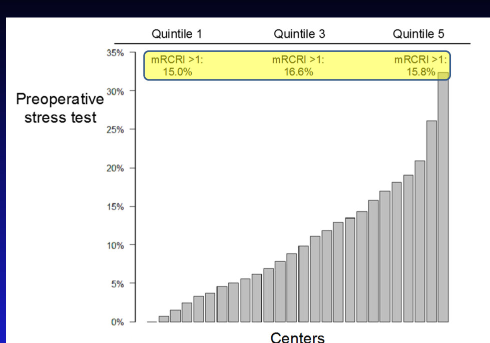
Methods: We used the Vizient Clinical Data Base to study patients who underwent 1 of 8 elective major surgical procedures (general, vascular, or oncologic) from 2015 to 2019. We grouped centers into quintiles by frequency of stress test use. We computed a modified revised cardiac risk index (mRCRI) score for included patients. Outcomes included in-hospital major adverse cardiac events (MACEs), myocardial infarction (MI), and cost, which we compared across quintiles of stress test use.

Keywords: adverse events, MACE, MI, preoperative testing, risk stratification, stresstesting, stress testing, preoperative stress test, Vizient

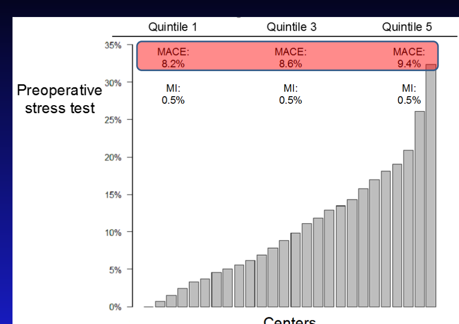
(*Ann Surg* 2023;278:621–629)

Nearly 4 million stress tests are performed annually in the United States, with an estimated associated cost of over $500 million.[1] This undoubtedly reflects the integral role that stress testing currently plays in contemporary preoperative risk stratification paradigms. The most recent American College of Cardiology (ACC) and American Heart Association (AHA) guidelines support preoperative stress testing for patients per-

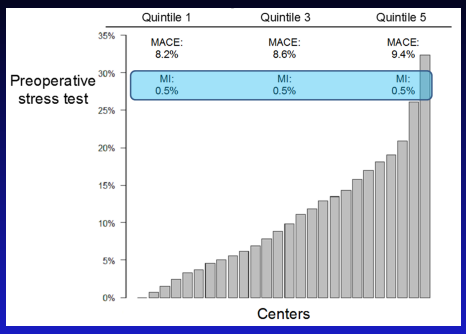
mRCRI:



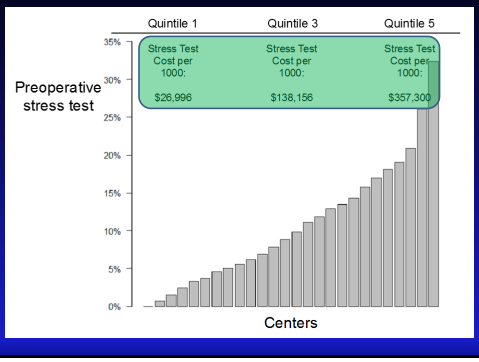
MACE and MI:



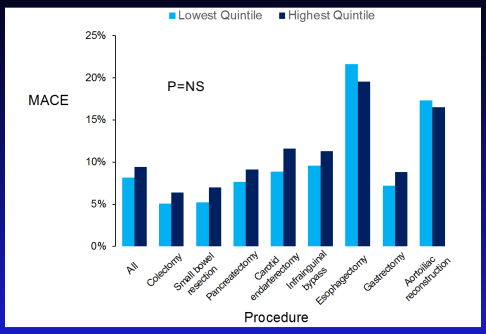
MACE and MI:



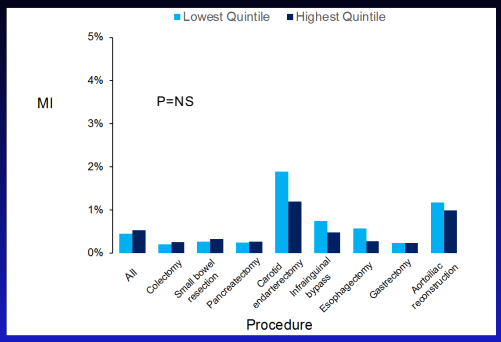
Cost:



Procedure MACE:



Procedure MI:



Summary:

- Current American surgery unnessarily relies on heavy overutilization of stress testing.

•Trends not unique to high risk vascular surgery

- Widespread testing did not lead to a reduction in perioperative cardiac events (MACE)

•Copious testing was associated with significant costs and potential delays in surgery

Conclusions:

- Opportunity to better inform current guidelines to reduce practice heterogeneity

•Streamline preoperative care and reduce costs

•Randomized trial to provide definitive evidence on the rightful role of preoperative stress testing.

Thank You