Editorials

Downsides of Detecting Atrial Fibrillation in Asymptomatic Patients

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See related Putting Prevention into Practice on page 383 and related U.S. Preventive Services Task Force Recommendation Statement at https://www.aafp.org/afp/2019/0315/od1.html.

The rise in the number of people who are obese and the fact that people live longer and with more comorbid conditions have led to an increase in the prevalence of atrial fibrillation (AF), a condition associated with stroke and heart failure.[1,2] AF is often asymptomatic. Oral anticoagulants are an accepted therapy for selected patients with AF. These factors have led some physicians to promote screening for AF.[3] The proliferation of devices capable of recording the heart rhythm has further increased enthusiasm for early detection.

Although early detection of disease has appeal, screening for AF presents several practical challenges.[4] These include low overall prevalence in the screened population, excess costs, poor specificity of tests for AF, harms from misdiagnosis and overtreatment, and lack of understanding of the natural history of screen-detected AF. The U.S. Preventive Services Task Force recently concluded that current evidence is insufficient to assess the balance of benefits and harms of screening for AF with electrocardiography (ECG).[5]

The Swedish STROKESTOP study illustrates the problem of low prevalence.[6] Using intermittent ECG recordings in more than 7,000 people 75 or 76 years of age, the authors found new AF on the initial ECG in 0.5% of the screened group. Thus, in this ideal population, the number needed to screen (NNS) to detect one person with AF is 200. Assuming an absolute stroke risk reduction of 2% with oral anticoagulants (number needed to treat = 50), the NNS to prevent one stroke is 10,000. In younger populations with a lower prevalence of AF, the NNS would be substantially higher.

The cost of screening that many people to prevent one event will likely exceed the cost of treating patients with stroke. For example, at an estimated ECG price of $40 (reasonable fair price; https://healthcarebluebook.com/) and a yearly oral anticoagulant price of $100, it would cost $1.4 million ([40 + 100] × 10,000 NNS) to prevent one stroke in people older than 75 years. Given a more realistic cost of $500 yearly (or more) for newer anticoagulants, the cost then increases to $5.5 million to prevent one stroke. That cost is further increased by downstream effects of medical care for true- and false-positive diagnoses of AF plus any incidental ECG findings (e.g., premature ventricular contractions).

The specificity of a test measures its ability to correctly identify those without the disease. The British Screening for Atrial Fibrillation in the Elderly (SAFE) study reported a 90% specificity for ECG findings obtained by general practitioners or nurses.[7] False-positive rates of 10% or more have been confirmed with computer reads of 12-lead ECGs,[8,9] the iPhone ECG,[10] and artificial intelligence–enhanced smartwatch detection of AF.[11] Screening with pulse palpation has a far lower specificity of 70% to 77%.[12] Causes of false-positive AF recordings include premature atrial contractions, premature ventricular contractions, atrial tachycardias, and, most commonly, unrecognized baseline artifact.

People can now have their heart rhythms recorded with an ECG rhythm-strip app on the Apple Watch. If we assume a screened population of 10 million watch owners, a 90% specificity for the recording, and a generous estimate of AF prevalence of 2%, 200,000 people will have AF and 9,800,000 will not. Multiplying the 10% false-positive rate by the 9.8 million people without AF leads to a misdiagnosis of AF in nearly 1 million people for every 10 million screened. If millions seek medical treatment, that would lead to iatrogenic harm from complications of diagnostic testing, bleeding from unnecessary anticoagulation, and anxiety from having a cardiac diagnosis. The prevalence of AF in the population of watch users is likely to be far lower than that in medical studies involving older individuals, such as those in the STROKESTOP study.

To date, no study of AF screening has measured outcomes. We know that AF screening leads to higher rates of detection, office visits, and prescriptions for anticoagulants.[13] Even if screening could be restricted to higher risk individuals, it is not clear that this would lead to better outcomes.

Despite decades of research, the natural history of AF remains poorly understood. Whereas epidemiologic studies find that AF is associated with stroke, links between AF and stroke fail to fulfill many of Hill's criteria for causation.[14] AF does not fit the temporality criteria[15]; it fails in the specificity criteria because many strokes in patients with AF stem from vascular disease rather than cardiac emboli[16]; and it fails the accordance with evidence criteria[17] suggesting that rhythm-control drugs would reduce stroke risk, which they do not.[18]

Another knowledge deficit is the uncertainty surrounding untreated stroke risks. A systematic review of patients with AF who were not treated with anticoagulants found a large variation in stroke risk, ranging from 0.4% to 9.3% per year, which persisted across any single CHA_2DS_2-VASc (congestive heart failure; hypertension; age 75 years or older [doubled]; diabetes mellitus; prior stroke, transient ischemic attack, or thromboembolism [doubled]; vascular disease; age 65 to 74 years; sex category) score.[19] This is problematic

because if the untreated stroke risk is not known, it is difficult to calculate the net benefits of anticoagulation.[20]

Finally, the evidence underpinning anticoagulation stems from trials in the 1990s involving patients with symptomatic AF. Given the decline in stroke rates, improvements in acute stroke care, and current use of devices capable of detecting seconds of AF, it is not known whether anticoagulant medications will deliver net benefit for screen-detected AF or at what threshold to begin therapy. Ongoing trials are studying the use of direct-acting oral anticoagulants vs. aspirin for device-detected subclinical AF.[20]

Despite the lack of outcomes evidence, the rise of wearable ECG sensors will cause many individuals to seek care for misdiagnosed AF. People with false-positive results will require only reassurance. The best intervention for patients with correct diagnoses remains unclear. Primary care physicians must use their skills in discussing uncertainty and aligning care with patients' goals.

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