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| **2L — Exercise ECG for screening for coronary heart disease** |
| **Summary of Intervention** |
| Exercise electrocardiogram (ECG) is a type of cardiac stress test that should no longer be used to screen for coronary heart disease (CHD).  **This guidance applies to adults aged 19 years and over.** |
| **Number of interventions in 18/19** |
| **45,745** |
| **Proposal** |
| Exercise ECG has no role in the screening of asymptomatic and low risk patients for coronary heart disease because it has a very low pre-test probability of identifying pathology. Risk calculators, such as Systematic Coronary Risk Evaluation (SCORE), are instead recommended to identify patients who are at greater risk of CHD.  Under the guidance of cardiologists, the test has a limited role for diagnosis in selected patients with symptoms suggestive of CHD, and/or where CHD has been diagnosed to confirm functional capacity or severity. |
| **Rationale for Recommendation** |
| In randomised control trials, screening with exercise ECG in asymptomatic patients found no improvement in health outcomes, even when focussing on higher risk populations such as those with diabetes. There is no research examining whether the addition of exercise ECG to traditional CHD risk factors results in accurate reclassification, however cohort studies looking at the role of resting ECG abnormalities found inconsistent impact on clinical  decisions.  Reliability of exercise ECG testing varies based on many features including age, gender and known history of CHD, which significantly limits its utility as a screening tool. ECG sensitivity has been cited as 45-50% and specificity of  85-90%. Sensitivity and specificity data of exercise ECG testing is dependent upon the cohort of patients being studied: sensitivity is higher in patients with triple-vessel disease, and lower in patients with single-vessel disease.  Gender differences mean that exercise ECG is only moderately specific for the diagnosis of CHD in women. The European Society of Cardiology (ESC) recommend the use of a risk-estimation system i.e. SCORE to calculate total risk estimation for asymptomatic patients >40 years of age without evidence of diabetes, chronic kidney disease, cardiovascular disease, or familial hypercholesterolemia. The assessment of a family history of premature CVD is recommended. A validated clinical score should be used in patients <50 years of age who have a family history of premature CVD in a first-degree relative.  In asymptomatic but high-risk adults (with diabetes, a strong family history of CVD, or when previous risk-assessment tests suggest a high risk of CVD), functional imaging or coronary CTA may be considered for cardiovascular risk assessment.  For people at low risk of cardiovascular disease, the potential harms of screening with exercise ECG is thought by some (including the US Preventative Service Task Force) to be equal to or exceed the potential benefits. For people at intermediate to high risk, current evidence is thought to be insufficient to assess the balance of benefits and harms of screening.  Therefore, the US Preventative Services Task Force recommends against screening for CHD with resting or exercise ECG in adults at low risk for CHD events.  Chou et al cite that exercise ECG screening has not been shown to improve patient outcomes and is instead associated with potential harms due to false-positive results leading to potentially unnecessary tests and procedures.  Overall in asymptomatic patients without a history of CHD, the potential harms of exercise ECG (which includes arrhythmias, acute MI, sudden cardiac death and harms of subsequent angiography or revascularisation procedures after abnormal test) are considered by many to exceed the screening benefit. However, literature examining the frequency of these harms is lacking. |
| **References** |
| 1. NICE Guidance. Chest pain of recent onset: assessment and diagnosis. 2016: https://www.nice.org.uk/guidance/cg95.  2. Jonas D, Reddy S, Middleton J et al. Screening for cardiovascular disease risk with electrocardiography: an evidence review for the US preventative services task force. Rockville MD: Agency for healthcare research and  quality. 2018.  3. Jin J. Screening for cardiovascular disease risk with ECG. JAMA, 2018; 319:22.  4. Koskinas K. Appropriate use of non-invasive testing for diagnosis of stable coronary artery disease. J Cardiology practice. 2014:12. Chou R. et al. Cardiac screening with electrocardiography, stress echocardiography, or myocardial perfusion imaging: advice for high-value care from the American College of Physicians. Ann Intern Med. 2015 Mar  17;162(6):438-47. doi: 10.7326/M14-1225.  5. Juhani Knuuti, et al. ESC Scientific Document Group, 2019. ESC Guidelines for the diagnosis and management of chronic coronary syndromes: The Task Force for the diagnosis and management of chronic coronary syndromes of  the European Society of Cardiology (ESC), European Heart Journal: https://doi.org/10.1093/eurheartj/ehz425. |