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Guest Editorial

Atrial Fibrillation Screening in Hong Kong – Where Are We Now?

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Atrial fibrillation (AF) is the most common sustained heart rhythm disorder¹ and has become a global epidemic especially in the developed countries with aging population. Although the risk of AF-related stroke can be markedly reduced by 64-70% by oral anticoagulation therapy,² a major challenge remains to be the evasive nature of the condition to be diagnosed early for effective treatment. Around a quarter of patients have silent or asymptomatic AF³ and up to 25% of patients with AF-related stroke have AF diagnosed only at the time of stroke.³⁻⁵

According to the WHO criteria, a disease is suitable for screening when it is an important health problem with an accepted treatment, there are facilities for diagnosis and treatment, there is a latent and symptomatic stage, the natural history is understood, there is an agreed policy on whom to treat, the cost of finding is economically balanced with overall health, the case finding is a continuous process and the screening test is suitable and acceptable to the population.⁶ AF satisfies most of those criteria and currently the European Society of Cardiology recommends opportunistic screening for AF by pulse taking or electrocardiogram rhythm strip in patients over 65 years of age.² Screening for AF in different settings and with different tools have been studied⁷ and in recent few years, researchers in Hong Kong have contributed significantly to the knowledge base in this area.

There were 2 large-scale community-based systematic screening programs carried out in Hong Kong in recent years.^{8,9} In both studies, Kardia mobile device, capable of producing a single-lead wireless smartphone electrocardiogram (sECG) for 30 seconds was used as the tool for screening.¹⁰ Chan et al reported a study aiming to assess the feasibility of community screening for AF using sECG and to generate epidemiological data on the prevalence and risk factors of AF in Hong Kong.⁸ All citizens aged 18 or above were eligible for participation. Among 13,122 (mean age 64.7) citizens, 101 (0.8%) had newly diagnosed AF with 66 (65.3%) being asymptomatic. The mean CHA₂DS₂VASc score was 3.1 in patients with newly diagnosed AF. The number-needed-to-screen (NNS) for one newly diagnosed AF was 129. AF was detected with sECG in 239 (1.8%) citizens and it was likely persistent AF. Apart from those patients, 872 (6.6%) citizens self-reported history of AF without sECG showing it and this likely represents paroxysmal AF. The independent predictors of AF shown in this study included increasing age and height, history of heart failure, valvular heart disease, stroke, hyperlipidaemia, coronary artery disease, peripheral artery disease and cardiothoracic surgery. Chan et al further examined the effectiveness of another community-based AF screening program named the AFinder program, the results of which were recently presented in a late-breaking session of the European Society of Cardiology Congress 2017.⁹ The AFinder program was characterized by being initiated by a panel of cardiologists, led by the Hong Kong Council of Social Service which was a non-governmental organization, and carried out by a group of trained layperson volunteers. All citizens aged 50 or above were eligible for participation. Among 10,735 (mean age 78.6) citizens screened with interpretable sECG's, 244 (2.3%) had AF and 74 (0.69%) had newly diagnosed AF. The

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mean CHA₂DS₂VASc score was 3.9 in patients with newly diagnosed AF. The NNS for one newly diagnosed AF was 145. A nurse performed a 9-month phone follow-up on those patients with AF and assessed the health-seeking behavior of them and for those indicated, whether they were given oral anticoagulation and their compliance. Among 72 patients with newly diagnosed AF and indication for oral anticoagulation, only 47 (65%) of them sought medical attention and more disappointingly, only 17 (24%) of them were prescribed oral anticoagulation. Once they were given oral anticoagulation, most of them (16, 94%) reported 100% compliance to therapy. Compared with the NNS for one newly diagnosed AF, the NNS for one patient receiving appropriate oral anticoagulation for newly diagnosed AF increased 3.6-fold to 671. This seriously underscores the utmost importance of a more structured downstream management pathway being embedded in any AF screening program. The potential of Kardia mobile device for auto-screening for AF has also been assessed in this study. The sensitivity and specificity of the automated algorithm in diagnosing AF were 75% and 98.2% respectively. The positive predictive value and negative predictive value were 64.9% and 99.5% respectively. The suboptimal sensitivity of the current version of algorithm limits its application in auto-screening.

Screening for AF has also been studied in the primary care setting in Hong Kong and different tools have been used.^{11,12} Chan and Siu et al used a smartphone camera-based device capable of diagnosing AF by measuring photoplethysmographic pulse waveform for AF screening in a primary care setting.¹¹ Patients with hypertension and/or diabetes mellitus or were ≥65 years of age were screened. AF was found in 28 (2.76%) of 1,013 participants and 5 (0.5%) had newly diagnosed AF. The sensitivity and specificity of the automated algorithm of the device were 92.9% and 97.7% respectively. The positive and negative predictive value were 53.1% and 99.8% respectively. The same group of researchers reported the use of another device, an automated blood pressure measurement device which is capable of generating an irregularity index based on R-R intervals, for AF screening, again in the primary care setting.¹² Similar to the study described above, they

screened patients with hypertension and/or diabetes mellitus or who were ≥65 years of age. In 5,969 patients recruited, AF was diagnosed in 72 (1.2%) of them. The proportion of patients with newly diagnosed AF was however not mentioned. The sensitivity and specificity of this device in diagnosing AF were 80.6% and 98.7% respectively. The positive and negative predictive value were 42.4% and 99.8% respectively. The overall diagnostic performance as determined by area under curve was 0.90.

AF screening program has also been carried out in specialist medical outpatient clinic in Hong Kong.¹³ Yan et al screened 9,046 (mean age 72.1) patients with the Kardia mobile device and identified 121 (1.5%) patients with newly diagnosed AF, all of whom had CHA₂DS₂VASc score ≥2. In addition, the overall prevalence of AF was 9.4% (850/9,046) in this screened population.

Although increasing data has become available in AF screening in recent years, the questions on what the most appropriate setting is and what the best tool should be remain. Obviously, many of us are looking forward to large and appropriately-powered randomized outcome studies to answer the above questions and in addition, to confirm that systematic AF screening programs can indeed reduce the burden of stroke and the consequent mortality. In Hong Kong, different groups of researchers studied AF screening in different settings and with different tools. However, they have the same passion and vision of reducing the burden of stroke and the consequent disability and deaths in Hong Kong. For any AF screening program to be sustainable, it is essential, at some point in time, to seek support from the government. In Hong Kong, we are now probably at that critical juncture.

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