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US PREVENTIVE SERVICES TASK FORCE STATEMENT ON THE EVALUATION OF NONTRADITIONAL RISK FACTORS FOR CARDIOVASCULAR DISEASE

Cardiovascular disease (CVD) risks have been traditionally assessed by using Framingham Risk Score per the recommendation by US Preventive Services Task Force (USPSTF) in 2009 or Cohort Pooled Equations. There have been concerns, however, that these scoring models often overestimate or underestimate the risks of CVD events and mortality in certain populations and lack an accurate prediction of these events in asymptomatic individuals with nontraditional risk factors. This issue of *CLIPs* briefly summarizes the current literature regarding the efficacy and applicability of additional screening tests for cardiovascular diseases. If you need further information, please contact the Center for Healthcare Innovation and Patient Outcomes Research (CHIPOR) at chipor@samford.edu.

Curry SJ, Krist AH, Owens DK, et al. Risk assessment for cardiovascular disease with nontraditional risk factors: US preventive task force recommendation statement. *JAMA.* 2018;320(3):272-280. doi:10.1001/jama.2018.8359

Introduction

- CVD is a leading cause of death in the United States and is responsible for one third of all deaths each year; therefore, identification of modifiable CVD risk factors and initiation of behavioral changes and preventive therapy accordingly have been critical in prevention of CVD events and mortality.
- Previously, the CVD risks have been quantified and classified via Framingham Risk Score or Pooled Cohort Equations scoring models using traditional risk factors such as advanced age, male sex, total cholesterol, HDL, smoking status, blood pressure (BP), and recently, race/ethnicity and co-morbid diabetes.
- Recent literature, however, suggested that the accuracy of such traditional scoring models can be improved by utilizing nontraditional risk assessment tools, such as ankle-brachial index (ABI), high-sensitivity C-reactive protein (hsCRP), and coronary artery calcium (CAC) score, as evidenced in clinical practice.
- The USPSTF conducted a systematic review of current literature on these assessment tools to evaluate their validity and applicability to practices and weighed benefits and harms associated with each test.

Coronary heart disease risk assessment tools

- Ankle-brachial index calculates the ratio of the systolic BP (SBP) at the ankle to the SBP at the brachial artery. Ratios less than 0.9 indicates the presence of peripheral artery disease.
- High-sensitivity C-reactive protein is a serum protein which is elevated in response to inflammation and activation of immune system and a level greater than 2-3 mg/L is associated with increased cardiovascular risks.
- Coronary artery calcium score measures the calcium content in the coronary arteries via computed tomography imaging and has a varying degrees of scoring systems.
- A total of 10, 25, and 19 articles, respectively, have been published evaluating the ABI, hsCRP level, and CAC scores.
- The USPSTF reviewed whether addition of these tests to previous assessment models improved calibration, discrimination, or risk reclassification.

Assessment

Ankle-Brachial Index

- One meta-analysis demonstrated improved discrimination when ABI was added to Framingham score, but only for female patients. However, a separate analysis per ethnic group did not find improvement when ABI was added to Pooled Cohort Equation.

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Assessment (continued)

Ankle-Brachial Index

- Addition of hsCRP was associated with inappropriate placement of patients in a higher-risk group leading to reclassify patients without CVD events to be inappropriately placed in the higher-risk group.
- Two randomized clinical trials (RCTs) compared ABI alone vs. traditional care to determine the need of chronic aspirin therapy in eligible patients for prevention of a CVD event after 7-year follow-up and found no benefit.
- One RCT demonstrated reduced mortality in patients who were screened for hypertension, abdominal aortic aneurysm, and peripheral artery disease using ABI compared to patients who did not receive any screening; however, the investigators were unsure which component of the triple screening contributed to the benefit.

High-Sensitivity C-Reactive Protein

- One study showed that adding hsCRP to the Pooled Cohort Equations did not yield an improvement in discriminations; and other studies illustrated a small to no improvement which were incongruent among studies.
- One RCT compared hsCRP vs. traditional care to assess the need of high-intensity statin therapy and concluded that hsCRP group resulted in a reduction of CVD events at 1.9-year follow-up; however, most patients were already candidates for high-intensity statin therapy per traditional care. The clinical applicability of the data is unknown.

Coronary Artery Calcium (CAC) Scores

- Most studies indicated that adding CAC scores to traditional risk assessment models yielded a small to large improvement in discrimination.
- Four studies which added CAC scores to the Pooled Cohort Equations demonstrated a very small to a small improvement to the area under the curve.
- Addition of CAC scores was associated with an inappropriate placement of patients in the higher-risk group.
- One study found no benefit in using CAC scores to determine the initiation of high-intensity statin therapy compared to the traditional care.
- Potential harm could occur when patients are exposed to radiation for testing.

Clinical Considerations

- Only CAC was associated with improvement in discrimination when added to the traditional risk assessment models.
- Generally, ABI, hsCRP, and CAC scores led to the more accurate reclassification of patients with a CVD event to the higher-risk group; but ABI and CAC scores also incorrectly graded the risk of atherosclerotic cardiovascular disease (ASCVD) in patients without a CVD event history.

Limitations

- The USPSTF did not consider the burden of patients on the cost of diagnostic tests into a consideration.

Conclusion

- Current literature is insufficient to justify benefits and harms of adding of ABI, hsCRP levels, and CAC scores as risk assessment tools to existing scoring models.
- Additional studies are needed that compare traditional risk assessment to traditional risk assessment plus the ABI, hsCRP levels, and CAC scores in a well-designed, prospective manner to demonstrate the clinical importance of values.