

The perils of perioperative stress testing

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Story from the Front Lines

A man in his 70s with insulin-dependent type 2 diabetes and remote stroke was seen for pre-operative evaluation for trans-urethral resection of the prostate (TURP). TURP was recommended as a result of chronic urinary retention due to prostatic enlargement requiring Foley catheter placement.

At time of pre-operative evaluation, patient reported chronically decreased exercise tolerance of ~100ft of ambulation limited by dyspnea without exertional chest pain or orthopnea. He also had chronic pitting lower extremity edema but had no rales on examination. A trans-thoracic echocardiogram (TTE) 6 months prior was limited by habitus but was showed likely normal LV function. Patient was referred from pre-operative clinic to cardiology for consideration of repeat echocardiography and stress testing; cardiology recommended TTE with contrast and nuclear stress imaging. While awaiting stress imaging, patient was admitted to another hospital with epididymo-orchitis thought to be due to Foley obstruction. He was treated with a prolonged course of oral antibiotics after discharge. Subsequent TTE confirmed normal LV function. Nuclear stress test with dipyridamole revealed chest pain after dipyridamole infusion and down-sloping ST depression in the lateral leads which was concerning for ischemia. Nuclear imaging was not able to be completed due to machine malfunction. Repeat stress test or direct referral to catheterization were offered to the patient and he opted to pursue cardiac catheterization. Left heart catheterization revealed a 70% stenotic lesion of the first obtuse marginal (OM1) branch and other non-obstructive coronary artery disease (CAD) without flow obstruction. PCI was not pursued without clear symptoms of ischemia. Patient subsequently underwent TURP without complication.

Teachable Moment

In this case we review a patient with high perceived risk of CAD undergoing pre-operative evaluation for noncardiac surgery. The patient did not have exertional chest pain, although his dyspnea on exertion was felt to be a possible anginal equivalent. His chronic lower extremity edema was also concerning for possible occult ischemic cardiomyopathy, although he denied orthopnea and did not have rales on examination.

In order to risk-stratify individuals for peri-operative vascular insult, scoring systems such as the RCRI and NSQIP can be used. This patient's RCRI can be calculated at 2, giving a 6.6% risk of major cardiac event (MACE) [1]. However, the NSQIP calculation showed a 0.7% risk of cardiac complication peri-operatively, based upon patient's total functional dependence, severe systemic illnesses, planned surgery, and multiple other factors [2,3]. Therefore, given a vascular risk of <1% based on the NSQIP calculator, the 2014 ACC/AHA guidelines suggest that the patient should not receive further cardiac testing [4].

Additionally, there is evidence that even if further cardiac evaluation identifies obstructive coronary lesions that patients may not benefit peri-operatively. The theoretical benefit of performing catheterization prior to surgery would be to identify a flow-limiting coronary lesion which could be stented, thereby reducing the risk of peri-operative myocardial infarction. This theory has been tested in previous studies, most notably the Coronary Artery Revascularization

Prophylaxis (CARP) study published in 2004 [5]. Investigators studied patients undergoing elective vascular surgery and randomized those who showed coronary lesions to revascularization or no intervention. Patients were eligible if they had at least a 70% coronary lesion judged to be suitable for revascularization. Patients in CARP had many of the same cardiac risk factors as the case patient, including prior stroke (~19%) and insulin-dependent diabetes (~19%).

In the CARP study there was no difference in 30-day mortality between the study groups. Long term data with a median follow up time of 2.6-2.8 years also demonstrated no benefit of preoperative revascularization. Additionally, 10 patients in the revascularization group died before their planned procedure, whereas 1 patient assigned to not receive revascularization died before their procedure. This study suggests that in patients with stable coronary lesions but who otherwise would not receive revascularization do not benefit from routine revascularization prior to a planned, elective procedure.

If we apply this data to our patient, it suggests that stress testing would not be routinely indicated purely to reduce peri-operative risk. The likelihood of identifying non-obstructive coronary disease in this patient is very high; however, per the CARP trial, revascularization of even a 70% stenotic lesion would not improve this patient's peri-operative outcomes. Initial concerning findings on stress test led to catheterization being performed, causing months of delay for surgery, during which time the patient was hospitalized due to an infection caused by a blocked urinary catheter. Therefore, the CARP trial should give pause to those considering pre-operative stress testing for similar patients undergoing low-risk procedures.

References:

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