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EDITORIAL COMMENT

Is Continuous Monitoring for Arrhythmia Advantageous in Low-Risk Groups?*

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Atrial fibrillation (AF) has been a clinical issue because of the risk of ischemic stroke.[1] The number of global AF patients is estimated to be 33 million and continues to increase.[2] The incidence of the stroke depends on CHA_2DS_2-VASc or $CHADS_2$ score. AF causes almost 20% to 40% of ischemic strokes.[3,4] Asymptomatic AF patients have particularly poor outcomes when ischemic stroke presents as the first symptom of AF.[3] Therefore, early detection of AF is one of the critical issues in recent cardiovascular medicine.

Many wearable devices are available now, such as photoplethysmography (PPG)- or electrocardiogram (ECG)-based armbands, rings, wristwatches, and chest belts. Clinical studies have shown their efficacy.[5,6] Also, handheld PPG-based or portable ECG devices have high performance, around 90% sensitivity, and 70%-90% specificity.[5] These reports have clearly shown the usefulness of wearable or mobile devices.

In this issue of *JACC: Asia*, Guo et al[7] reported that PPG-based wearable devices helped AF screening in a large general population. Because AF susceptibility increases with age, it is obvious that wearable devices can frequently pick up AF in this population. However, Guo et al[7] emphasized the importance of continuous monitoring for AF and obstructive sleep apnea (OSA) in the young population, even if they are at low risk for AF. As we know, the existence of OSA is a risk factor for AF.[8]

This study followed 2,852,217 subjects with HUAWEI smart devices that can also detect AF and OSA. Those subjects were monitored for AF and OSA. OSA is classified into 3 groups: low-risk (apnea hypoxia index [AHI] >5 to ≤15), intermediate risk (AHI >15 to <30), and high risk (AHI ≥30). The HUAWEI smart device can detect high-risk OSA with 87.9% accuracy. Subjects who received an AF alert from the devices were referred to medical institutes for further evaluation in this study. Then, 12-lead ECG and 24-hour Holter ECG were performed to confirm the diagnosis of AF.

There were just 0.1% of AF episodes during the first 14 days. But, within 3 years, detected AF episodes increased up to 3.84%. OSA was simultaneously monitored in 961,931 subjects. Among them, 18,032 subjects (1.9%) had been identified as having high-risk OSA. Those OSA-detected subjects had a higher incidence of AF episodes: a 1.16-fold increase in low-risk OSA, a 1.27-fold increase in intermediate-risk OSA, and a 1.5-fold increase in high-risk OSA. These results suggested that device-detected OSA was an AF risk. Thus, PPG- or ECG-based cardiac rhythm monitoring of OSA patients could be reasonable. If OSA were adequately managed, we suppose that AF susceptibility would decrease in those patients.[8] Therefore, early detection of OSA is also essential for early AF detection.

The authors also determined additional predictors of new-onset AF through screening. Palpitation, history of heart failure, hypertension, and diabetes mellitus were risks for AF episodes in the study. As we know, these people are almost the same population as those with high CHA_2DS_2-VASc or $CHADS_2$ scores. Therefore, they would be more encouraged to be monitored to detect AF before an ischemic stroke occurs.

The incidences of AF detection by wearable devices in a low-risk group are not high during

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short-term monitoring, such as <1 year.[9] On the other hand, the survey by Guo et al[7] showed that long-term monitoring could reveal occurrences of AF even in populations thought to be low risk.[7]

Subjects with a low risk for ischemic strokes, such as CHA_2DS_2-VASc score 0 (1 for women) or $CHADS_2$ score 0, do not all require anticoagulants even if new-onset has AF occurred, as long as the AF episodes are paroxysmal. However, anticoagulants should be considered if the detected AF progresses from paroxysmal to persistent AF.[10] Therefore, it may be advantageous to routinely monitor even PAF patients with low risk, because the long-term monitoring in the study by Guo et al[7] revealed that some low-risk patients have long-AF episodes.

Recently, because wearable devices are easily accessible, daily monitoring for the low-risk groups has become a reality. If subjects do not want to use wearable devices daily, weekly methods would be an alternative. In such cases, pulse checks with a sphygmomanometer, handheld PPG, or ECG-based devices can be helpful. These methods are probably sufficient to detect persistent AF that lasts more than a week, pointing out the patients who require anticoagulants.

Intermediate risk was regarded as CHA_2DS_2-VASc score 1, and above CHA_2DS_2-VASc score 2 was regarded as a high-risk population of ischemic stroke.[11] Therefore, those over the age of 65 years should be considered intermediate-risk subjects for ischemic stroke. Furthermore, for intermediate- to high-risk subjects, long-term wearable monitoring, such as PPG- or ECG-based wristbands, is suitable because of its ease of wearing and the benefits of continuous monitoring shown in this study.

AF incidence was higher in subjects older than 65 years than those under 65 years, and higher in subjects older than 75 years than those under 75 years in this study. As higher CHA_2DS_2-VASc or $CHADS_2$ scores subjects would require anticoagulants if wearable devices detected AF, long-term monitoring may be more actively considered in those subjects. Especially for high-risk patients, more intense monitoring may not be excessive because subjects with asymptomatic AF have poor outcomes. In addition, asymptomatic AF is not so rare but is not easy to detect in the early phase.[12] AF duration leading to cardiogenic stroke is considered shorter in high-risk subjects compared with low-risk subjects.[13] Some studies showed that just 6 hours of AF duration in subjects with a higher CHA_2DS_2-VASc score leads to risk of ischemic stroke caused by AF.[14] Therefore, once weekly monitoring seems insufficient to detect short-duration AF for the high-risk population. Mobile monitoring devices such as smartwatches would be recommended for them.

The report from Guo et al[7] brings to the fore new questions in the field of AF monitoring and management. For example, “who is to be monitored” and “how should they be monitored?” Several types of monitoring devices are readily available. AF motoring strategies and devices should be determined depending on each patient’s risk levels.

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