Critical Review Form
Diagnostic Test
Shoyeb A, et al. Value of definitive diagnostic testing in the evaluation of patients presenting to the ED with chest pain, Am J Cardiology 2003; 91: 1410-1414.

Summary

Objective: To evaluate the role of stress myocardial perfusion imaging (MPI) in patients hospitalized for the evaluation of chest pain.

Methods: Prospective, non-randomized, observational cohort of "Level III" patients admitted to New York Presbyterian Hospital for evaluation of chest pain from December 2000 to December 2001 with those who had stress MPI compared with those who did not for the endpoints of death or ED recidivism at 3 months.

Guide		Comments
I.	**Are the results valid?**	Answer questions IA, IB, & IC below
A.	**Did clinicians face diagnostic uncertainty?**	Yes, though non-randomized design allows bias in that the reader is unable to determine how results of MPI effected further management decisions (catheterization, CABG, etc.).
B.	**Was there a blind comparison with an independent gold standard applied similarly to the treatment group and to the control group?**	There were no treatment/control groups, as this is an observational design at New York Presbyterian Hospital of "a protocol-driven chest pain diagnosis and treatment plan developed by a multi-disciplinary team of cardiologists,internists, emergency physicians, nurses, and hospital administrators" (p. 1410). Among Level III patients, the "gold standard" cardiac catheterization was performed in 58/509 who had MPI and in 56/686 who did not have MPI. Thus, the majority of patients in this cohort did not have the "gold standard".
C.	**Did the results of the test being evaluated influence the decision to perform the gold standard?**	Most likely (or else why do the test if a positive result is not going to change your post-test management?), but cannot accurately determine cause-and-effect relationship with an observational study design (see discussion below).

II.	**What are the results?**	Answer questions IIA below.
A.	**What likelihood ratios were associated with the range of possible test results?**	One cannot assign cause-and-effect relationships with observational study design, but rather only note associations (statistically significant) between variables and endpoints during the observation period. Thus, results here are not reported as sensitivity/specificity/LR, but rather as the percentage of patients in each group (MPI obtained, MPI not obtained) who went on to have the defined endpoints. Another potential flaw is that the authors assume that patients will return to their hospital for subsequent care. Having said that, the associations the authors' note in the current study are that *patients who had "definitive diagnostic testing" (MPI and/or cardiac catheterization) at the index ED visit had a lower incidence of MI (0.9% versus 2.1%) and death (0.4% versus 3%, p<0.001) than those who did not have diagnostic testing.*
III.	**How can I apply the results to patient care?**	Answer questions III A-D below.
A.	**Will the reproducibility of the test result and its interpretation be satisfactory in my clinical setting?**	The rates of AMI (2% in each study) and USA (14% Shoyeb and 11% Udelson) appear consistent across studies and probably approximate most academic hospitals. Without clearly defining who had exercise stress test (EST) and who had MPI, it is uncertain whether the same results would be obtained by different physicians (testing bias). Furthermore, without a kappa analysis (or even a raw agreement score), we are uncertain about the reproducibility of their EST or MPI, or more importantly, of their assignment of patients to Tatum's Level II, III, or IV which is crucial to reproducing these study results.

B.	**Are the results applicable to the patients in my practice?**	Based upon Table 1 (p. 1412), the patient's seem similar to those at BJH.

C.	**Will the results change my management strategy?**	Not really, since those presenting with a suspicious history and non-diagnostic EKG (Tatum Level III) already merit provocative testing, in my opinion. This study will provide some evidence to support your case, though, if admitting consultants feel outpatient evaluation is safe. The main shortfall of this paper, as alluded to above, is that it is observational (i.e., non-interventional). Cause-and-effect cannot reliably be determined. For instance, what if a disproportionate number of those not evaluated with definitive diagnostic testing had a terminal illness. This would explain increased death rates and probably would explain lack of testing (why test for something for which treatment would not improve mortality?). Table 1 does not account for such underlying illness. Furthermore, the study design does not delineate if repeat ED visits were related to chest pain or whether deaths were of a cardiac etiology. Therefore, the study requires verification in a RCT fashion (if you believe such a study to be ethical). Until such verification is available, however, this observational study represents the some of the best-available evidence as to the diagnostic utility of imaging ED chest pain patients.
D.	**Will patients be better off as a result of the test?**	Yes, if it improves utilization of definitive diagnostic testing.

<u>Bottom Line:</u> 10% of those with definitive diagnostic testing performed during the index ED visit returned for subsequent repeat ED visits compared to 15% of those with no definitive diagnostic testing. Of those who returned who had definitive diagnostic testing, 4% had a normal stress test and 19% had an abnormal stress test. The 3-month mortality was 0.4% for those with diagnostic testing and 3% for those without. Definitive diagnostic testing of adult ED chest pain patients with low- to moderate- pre-test probability by a modified Tatum classification may reduce ED recidivism and 3-month mortality.